CALPINE
OSPREY
ENERGY CENTER

Site Certification Application

Volume I
Chapters 1-9

Submitted by

CALPINE
CONSTRUCTION FINANCE
COMPANY, L.P.

Prepared by

Golder Associates

March 2000

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Golder Associates Inc.

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March 16, 2000

Mr. Hamilton S. Oven, Jr.
Siting Coordination Office
Florida Department of Environmental Protection
2600 Blair Stone Road, MS 48
Tallahassee, Florida 32399

Re: Calpine's Osprey Energy Center

Dear Mr. Oven:

Enclosed are three copies of the Site Certification Application (SCA) for the Osprey Energy Center, a natural gas fired electrical power plant that will be built by Calpine Construction Finance Company, L.P. (Calpine), in the City of Auburndale, Florida. The key features and benefits of the Osprey Energy Center are described concisely in the SCA's Executive Summary.

Copies of the SCA are being distributed to the individuals, agencies, and libraries identified in the attached Distribution List. All of these copies of the SCA will be delivered within the next few days.

By copy of this letter, we are requesting the agencies to commence their review of the SCA, in accordance with the provisions of the Florida Electrical Power Plant Siting Act (Sections 403.501-.518, Florida Statutes), so that they can complete their evaluation of the SCA's "sufficiency" in a timely manner. We also hereby request the public libraries to make the SCA available for public inspection.

Golder Associates is serving as Calpine's consultant for this project. Accordingly, please call me at (813) 287-1717 if you have any questions about the SCA. David Dee will serve as Calpine's environmental counsel. Mr. Dee can be reached at Landers & Parsons, at (850) 681-0311. Calpine looks forward to working with you and your staff to achieve an effective review and approval.

Sincerely,

Richard Zwolak, AICP
Associate, Director of Environmental Planning

Attachments: SCA Distribution List

CC: Tim Eves, Calpine
Paul Barnett, Calpine
David Dee, Landers and Parsons
Ken Kosky, Golder
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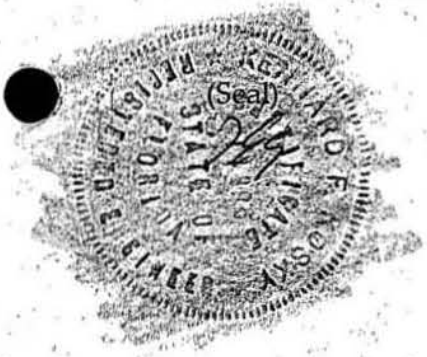
Professional Engineer Statement
for Osprey Energy Center Site Certification Application

I, the undersigned, hereby certify that to the best of my knowledge, there is reasonable assurance that the facility and pollution control equipment described in this Site Certification Application, when properly operated and maintained, will comply with the applicable standards found in the Florida Statutes and the rules of the Florida Department of Environmental Protection.

Kennard F. Kosky

March 10, 2000
Date

Kennard F. Kosky
Professional Engineer Registration No. 14996
Golder Associates, Inc.
6241 NW 23rd Street, Suite 500
Gainesville, Florida 32653-1500



Poor Original

APPLICANT INFORMATION

Please supply the following information:

Applicant's Official Name: ***Calpine Construction Finance Company, L.P.***

Address: ***The Pilot House, 2nd Floor, Lewis Wharf, Boston, MA 02110***

Address of Official Headquarters: ***50 West San Fernando Street, San Jose, CA 95113***

Business Entity (corporation, partnership, co-operative): ***Corporation***

Names, owners etc. ***Calpine Construction Finance Company, L.P.***

Name and Title of Chief Executive Officer: ***Peter Cartwright, Chief Executive Officer***

Name, Address and Phone Number of Official Representative responsible for obtaining certification: ***Paul A. Barnett, The Pilot House, 2nd Floor, Lewis Wharf, Boston MA 02110 Phone: (617) 723-7200 Fax: (617) 723-7635***

Site Location (county): ***Polk County***

Legal Description: ***The West½ of the NW¼, of the NW ¼ of Section 15, Township 28 South, Range 25 East, Polk County, Florida less Road Right-of-Ways.***

Nearest Incorporated City: ***Auburndale***

Latitude and Longitude: ***28°03'09"N, 81°48'30"W***

UTM's Northerly: ***421.0 km Zone 17***
Easterly: ***3101.2 km***

Section, Township, Range: ***Section 15, Township 28S, Range 25E***

Location of any directly associated transmission facilities (counties): ***None***

Name Plate Generating Capacity: ***527 Megawatts (average ambient)***

Capacity of Proposed Additions and Ultimate Site Capacity (where applicable): _____

Remarks (additional information that will help identify the applicant: _____

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NOTE

Original signatures were filed with the Site Certification Application filed with Hamilton S. Oven, Jr., P.E., Administrator, Office of Siting Coordination, Department of Environmental Protection. All copies of the Site Certification Application contain copies of the signature pages.

Original signature pages may be requested by contacting:

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Tampa, Florida 33607

VOLUME I

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ACRONYMS AND ABBREVIATIONS

AAQS	ambient air quality standards
AIG	ammonia injection grid
ANR	American National Resources
ANSI	American National Standards Institute
bpf	blows per foot
BACT	Best Available Control Technology
bcf	billion cubic feet
BLD	below laboratory limits
bls	below land surface
BMP	best management practices
BTI	Boyce Thompson Institute
Btu	British thermal units
Btu/lb	British thermal units per pound
°C	degree Celsius
CAA	Clean Air Act
CALPUFF	California Puff Model
CEM	continuous emission monitoring
CFR	Code of Federal Regulations
CH	fat clay/fat clay with sand
CO	carbon monoxide
CR	County Road
CT	combustion turbine
CTG	combustion turbine generator
dBA	decibels, A-weighted
DCA	Department of Community Affairs
DCS	distribution control system
DHR	Division of Historical Resources
DLN	dry-low nitrogen oxides
EAR	Evaluation and Appraisal Report
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
ET	evapotranspiration
°F	degree Fahrenheit
FAC	Florida Administrative Code
FCG	Florida Electric Coordinating Group
FCREPA	Florida Committee on Rare and Endangered Plants and Animals
FDA	Florida Department of Agriculture
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation

ACRONYMS AND ABBREVIATIONS - continued

FEECA	Florida Energy Efficiency and Conservation Act
FEMA	Federal Emergency Management Agency
FEPPSA	Florida Electrical Power Plant Siting Act
FERC	Federal Energy Regulatory Commission
FGFWFC	Florida Game and Fresh Water Fish Commission
FIRM	Flood Insurance Rate Map
FLUCCS	Florida Land Use, Cover and Classification System
FLUCFCS	Florida Land Use, Cover and Forms Classification System
FNAI	Florida Natural Areas Inventory
FPC	Florida Power Corporation
FRCC	Florida Reliability Coordinating Council
FS	Florida Statutes
ft	feet
ft/d	feet per day
ft-msl	feet above mean sea level
g	gram
g/ha/yr	grams per hectare per year
$g/m^2/s$	grams per square meter per second
gdw	gram dry weight
GEP	good engineering practice
gpd	gallons per day
gpm	gallons per minute
gpd/ft	gallons per day per foot
GPR	ground penetrating radar
GSSR SIR	Geophysical Systems Survey Inc. Subsurface Interface Radar
HHV	higher heating value
HNO_3	nitric acid
HR	hour
HRSG	heat recovery steam generators
Hz	hertz
i	hydraulic gradient
ISCST3	Industrial Source Complex Short-Term Model
k	permeability
K	hydraulic conductivity
kg	kilogram
km	kilometer
kV	kilovolt
kWh	kilowatt-hour
L_{eq}	equivalent sound pressure level averaged for sampling period
LD	leaf damage
LDR	Land Development Regulations

ACRONYMS AND ABBREVIATIONS - continued

LHV	low heating value
LI	Light Industrial
LOS	Level of Service
m	meter
mgd	million gallons per day
mg/l	milligrams per liter
mg/m	milligrams per meter
MH	elastic silt/elastic silt with sand
MIA	Most Impacted Areas
mph	miles per hour
MSSW	Management and Storage of Surface Waters
MW	megawatt
N	nitrogen
NaOH	sodium hydroxide
NEPA	National Environmental Policy Act
NH_4NO_3	ammonium nitrate
NO_2	nitrogen dioxide
NO_3	nitrate
NOAA	National Oceanic and Atmospheric Administration
NO_x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
NWS	National Weather Service
O_2	oxygen
O_3	ozone
OEC	Osprey Energy Center
Pb	lead
PM	particulate matter
PM_{10}	particulate matter with diameter less than 10 microns
POS	plan of study
ppm	parts per million
ppmvd	parts per million, volume dry
PPSA	Florida Electric Power Plant Siting Act
PSC	Public Service Commission
PSD	prevention of significant deterioration
Pz	Piezometer
QA	quality assurance
QA/QC	quality assurance/quality control

ACRONYMS AND ABBREVIATIONS - continued

RARE	Roadless Area Review and Evaluation
RIMS II	Regional Input-Output Modeling System
SACTI	Seasonal and Annual Cooling Tower Impact Model
SAS	surficial aquifer system
SC	clayey sand
SCA	Site Certification Application
scf	standard cubic feet
SCR	selective catalytic reduction
SCRAM	Support Center Regulatory Air Model
SCS	U.S. Soil Conservation Service
SDII	SDII Global Corporation
SEL	sound exposure level
SELS	Severe Local Storms
SHWT	Seasonal High Water Table
SIP	State Implementation Plan
SO_2	sulfur dioxide
SP	poorly graded sand
SP-SC	poorly graded sand with clay
SPCC	Spill Prevention Control and Countermeasure
SPL	sound pressure level
SPPP	Stormwater Pollution Prevention Plan
SPT	standard penetration test
SR	siesmic reflection
SR	State Road
S_s	specific storage
SWFWMD	Southwest Florida Water Management District
S_y	specific yield
T	transmissivity
TBEL	technology-based effluent limitation
TDS	total dissolved solids
TECO	Tampa Electric Company
TNN	Technical Transfer Network
TSP	total suspended particulate
TYP	tons per year
um	micrometers
UFA	Upper Floridan aquifer
USACE	U.S. Army Corps of Engineers
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USCS	Unified Soil Classification System
UV	ultraviolet

ACRONYMS AND ABBREVIATIONS - continued

v	velocity
VOC	volatile organic compound
WSAC	wet surface air cooler
WUPASF	Water Use Permit Application Supplemental Form

EXECUTIVE SUMMARY

Calpine Construction Finance Company, L.P. (Calpine), intends to license, construct, own and operate a new 527-megawatt (MW) power plant in the City of Auburndale, Polk County, Florida. Calpine's new facility, the Osprey Energy Center, will use clean natural gas and state-of-the-art technology to generate electricity in an extremely efficient and environmentally friendly manner. Every aspect of the Project has been designed to minimize the Project's potential impacts on the environment.

This Executive Summary describes some of the key features of the Osprey Energy Center. Additional information about the Project can be found in the Site Certification Application that Calpine filed pursuant to the Florida Electrical Power Plant Siting Act (PPSA).

The Site and Surrounding Areas

The Osprey Energy Center will be built on 19.5 acres of vacant land (the Site) that were used in the past as an orange grove, but now are neglected and overgrown. The Site does not contain any surface water bodies, wetlands, significant wildlife habitat, threatened or endangered species, or historic or archaeological resources. The Site is not within the 100-year floodplain. Therefore, the construction and operation of the Osprey Energy Center will not adversely affect any natural or biological resources on the Site.

The Site is located in an area that has been affected over the years by existing industrial and commercial activities. The Site is bordered on the east by the Auburndale Power Plant (a 150-MW cogeneration facility) and Tampa Electric Company's Recker Substation. Citrus processing plants and other industrial facilities are east of the Auburndale Power Plant. The Site is bordered on the south by Recker Highway and on the north by Derby Avenue. There are several commercial businesses and a few homes along these two roadways in the vicinity of the Site. A cemetery is located along the western border of the Site.

The Project's Air Emissions

The Osprey Energy Center will use the Best Available Control Technology to minimize the facility's airborne emissions. Emissions of nitrogen oxides (NO_x) will be reduced to very low levels (4.0 ppmvd) through the use of modern dry low-NO_x technology and a selective catalytic reduction (SCR) system. Emissions of other pollutants also will be reduced to very low levels by using clean-burning natural gas and advanced combustion turbines.

The Project's impacts on ambient air quality will be minimal. The Project will not cause or contribute to any violations of any state or national ambient air quality standards (AAQS), or any Class I or II increments for the prevention of significant deterioration (PSD) of air quality. The Project's impacts on ambient air quality will be far less than the "significant impact levels" and "de minimis" monitoring levels established under state and national air quality regulations. The Project's impacts on ambient air quality will be three percent or less of the allowable impacts under the AAQS, which have been set by

the U.S. Environmental Protection Agency to protect human health and the environment, including the health of the young, the elderly, and those with respiratory diseases.

Wastewater Discharges

The Osprey Energy Center will not discharge any industrial or domestic wastewater to any surface or ground water. All of the wastewater from the power plant will be sent by pipeline to the City of Auburndale's wastewater treatment facilities for disposal.

Water Supply Sources

Treated domestic wastewater (reclaimed water) will be pumped from the City's Allred Wastewater Treatment Plant to the Osprey Energy Center for reuse. The Project will use all of the reclaimed water that the City of Auburndale's Allred Wastewater Treatment Plant can provide. By maximizing the use of reclaimed water, the Project will minimize its use of ground water, and will reduce the likelihood that the City will dispose of its reclaimed water in Lake Lena Run, a nearby surface water. The supply of reclaimed water will be approximately 800,000 gallons per day when the Project commences operation and will grow to 1.4 million gallons per day (mgd) in the future.

The Osprey Energy Center will implement water conservation measures and will recycle water to the greatest extent possible, but the Project will still need approximately 3.55 mgd of water on an annual average basis. The Project will use reclaimed water, as available, and groundwater from two new on-site wells to satisfy its needs. The Project will use approximately 2.75 mgd (annual average) of groundwater initially, but groundwater use will decrease over time as the supply of Auburndale's reclaimed water increases.

Impacts of Groundwater Withdrawals

The Project's use of groundwater will not adversely affect any wetlands, surface waters or existing legal uses of water. A computer model (Visual MODFLOW) was used to evaluate several different operating scenarios at the Project. The computer analyses demonstrated that the Project's groundwater withdrawals would cause a drawdown at the Site boundary of only 0.36 feet in the surficial aquifer and only 2.80 feet in the Upper Floridan aquifer. These potential impacts are well within the range allowed by the Southwest Florida Water Management District (SWFWMD).

Stormwater Management

The stormwater management plan for the Osprey Energy Center has been designed to comply with all of the applicable requirements of the SWFWMD, Florida Department of Environmental Protection, and the City of Auburndale. During the construction and operation of the Project, stormwater will be collected and routed to detention basins for treatment. Any discharges of treated stormwater from the detention basins will enter the drainage swales along Derby Avenue and Recker Highway. The stormwater drainage patterns and discharges from the Site in the future (post-development) will mimic the current conditions.

Traffic and Other Public Services

During the construction of the Osprey Energy Center, there will be a temporary increase in traffic on local roads, but the roads will continue to operate at acceptable levels (Level of Service "C" or greater). The long-term operation of the Osprey Energy Center will not cause any significant impacts on traffic or public services

Linear Facilities

Calpine is not requesting authorization under the PPSA to build any off-site linear facilities (i.e., electric transmission line corridors, gas transmission pipelines, or water or wastewater pipelines). No new electric transmission line corridor will be needed to connect the Project to the existing state power grid because Tampa Electric Company's Recker Substation is adjacent to the Site. Natural gas will be transported to the Site via a new underground pipeline that will be designed, permitted, owned and operated by Gulfstream Natural Gas Transmission Company, LLC. The City of Auburndale will provide water and wastewater pipelines to the Site.

Zoning and Comprehensive Land Use Plan Designations

Calpine has worked with the City of Auburndale to ensure that the Osprey Energy Center will be in compliance with the applicable land use regulations. Accordingly, the City annexed the Site and then designated it as a "Business Park", pursuant to the City's Comprehensive Plan. The City's Planning Commission and the City Council found that the plans for the Osprey Energy Center are consistent with this land use designation. Auburndale's planned zoning designation for the Site is "LI – Light Industrial". This rezoning is consistent with the land use designation for the adjacent Auburndale Power Plant, which was zoned "LI – Light Industrial" by Polk County.

Land Use Compatibility

The Osprey Energy Center has been designed to minimize any potential impacts on nearby land uses. The major components of the Project have been setback from the property lines to maximize the on-site buffer areas. The buffers on the Site's northern, southern and western sides will be heavily landscaped to enhance the Site's appearance. The major components of the Project (e.g., the combustion turbines) will be placed inside a fully enclosed building, which will reduce ambient noise impacts, minimize contact stormwater, provide other environmental benefits and improve the Site aesthetics. These measures will make the Project compatible with the existing and future land use trends in the area, which are primarily industrial and commercial.

Noise

Calpine will use sophisticated noise suppression techniques and an enclosed building to reduce the Project's impacts on ambient noise levels. The Project will comply with the City's noise standards for residential areas; however, the Project will not comply with the City's current noise standards for industrial areas, which apply along the Site's western boundary, where the cemetery is located. Since the City's noise standards for industrial areas are more stringent than the standards for residential areas, and will work a hardship in this case, Calpine will seek a variance from the City to address this issue.

Economic Benefits

The Project's direct economic benefits will include:

- Approximately $0.8 to $1.16 million annually in additional ad valorem tax revenue to Polk County.
- Approximately $0.9 to $1.3 million annually in additional ad valorem tax revenue to the Polk County School District.
- Approximately 25 new permanent jobs with an average salary of approximately $40,000, plus job benefits that average 30-percent. The total payroll is estimated at $1,000,000 annually.
- Approximately 162 construction jobs (full time equivalent) and construction wages of approximately $13 million that will be paid over the two year construction period.
- A capital investment of about $182 million to build the Project.
- Approximately $500,000 per year to the City of Auburndale in ad valorem taxes, and municipal service fees.

In addition to the direct benefits, numerous indirect benefits will accrue as a result of the construction and operation of the Project.

Environmental Benefits

The Osprey Energy Center will provide a variety of environmental benefits for the citizens of Auburndale, Polk County, and the State of Florida. Among other things, the Osprey Energy Center will fund improvements to the City of Auburndale's wastewater treatment facilities that will:

- Enhance the disinfection that is presently provided by the Allred Wastewater Treatment Plant,
- Enable the City to provide reclaimed water to areas with unrestricted public access when the Project does not use reclaimed water due to Project maintenance,
- Reduce the likelihood that the City will discharge reclaimed water to Lake Lena Run,
- Provide capital for infrastructure improvements between the City's Allred and North Regional Wastewater Treatment Plants so that the City can further reduce the likelihood of discharging reclaimed water to Lake Lena Run, and
- Potentially create an active/passive recreational facility that also may serve as a refuge for wildlife.

The Osprey Energy Center will provide environmental benefits for all Floridians because it will provide a new, clean, cost-effective and energy efficient source of electricity to meet the growing demand for power in Florida.

The Osprey Energy Center will use less fuel than the existing power plants in Florida when producing an equivalent amount of electricity. By comparison to the state's existing facilities, the Project will save 6.85 billion cubic feet (BcF) of natural gas and 1.1 million barrels of oil each year based on a mix of gas and oil.

The Osprey Energy Center also will produce less air pollution than the existing power plants in Florida when producing the same amount of electricity. To the extent that the Osprey Energy Center reduces the use of older, less efficient power plants in Florida, the Project will reduce the amount of air pollution associated with power generation in Florida. Specifically, the Project will reduce total emissions by about 20,000 tons per year (TPY), including 10,600 TPY of NO_x (assuming displacement of the current mix of oil- and gas-fired plants, which is about 41-percent and 59-percent, respectively).

1.0 NEED FOR POWER AND PROPOSED FACILITIES

1.1 INTRODUCTION

1.1.1 THE APPLICANT

Calpine Construction Finance Company, L.P. (Calpine), a San Jose, California-based company, is the applicant for the Site Certification of a gas-fired combined-cycle power plant to be known as the Osprey Energy Center (Project). This new facility will generate electricity for sale at wholesale to other utilities in Peninsular Florida. Electricity from the Osprey Energy Center will enter the electrical grid at Tampa Electric Company's Recker Substation, which is adjacent to the Site.

Calpine's parent company, Calpine Corporation is a San Jose, California-based company, which owns and/or operates, or is developing electrical generating facilities consisting of 67 power plants. Calpine Corporation operates 25 gas-fired and 19 geothermal power plants. It also has 9 power plants under construction, and 14 under development. The aggregate capacity of these plants is 18,197-megawatts (MW) (net ownership of 15,508 MW). The 25 operating gas-fired plants are located in California (7 plants), New Jersey (3 plants), Pennsylvania (2 plants), New York (4 plants), Texas (3 plants), and 1 plant each in Florida, Illinois, Massachusetts, Oklahoma, Virginia, and Washington.

Calpine Corporation has a 50-percent ownership interest in the Auburndale Power Partners, Inc., power plant which is a 150-MW natural gas-fired cogeneration plant in Polk County, Florida, southwest of Auburndale. This plant is located on property adjacent to the east side of the Project Site.

1.1.2 PURPOSE OF SITE CERTIFICATION APPLICATION

Calpine is proposing to own and operate a new 527-MW (average ambient) combined-cycle power plant (Project). The Project will be located on vacant land in Polk County within the city limits of Auburndale, Florida. The proposed Site was selected as the preferred location for the Osprey Energy Center because it has no environmentally sensitive features (e.g., wetlands or surface water bodies), it is adjacent to existing, required infrastructure (e.g., access road, substation and transmission lines, water and sewer pipelines), and is predominantly surrounded

by commercial and industrial development and non-residential uses. Furthermore, the Site's terrain is favorable for power plant siting and the parcel is of sufficient size to accommodate the Project. Locating the Osprey Energy Center at the proposed Site takes advantage of the existing adjacent electrical infrastructure [Tampa Electric Company's Recker Substation and associated 230-kilovolt (kV) transmission lines] and nearby reclaimed water supply/wastewater disposal facilities (Auburndale's Allred Wastewater Treatment Plant on Recker Highway). The Site is a non-producing citrus grove with no onsite surface water or wetland features. Development of this land minimizes potential environmental impacts that might otherwise be associated with the construction of a power plant at a previously undeveloped Site. On a MW per acre basis, this project maximizes the land use while simultaneously minimizing environmental impacts.

The licensing of power plants in Florida requires compliance with federal, state, regional, and local laws, regulations, and ordinances. The primary law governing the licensing of the Project is the Florida Electrical Power Plant Siting Act [FEPPSA, Sections 403.501 to 403.518, Florida Statutes (FS)].

FEPPSA establishes the state's policy toward balancing the needs for increased electrical power generation with the effects on human health, the environment and ecology of the lands and waters within the state. In the site certification process, the Florida Public Service Commission (PSC) is the exclusive forum for the determination of need, and the Florida Department of Environmental Protection (FDEP) acts as the central coordinator of the certification process. Certification begins with the submittal of a Site Certification Application (SCA) to FDEP by the applicant and culminates with approval by the Governor and Cabinet. Implementation procedures are set forth in FEPPSA and Chapter 62-17, Florida Administrative Code (FAC), *Electrical Power Plant Siting*.

This single application, the SCA, is being submitted to the FDEP to describe the Osprey Energy Center and the environmental conditions and impacts associated with the Project. This SCA has been prepared to meet the requirements of the primary law (i.e., FEPPSA) which governs this Project.

Agency and public comments regarding the Project have been obtained through meetings, discussions, and presentations. State, regional, and local agency meetings regarding the Osprey Energy Center were held in December 1999, January 2000, and February 2000. A general public information meeting was held in Auburndale on February 15, 2000.

1.2 NEED FOR THE PROPOSED POWER PLANT

The Project is needed by Calpine to allow Calpine to increase its participation in the Peninsular Florida competitive wholesale power market. The Project is also needed by Peninsular Florida for electrical system reliability and integrity and for adequate electricity at reasonable cost. The Osprey Energy Center is also needed to provide the energy conservation and environmental benefits described herein. The "need for power" issue often encompasses several aspects of need. The following discussion addresses in detail the manner in which the Project meets these needs.

1.2.1 NEED FOR THE PROJECT

As previously stated, Calpine is a wholly owned subsidiary of Calpine Corporation. Calpine will construct, own and operate the Project in a manner that will provide reliable, competitively priced, environmentally clean power in the Peninsular Florida wholesale market without risk to Florida's retail electric customers. As expressed in Federal Energy Regulatory Commission's (FERC) Order No. 888 relating to transmission access, it is the goal of the FERC and the Congress to "remove impediments to competition in the wholesale bulk power marketplace and bring more efficient, lower cost power to the nation's electricity customers." Calpine is developing the Project consistent with the policies of the FERC to create and promote a robust, competitive, wholesale electricity market. The PSC has also recognized that a competitive wholesale electricity market is enhanced by competitive wholesale power plants like the Osprey Energy Center: "Merchant plants increase wholesale competition thereby in theory lowering wholesale electric prices from what they otherwise may be." *In re: Joint Petition for Determination of Need for an Electrical Power Plant in Volusia County by Utilities Commission, City of New Smyrna Beach, Florida and Duke Energy New Smyrna Beach Power Company, Ltd., L.L.P., 99 F.P.S.C. 3:401, 438 (1999).* Calpine seeks to continue its role in developing merchant plants, and thus satisfy the public need for cost-effective and environmentally clean power supply resources such as the Project, and to promote the State and Federal governments' goals of ensuring competitively priced wholesale generation for the benefit of electric customers.

There are immediate reliability (kilowatt) and economic needs in Peninsular Florida for the Project. The reliability need for the 527 MWs (average ambient) of highly efficient reliable electric capacity and associated energy production in Peninsular Florida is evidenced by the

current constrained reserve margins. Peninsular Florida needs the Osprey Energy Center because the Project will provide bulk power and energy at the lowest cost available to customers as compared to the continued use of traditional rate-based power plants. Moreover, the high-efficiency, gas-fired combined cycle technology chosen for the Project represents the lowest cost technology available to serve Peninsular Florida's future power supply needs. In addition, the Project represents an environmentally benign alternative to conventional power plants. As such, there is a demonstrable need for the Project in Peninsular Florida.

1.2.2 NEED FOR ELECTRIC SYSTEM RELIABILITY AND INTEGRITY

The Project is consistent with and meets Peninsular Florida's needs for generating capacity to maintain system reliability and integrity. According to the *1999 Regional Load & Resource Plan* prepared by the Florida Reliability Coordinating Council (FRCC) dated July 1999 *(1999 FRCC Regional Plan),* Peninsular Florida needs more than approximately 10,000 MW of new installed capacity in order to maintain winter reserve margins generally between four-percent and ten-percent without exercising load management and interruptible resources from the winter of 1999-2000 through the winter of 2008-2009. Even with the exercise of load management and interruptible resources, Peninsular Florida needs approximately 10,000 MW of new capacity to maintain reserve margins generally between 15-percent and 20-percent during the same period. A 20-percent reserve margin was recently adopted by Florida's three large investor-owned utilities, which together account for approximately three-fourths of all generation resources in Peninsular Florida. *In Re: Generic Investigation into Aggregate Electric Utility Reserve Margins Planned for Peninsular Florida,* 99 FPSC 12:426. Considering Peninsular Florida as a whole, the projected reserves meet or exceed this 20-percent criterion in only two of the ten years covered in the *1999 FRCC Regional Plan.*

The foregoing discussion of reserve requirements clearly demonstrates that there is a significant and substantial reliability need for new generating capacity in Peninsular Florida. The Project will contribute to meeting that need either a) by providing firm capacity (if other utilities contract for the Project's output, or b) if the Project's capacity remains uncommitted, by providing additional reliability protection through the Project's presence and availability. The Project will improve the Peninsular Florida winter reserve margin by approximately 1.4-percent in the winter of 2003-2004. The winter 2003-2004 reserve margin of generation resources will

increase from 10.5-percent to 11.9-percent with the Project's additional 527 MW (average ambient). The Project will provide similar reserve margin improvements in the summer seasons, and these improvements will continue to be realized in subsequent years.

Under any scenario, the Project is expected to provide an additional 585 MW of net capacity to Peninsular Florida utilities during extreme winter peaking conditions and an additional 486 MW of capacity during the extreme summer peaking conditions without power augmentation or duct firing. In an extreme weather event (e.g., a prolonged period in the summer with daily high temperatures exceeding 100°F or winter weather similar to that experienced at Christmas of 1989), the Project will provide substantial additional generating capacity to Peninsular Florida that would not otherwise be available. Assuming an average coincident peak demand of 5 to 6 kW per residential customer, the Project's capacity would be sufficient to maintain electric service to approximately 90,000 to 110,000 customers during such an event.

1.2.3 NEED FOR ADEQUATE ELECTRICITY AT A REASONABLE COST

The Project meets Peninsular Florida's need for adequate electricity at a reasonable cost. Most new capacity proposed by other Florida utilities is similar gas-fired combined cycle capacity. The direct construction cost and heat rate of the Project compare favorably to those of other proposed similar power plants in Peninsular Florida. Because no utilities or retail customers can be required to pay for the cost of the Project and because other Peninsular Florida utilities can reasonably expect to buy power from the Project *only* when it is cost-effective (as compared to other supply sources), the Project is also necessarily consistent with and meets Peninsular Florida's need for adequate electricity at a reasonable cost. Moreover, the Project's estimated projected operating costs will place it favorably in the Peninsular Florida "supply stack" of generating plants. The Project will be more cost-effective than approximately 20,000 MW or more of the existing generating capacity in Peninsular Florida.

As indicated above, the Project will be a competitive wholesale power plant. In the PSC's terminology, the Project will be a "merchant plant", which has been defined by the PSC as "a power plant with no rate base and no captive retail customers." Such competitive wholesale power plants differ from traditional "rate-based" plants in that the overhead finance, construction and operating costs of a rate-based plant are recovered through rates charged to

the utility's captive customers. If, after a rate-based plant is constructed, lower cost power becomes available, the utility nevertheless remains entitled to recover the costs of its plant through its rates. Hence, the utility's ratepayers, rather than its shareholders, bear the risks associated with obsolescence. Similarly, absent a finding of imprudence, a utility is permitted to recover the fixed and variable operating costs of its rate-based plants, even if those costs are higher than originally projected or if the plant fails to operate as projected. In essence, the utility has an incentive to maximize the amount of its rate base, thereby permitting its allowed return on equity to be applied to a larger sum that results in greater earnings.

In contrast, a competitive wholesale power plant (or merchant plant), like the Osprey Energy Center, has no rate base and no captive customers. Therefore, it must produce power at the lowest possible cost while meeting reliability standards to ensure it remains truly competitive. It is this simple, yet powerful, free market force, which ensures Florida residents of the benefit of this new low-cost energy power source. These competitive wholesale plants simply offer their capacity and energy to potential wholesale customers, who are free to purchase or decline to purchase capacity and energy offered by competitive wholesale suppliers. An economically rational purchasing utility will only enter an agreement to purchase electric capacity or energy from a competitive wholesale plant if the costs of that capacity or energy are lower than the costs of alternatives otherwise available to the utility (e.g., generation from its own power plants or purchases from others). If the cost of power from the competitive wholesale plant is higher than the costs of other alternatives, a purchasing utility will simply choose not to buy the competitive wholesale plant's output. In such circumstances, the unrecovered costs of the competitive wholesale plant will be borne by the plant's owners, and not by any customer. The same result will occur if the competitive wholesale plant incurs cost overruns or fails to operate as efficiently or reliably as projected; the plant's owners, rather than any ratepayers, bear all of the capital, operating and market risks associated with the power plant. Consequently, if the competitive wholesale plant's economics are favorable, other utilities and power marketers will purchase its output and enjoy cost savings. If the plant turns out not to be economical, a merchant plant has full incentive to improve its competitiveness. For these reasons, a competitive wholesale power plant can only benefit other utilities and their customers.

1.2.4 STRATEGIC CONSIDERATIONS

The Project is consistent with strategic factors that may be considered when building a power plant, both from Calpine's perspective and from the perspective of the State of Florida. The Project will be fueled by domestically produced natural gas rather than by imported fuel that may be subject to interruption due to political or other events.

The Project has a low installed cost and a highly efficient heat rate, assuring its long-term economic viability. The Project's gas-fired combined cycle technology is exceptionally clean and minimizes airborne emissions. Since the Osprey Energy Center will use very clean natural gas as its fuel, there is substantially less risk that the Project will be adversely affected by future changes in environmental regulations. Moreover, the Project's use of natural gas in a very efficient generation technology will improve the overall environmental profile of electricity generation in Florida. The Project will also conserve fuel consumed for electricity production in Florida (by displacing generation from less efficient resources). Consistent with the goals of the Florida Energy Efficiency and Conservation Act, the Project will enhance the overall efficiency of electricity production and of natural gas use, as well as reduce the consumption of petroleum fuels for electricity generation in Florida. Furthermore, the use of reclaimed water as a significant source of the Project's water supply will conserve the water resources Florida enjoys. Additionally, the Project will work to reduce market concentration that will reduce market power, thereby increasing the effectiveness of competition in reducing wholesale pricing.

1.2.5 COST EFFECTIVENESS

1.2.5.1 Cost-Effectiveness to Peninsular Florida

The Project will be a cost-effective power supply resource for Peninsular Florida. Projections of the Project's operations show that the Osprey Energy Center will operate, economically, at annual capacity factors of approximately 80- to 85-percent from 2003 through 2013. This result is not surprising because the Project is expected to operate more cost-effectively, in terms of incremental generation costs, than well over 20,000 MW of existing generating capacity in Peninsular Florida. Moreover, these high projected annual capacity factors are not surprising in light of the fact that most new capacity proposed for peninsular Florida is gas-fired combined or simple cycle capacity. This suggests the average generation pool heat rate will decline. The presence of the Project, with its high efficiency, is expected to suppress wholesale power prices

below what they otherwise would be. As a merchant plant, the output of which no utility is obligated to buy, the Project will minimize power supply costs. The Project cannot increase power supply costs above the cost of existing or planned power supply alternatives.

Power produced by the Project will be sold in the wholesale market to other utilities and power marketers for use in Peninsular Florida. Beginning in 2003, all of the Osprey Energy Center output is expected to be sold to other utilities and power marketers in Peninsular Florida (i.e., within the FRCC region) on the basis of the relative economics of the Project and other Peninsular Florida generation facilities. Sales outside of Florida are not expected due to generation costs, in general, being lower in Georgia than Florida, and additional transmission wheeling charges which would be incurred to make such sales. Moreover, transmission export capability at the Georgia/Florida interface is limited.

Calpine will *only* be able to sell its wholesale power to other utilities if and when utility purchasers determine that such purchases are cost-effective relative to those utilities' alternative power supply options (e.g., self-generation or other supply side purchases). In addition, the PSC's ongoing regulatory oversight of utilities' fuel and purchased power costs ensures that Florida's ratepayers are responsible only for reasonable and prudent expenses. In other words, not only will the market ensure that Florida retail-serving utilities' purchases are cost effective, the PSC's ongoing regulation will similarly ensure that purchases from the Project are cost-effective.

Even if the Project were not needed to maintain reliable service to Florida electric customers, the Project will provide cost-effective power to utilities that provide retail service in Florida. Since the savings resulting from cost-effective purchases from the Project will be passed directly through to retail customers through the purchasing utilities' fuel and purchased power cost recovery charges, the Project will also provide cost-effective power to those utilities' retail customers. The Project will not be subject to inclusion in any utility's rate base; accordingly, there is no risk that captive retail (or wholesale) customers will be *required to* bear the Project's capital or other costs. Retail customers can only be asked to pay for the cost of power from the Project when their retail-serving utility elects to buy power from the Project. These purchases

will occur *only* when such transactions are cost-effective to the purchasing utility (i.e., when the Project offers power that costs less than what is available elsewhere).

The Project is also demonstrably cost-effective based on a comparison of its construction cost and heat rate to the costs and heat rate of other proposed units. This analysis is based on the reasonable assumption that the cost of natural gas to the Project would be similar to the cost of natural gas to other proposed power plants. The direct construction cost of the Project is estimated to be approximately $182 million. This construction cost equates to approximately $333 per kW of installed capacity (based on 546 MW at ISO). The Project's full load heat rate is projected to be 6,800 British thermal units (Btu) per kilowatt-hour (kWh) (higher heating value, HHV, of natural gas) at average ambient conditions. Both the Project's direct construction cost and its heat rate compare favorably to those of other new gas-fired combined-cycle power plants proposed for Florida. The proposed Cane Island 3 unit for the Florida Municipal Power Agency and the Kissimmee Utility Authority, the proposed Duke Energy New Smyrna Beach Power Company Project, and the proposed Okeechobee Generating Company Project are the only projects which have similar projected construction costs *and* heat rates.

By virtue of the lack of risk to Florida's electric customers and the low cost production characteristics of this proposed merchant plant, the Project will *necessarily* be a cost-effective power supply option for the utilities that elect to purchase the plant's merchant power. This will translate into lower rates for customers of these utilities. Because no utility or retail customers will be obligated to purchase the Project's output, and assuming economically rational behavior by purchasing utilities, it is reasonable to conclude that any purchases from the Project will be made at prices less than or equal to the cost of the purchasing utility's next-best alternative. In light of these facts, the Project's actual costs are not essential to a determination of cost-effectiveness to Florida ratepayers. These ratepayers *cannot be required* to bear the Project's costs in their rates.

1.2.5.2 Cost-Effectiveness to Calpine

Calpine has considered various generating technologies and various configurations of combined-cycle power plants that could be accommodated at the proposed Site and determined

that the Project represents the most cost-effective and reliable alternative for Calpine to meet its projected wholesale power sales commitments.

1.2.6 ENERGY CONSERVATION

As a federally regulated public utility selling electricity only at wholesale, Calpine does not engage directly in the implementation of end-use energy conservation programs. Moreover, Calpine is not required to have conservation goals pursuant to Section 366.82(2), F.S. The Project meets the overall goals of the Florida Energy Efficiency and Conservation Act ("FEECA"), Sections 366.80-.85 and 403.519, F.S., because the Project contributes directly and significantly to the increased efficiency and cost-effectiveness of electricity production and natural gas use (Section 366.81, F.S.). The Project does so by using state-of-the-art generation technology. The Project's primary energy conversion efficiency of approximately 56-percent is significantly better than almost all existing utility generating capacity in Florida, better than most cogeneration facilities, and as good as or better than the vast majority of other Florida utilities' proposed new gas-fired combined cycle capacity. To the extent that the Project, with its average heat rate of 6,800 Btu per kWh at ambient site conditions, displaces generation from less efficient oil, coal and gas-fired units, the Project will result in substantial increases in the efficiency of natural gas use. Based on projected operations, the Osprey Energy Center is expected to save approximately 13,700,000 million Btu of primary energy per year. If the entire savings were realized through the displacement of natural gas fired generation, this would represent a savings of approximately 13,700 billion cubic feet (bcf) of natural gas per year. If the Project displaced only oil-fired generation, this would reflect a savings of approximately 6,422,000 barrels of residual fuel oil per year. To the extent that the Project displaces oil-fired generation, it will contribute to the express statutory goal of conserving expensive resources; especially petroleum fuels (Sections 366.81 and 366.82(2), F.S. (1997). In addition, the Project's capacity and energy will be economically and environmentally preferable to other supply-side alternatives. Thus, future cost-effective conservation measures would likely displace other supply-side alternatives, rather than displace the capacity and energy available from the Project.

1.3 OVERVIEW OF OSPREY ENERGY CENTER

1.3.1 INTRODUCTION

To provide wholesale electric power and to help ensure adequate capacity and reliability for future growth in Florida, Calpine is proposing to own and operate a 527-MW (average ambient) capacity combined-cycle power plant. Construction of the Osprey Energy Center is proposed to commence in 2001, with the facility being placed into service in the first quarter of 2003. The proposed plant will consist of a combined-cycle facility burning natural gas as the fuel. The Osprey Energy Center facility will use dry low nitrogen oxide (NO_x) combustors and SCR to control NO_x emissions. No new transmission line corridor will be needed to connect the proposed facility to the existing state power grid because Tampa Electric Company's Recker Substation is located immediately adjacent to the southeast portion of the Site. The Project will provide additional employment and tax base to the local economy. Calpine will submit a Need Determination application for the proposed plant to the Florida Public Service Commission (PSC) in the near future. A Need Determination hearing is anticipated during June or July 2000. The statutory timeframe within the PPSA forecasts issuance of a Site Certification within 14 months after submittal of a complete application. Based on an expedited review schedule, Calpine anticipates the completion of the Site Certification in February/March 2001 with commencement of construction in April 2001.

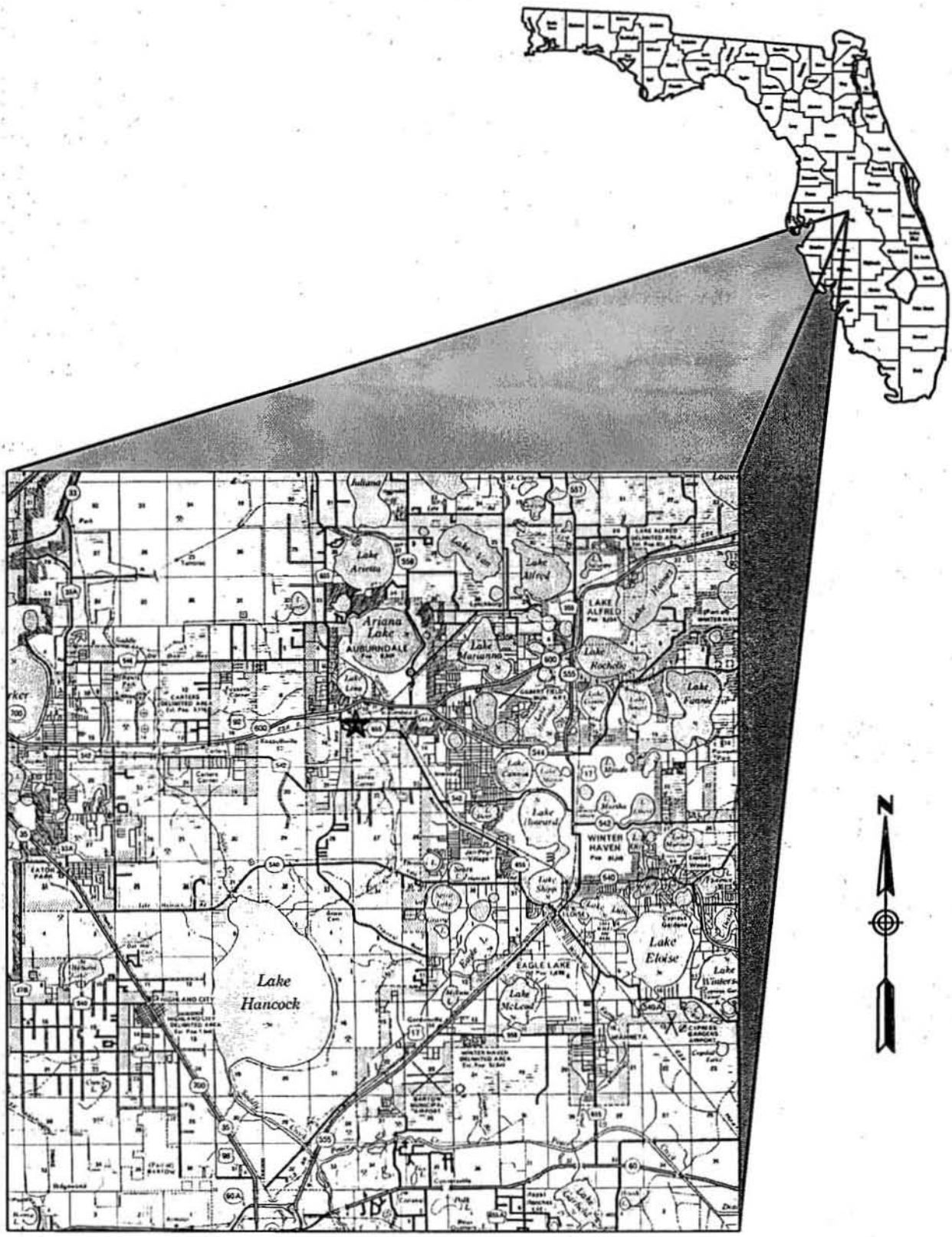
Further description of the proposed new facilities may be found in Chapter 3.0.

1.3.2 SITE LOCATION AND DESCRIPTION

The Osprey Energy Center will be located within the City of Auburndale, Polk County, Florida. The Site is approximately 1.5 miles from downtown Auburndale and approximately 37 miles east of Tampa Bay (see **Figures 1.3.2-1 through 1.3.2-3**). The Site is located in the west one-half of the northwest quarter [less right of way for County Road 544A (Derby Avenue)] of Section 15, Township 28 South, Range 25 East on the Auburndale, Florida U.S. Geological Survey (USGS) 7.5-Minute Topographic Quadrangle map (see **Figure 1.3.2-2**). The site is approximately 19.5-acres in size and is presently unused. Formerly, the site was used as a citrus grove, although the grove has not been maintained for several years. An aerial photograph of the Site is presented

IMAGE QUALITY

AS YOU REVIEW THE NEXT GROUP OF IMAGES, PLEASE NOTE THAT THE ORIGINAL DOCUMENTS WERE OF POOR QUALITY.



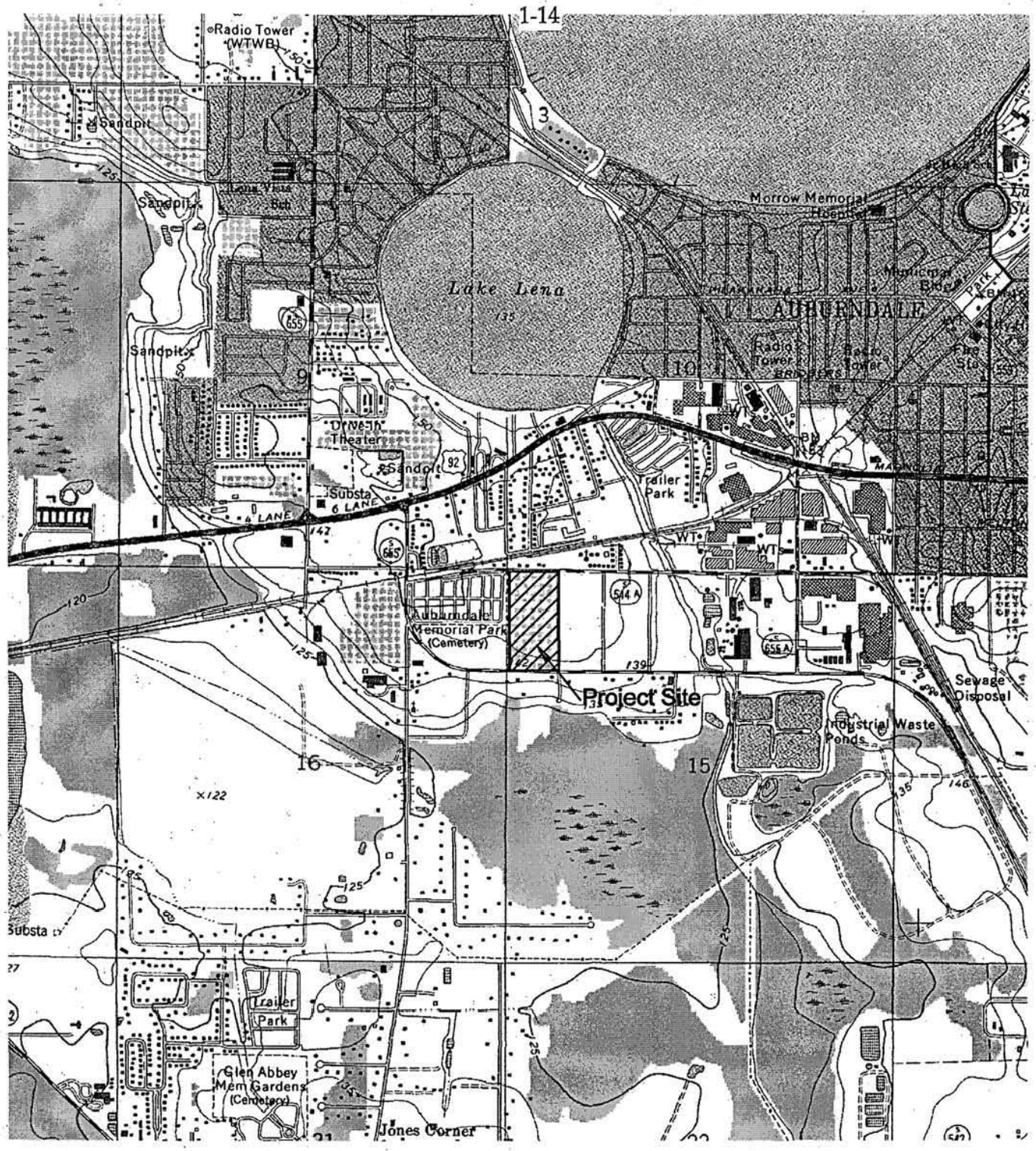
★ Project Site

Golder Associates — Tampa, Florida

Project Site Area

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	NTS	Job No.	993-9570
CHK BY:	CA	DATE:	02/04/00	FIGURE	1.3.2-1
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LEGEND

PROJECT SITE

REFERENCE

USGS 7.5 Minute Topographical Quadrangle, Auburndale, Florida

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1"=2000'

Golder Associates

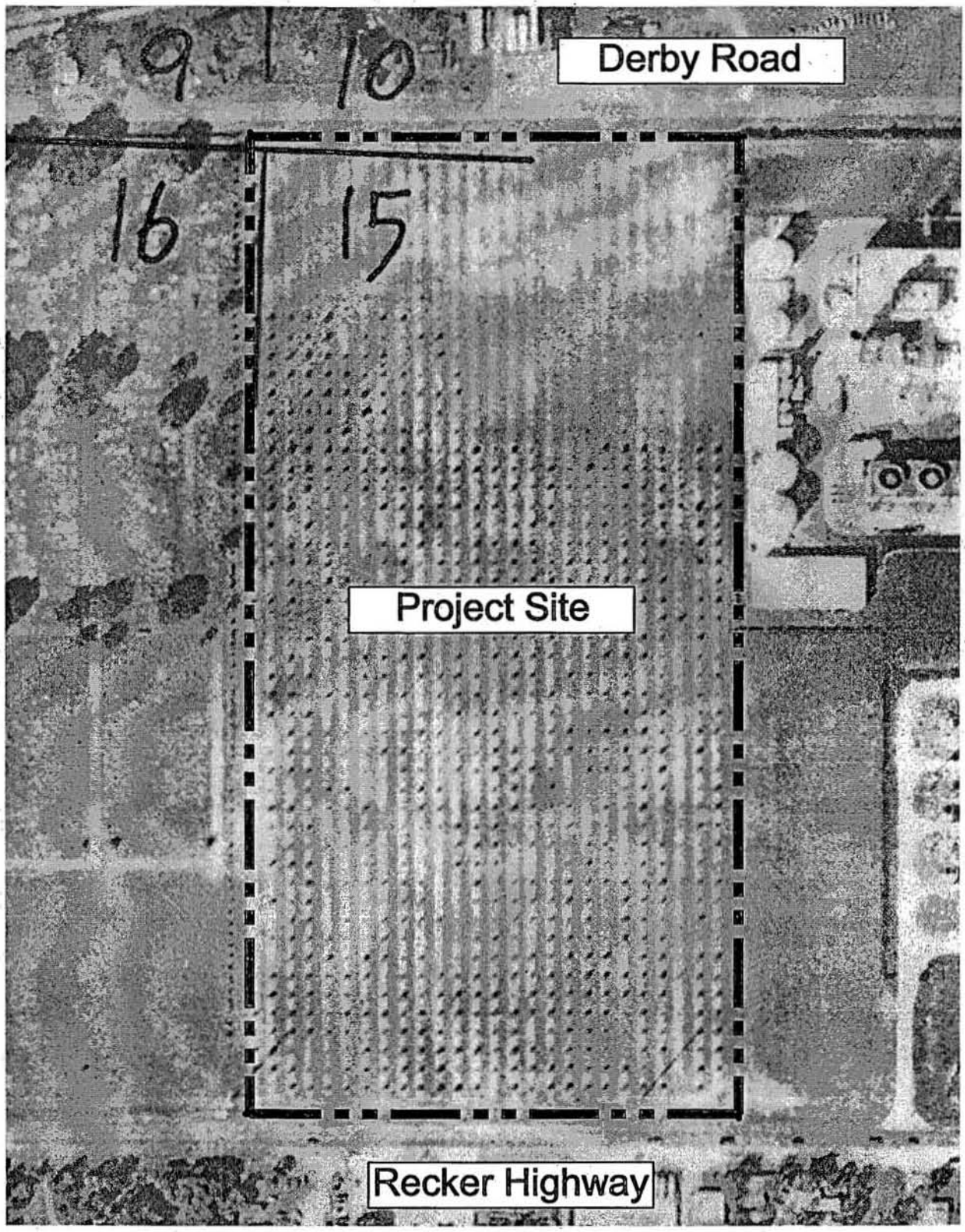
Tampa, Florida

Project Site Location

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: 1"=2000'	Job No. 993-9570
CHK BY: RAZ	DATE: 02/04/00	FIGURE 1.3.2-2
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Golder Associates
Tampa, Florida

Aerial Photograph of Site

Client / Project
Calpine Construction Finance Copany, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	1"=200'	Job No.	993-9570
CHK BY:	RAZ	DATE:	02/04/00	FIGURE	1.3.2-3
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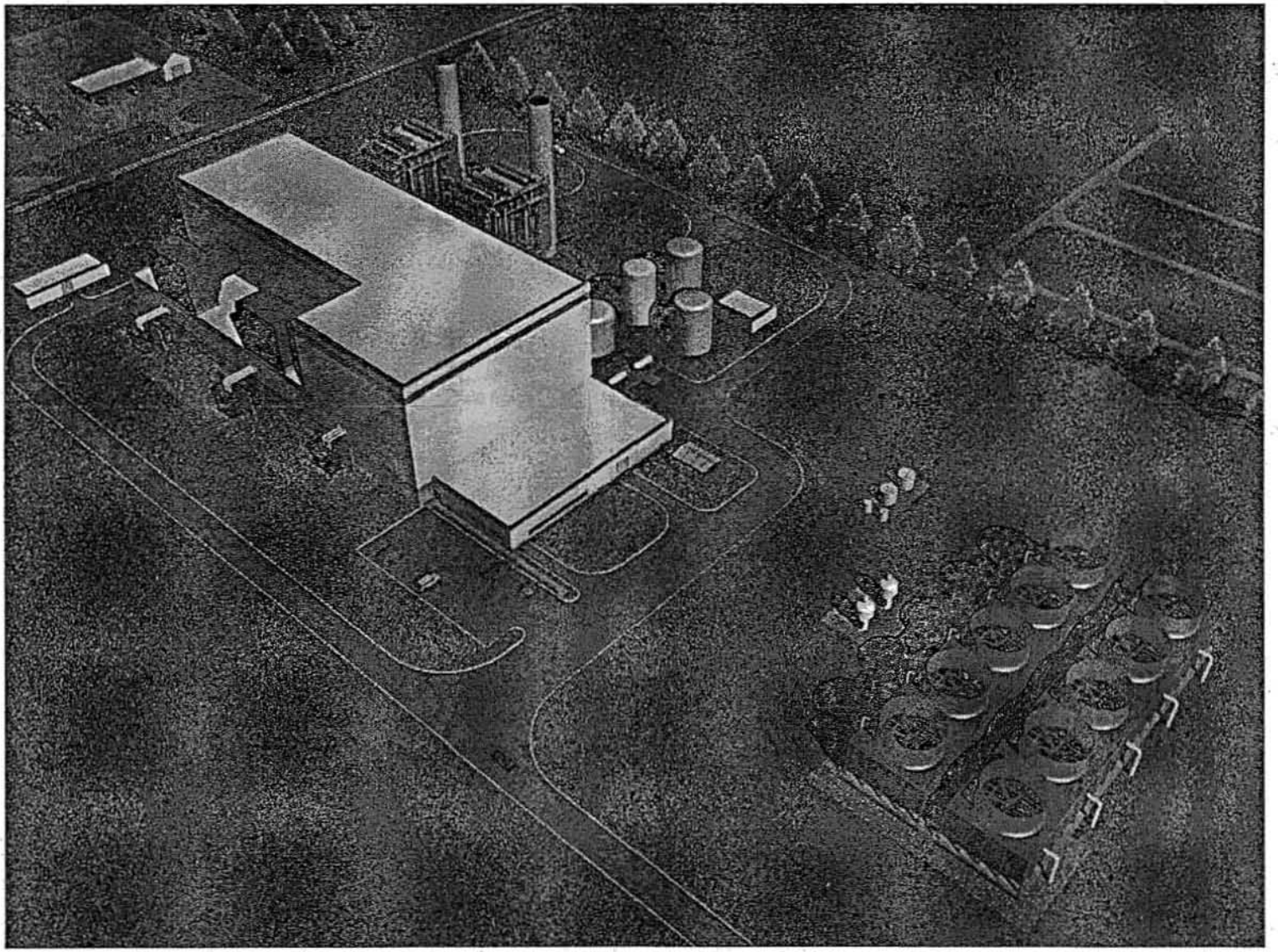
in **Figure 1.3.2-3**. A boundary and topographic survey map of the Site may be found in **Appendix 10.6.**

The Site is bordered on the east side by Tampa Electric Company's Recker Substation and the existing Auburndale Power Plant, a 150-MW natural gas and oil-fired cogeneration plant [jointly owned by Edison Mission Energy Company and Calpine Corporation as Auburndale Power Partners, L.P]. Recker Highway (SR 655, a two-lane, paved collector road) forms the southern boundary of the Site, with some commercial operations (sand/cement plant, auto parts shop, and storage center) on the south side of that road. The City of Auburndale's Memorial Park Cemetery is located on the adjacent property to the west of the Site. To the north of the Site is Derby Avenue (CR 544A, a two-lane, paved collector road). Sure (propane) Gas Company and a few residential housing units are located along the north side of the road. This road serves as a main access to other nearby industries, including Cutrale Citrus Juices USA, Inc. An operating railroad corridor is located immediately behind (north of) the propane gas company and the residential housing.

The Site is located in the City of Auburndale, Polk County, Florida and is owned by Mr. Don Hemphill. The property is presently under a purchase option agreement with Calpine.

1.3.3 PROJECT DESCRIPTION

The Project (see **Figure 1.3.3-1**) will consist of two 170-MW Westinghouse Model 501F Class combustion turbines (CTs) in combined-cycle configuration totaling 340 MW (net). Each CT will be connected to a three pressure level heat recovery steam generator (HRSG) producing steam for a single steam turbine (200 MW unfired). Therefore, the generating capacity of the Osprey Energy Center will be 527-MW (average ambient). The combustion turbines will be fired using natural gas as the only fuel. The Project will be evaluated for permitting at an annual capacity of 100-percent, but in actual operation the plant's annual capacity would be approximately 85-percent. A site arrangement drawing (Site Plan) for the Project is depicted in **Figure 1.3.3-2**.



Golder Associates

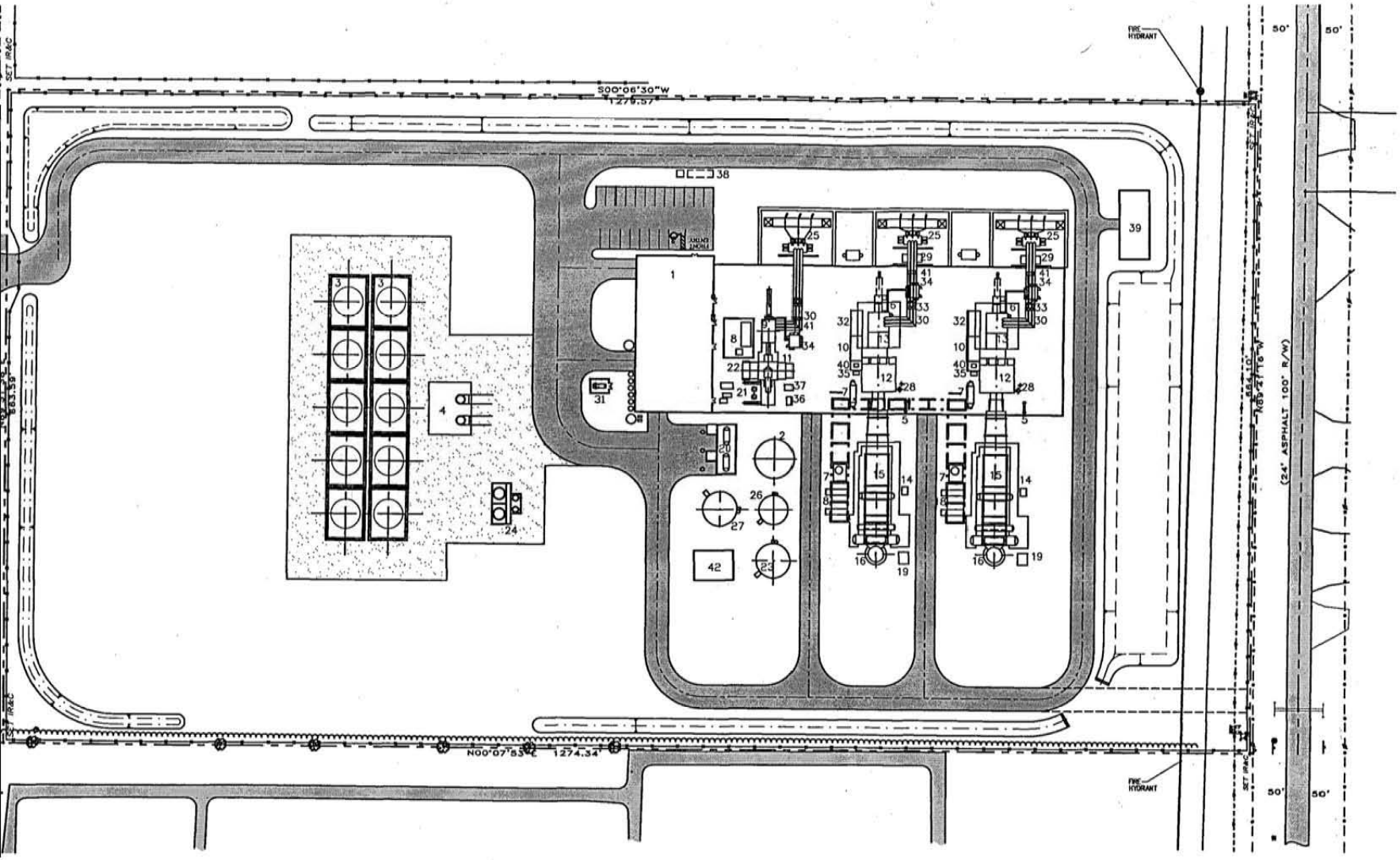
Tampa, Florida

Project Rendering

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	NTS	Job No.	993-9570
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Legend

1. ADMINISTRATION AND MAINTENAN
2. SERVICE WATER TANK
3. COOLING TOWER
4. CIRCULATING WATER PUMPS
5. FUEL GAS HEATER
6. COMBUSTION TURBINE AIR INLET
7. KETTLE BOILER
8. LUBE OIL SKID
9. ST GENERATOR
10. CT MECHANICAL PACKAGE
11. STEAM TURBINE
12. COMBUSTION TURBINE
13. CT GENERATOR
14. AMMONIA INJECTION SKID
15. HEAT RECOVERY STEAM GENERAT
16. HRSG STACK
17. HRSG BLOWDOWN TANK
18. BOILER FEED PUMP HOUSE
19. CEMS
20. AMMONIA STORAGE TANKS
21. CONDENSATE PUMPS
22. CONDENSER
23. DEMINERALIZED WATER STORAGE
24. WET SURFACE AIR COOLER
25. GENERATOR STEP-UP TRANSFORM
26. WASTEWATER TANK
27. RAW WATER STORAGE TANK
28. FUEL GAS SCRUBBER
29. UNIT AUX. TRANSFORMER
30. ISO-PHASE BUS DUCT
31. STANDBY GENERATOR
32. ELECTRICAL EQUIPMENT PACKAGE
33. GENERATOR VT & SURGE CUBICLE
34. GENERATOR EXCITATION SKID
35. COMPRESSOR WATER WASH SKID
36. STEAM JET AIR EJECTORS
37. GLAND STEAM CONDENSER
38. OIL/WATER SEPARATOR
39. GAS METER BUILDING
40. HYDRAULIC SKID
41. EXCITATION TRANSFORMER
42. CENTRAL PUMP HOUSE

N

120' 0 120'

scale feet

Golder Associates — Tampa, Florida

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

Site Plan

CAD BY: CDT	SCALE: 1"=120'	Job No.	
CHK BY: RAZ	DATE: 03/08/00	FIGURE	1
REV BY: —	FILE No.: fig1_3_3-2.dwg		

The Project will consist of the power block, the operations control center, and directly associated facilities, including cooling towers, water treatment building, central pump house, storage facilities, a general services/warehouse building and a gas metering station.

The Project will be a highly efficient combined-cycle power plant that will take advantage of the latest pollution abatement technology, will utilize reclaimed water, and will provide optimum efficiency with regard to electric power generation. Nitrogen oxides (NO_x) will be controlled by dry low-NO_x technology working in conjunction with SCR technology. NO_x emissions will also be controlled using a selective catalytic reduction (SCR) system. The NO_x emission limits are proposed to be 4.0 parts per million, volume dry (ppmvd), corrected to 15-percent oxygen (O_2) when firing natural gas. A NO_x limit of 4.0 ppm is proposed when duct firing.

Plant make-up water for the cooling tower and process water requirements, as well as wastewater generation have been estimated. The Project will utilize a combination of reclaimed water and well water for its supply. The daily average annual consumption of the plant is 3,554,000 gpd and the maximum monthly consumption is 4,788,000 gpd. It is expected that at the time the plant goes on line an average of 800,000 gpd of the total demand will be supplied from reclaimed water from the City's Allred Wastewater Treatment Plant. This quantity is expected to increase over time, ultimately reaching the treatment plant's capacity of 1.4 mgd. The balance of the supply water will be provided by new on-site wells withdrawing water from the Upper Floridan aquifer (at a depth of approximately 700 feet). The details of the water supply, plant consumption and wastewater discharge are provided in Chapter 3 and Chapter 10.

A Water Supply Alternatives Study has been conducted to identify and evaluate potential water sources for the Project, including water reuse options. The results of the Water Alternatives Study, which will be used in the final design of the Osprey Energy Center Project, are included in this Application as **Appendix 10.1.8.**

The proposed plant will connect to the electrical grid at the existing Tampa Electric Company's Recker Substation, which is located immediately adjacent to and east of the southeast boundary of the Site. There will be no new linear transmission line "corridor" required for the Project.

The transmission conductors will cross the eastern property boundary for a direct connection of the plant to Tampa Electric Company's Recker Substation.

Natural gas will be transported to the Site via a new underground pipeline lateral to be constructed to the Site. The corridor for this pipeline is not included in this Site Certification and will be developed separately by the ANR/Coastal Corporation Company through its Gulfstream Pipeline project.

A conceptual design for the Project has been developed to provide an initial basis for planning and development of this Site Certification Application. Specific environmental criteria have been used to ensure that the Osprey Energy Center will be in compliance with all federal, state, and local regulations. These criteria provide a maximum range of potential resource utilization and pollutant discharges to develop possible "worst-case" environmental impacts for the Project.

1.4 BENEFITS OF THE PROJECT

The primary benefit of this Project to Polk County, the region, and the State of Florida is the provision of a new, clean, reliable, and cost-effective energy source. In addition to providing cost-effective energy, the Osprey Energy Center will provide employment and tax revenues, as well as increased statewide electrical system reliability. Additionally, the Project minimizes environmental impacts through site selection, land utilization relative to the output, and through the selection of a reliable, clean cost-effective fuel. The Project makes beneficial use of a non-producing citrus grove and minimizes potential environmental impacts through the use of existing facilities (i.e., access road, substation and transmission lines, and water and sewer pipelines), the avoidance of wetlands or wildlife habitat, and the use of reclaimed water from a local wastewater treatment plant.

Because of the previously altered environment on the Site, location of the Site in an industrial area, use of clean-burning natural gas as a fuel, and the use of both dry low NO_x combustors and SCR as NO_x control technology, no significant adverse environmental or social impacts will result from the construction or operation of the Osprey Energy Center.

1.4.1 EXTERNAL BENEFITS

This Project is beneficial to Floridians due to its ability to provide economic savings and rate stability for electric power customers, as well as satisfying the need to meet projected growth in Florida's electric power demand. Also, with its use of natural gas as a fuel combustors, and SCR and dry low NO_x controls, this Project will provide electrical power at low emission rates when compared to power plants operating in Florida.

Other benefits include:

- Benefit to Auburndale via use of reclaimed water,
- Added tax base,
- Additional employment,
- Reduced emissions,
- Added reserve margin, and

- Wastewater treatment plant improvements funded by Calpine that will enable the City to provide reclaimed water to be used in areas with unrestricted public access when the Project maintenance reduces the need for reclaimed water.

The Project will burn natural gas and will tie into the new Gulfstream gas pipeline that is to be installed which will bring gas from the Gulf of Mexico to the Florida peninsula. The Project, as an anchor tenant, will buy transportation services from Gulfstream. A portion of these fees will be applied against the costs of this added infrastructure. As a result, the Project acts as an economic anchor tenant for the pipeline and, as such, plays a key role in the long-term availability of the Gulfstream natural gas pipeline to the State of Florida.

2.0 SITE AND VICINITY

2.1 SITE AND ASSOCIATED FACILITIES

This section provides information concerning the location of the Osprey Energy Center. This section also provides maps showing existing uses of the Site, adjacent properties, the area, and communities in the vicinity of the Site.

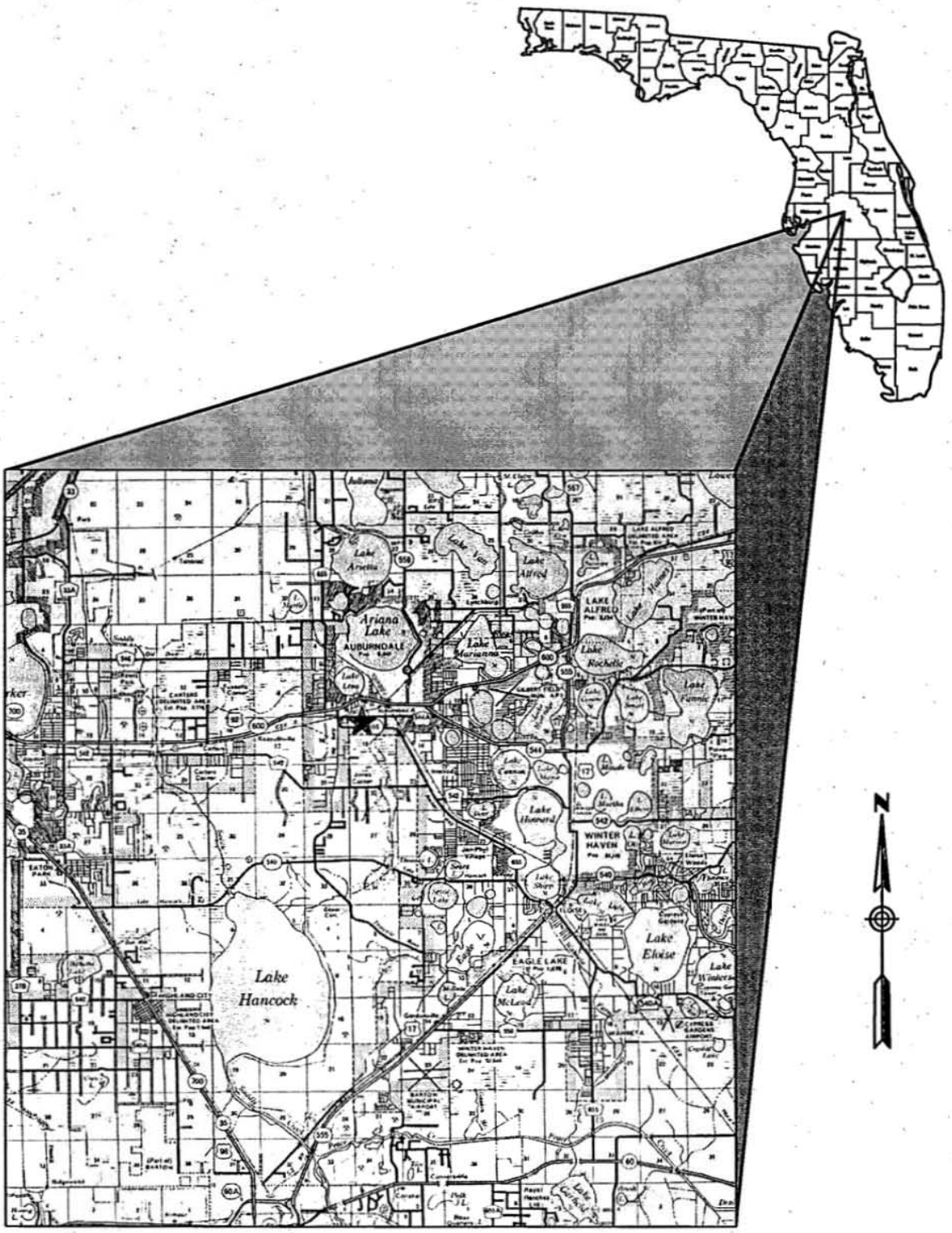
The Osprey Energy Center will be located on a 19.5-acre site in Auburndale, Polk County. The Site is located approximately 1.5 miles from downtown Auburndale, approximately 5 miles west of Winter Haven, 6 miles southeast of Lakeland, and 37 miles east of Tampa Bay (see **Figure 2.1.0-1**). The Site is bordered on the east by the existing 150-MW Auburndale Power Plant and Tampa Electric Company's Recker Substation. Recker Highway (SR 655) forms the southern boundary of the Site, Auburndale's Memorial Park Cemetery forms the western boundary, and Derby Avenue (CR 544A) forms the northern boundary.

The Site is located in the west ½ of the northwest ¼ of the northwest ¼ of Section 15, Township 28 South, Range 25 East. The Osprey Energy Center's facilities will occupy approximately 15 acres of the 19.5-acre site. The Site is currently occupied as a non-producing citrus grove which has not been maintained or harvested for several years. With the exception of the citrus trees, the Site is undeveloped. There are no surface water bodies, wetlands, nor significant wildlife habitats or threatened and endangered species on the Site. Surrounding properties are shown in **Figure 2.1.0-2**. No portion of the proposed Site is within the 100-year floodplain (see **Figure 2.1.0-3**).

The Osprey Energy Center will require no electrical transmission line corridor off-site since the plant will interconnect directly with the adjacent Tampa Electric Company's Recker Substation. An underground pipeline will be permitted separately and built by ANR/Coastal Gas Transmission Company to transport natural gas to the Site. In addition, the City of Auburndale will separately permit and build an underground pipeline to supply reclaimed water to the Site; an underground pipeline to take industrial wastewater from the Site to Auburndale's Allred Wastewater Treatment Plant, and a force main to enhance their ability to handle the Project's industrial wastewater at the City's wastewater facilities.

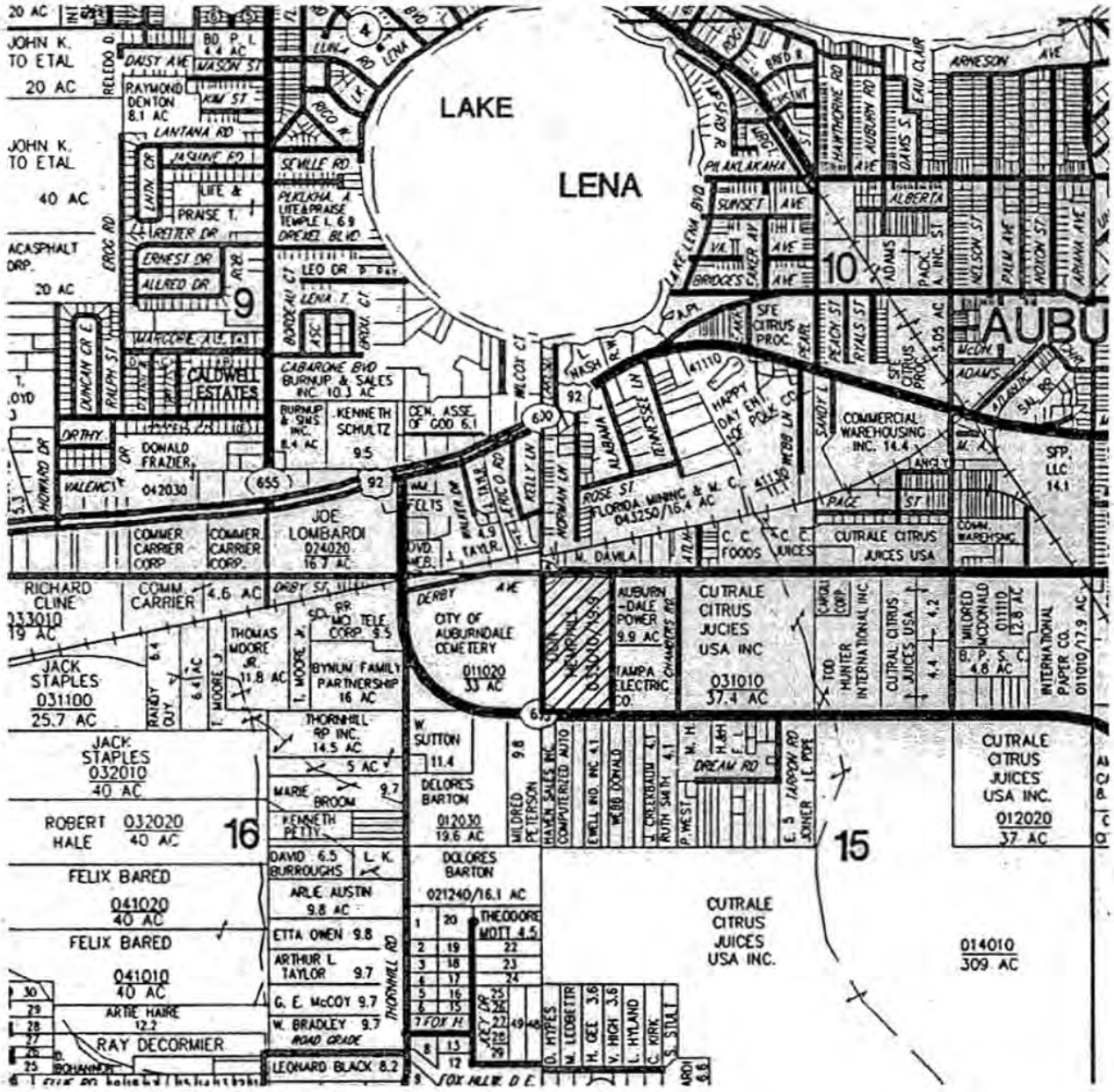
IMAGE QUALITY

AS YOU REVIEW THE NEXT GROUP OF IMAGES, PLEASE NOTE THAT THE ORIGINAL DOCUMENTS WERE OF POOR QUALITY.



★ Project Site

Golder Associates Tampa, Florida	Project Site Area		
Client / Project: Calpine Construction Finance Company, L.P. Osprey Energy Center	CAD BY: CDT	SCALE: NTS	Job No. 993-9570
	CHK BY: CA	DATE: 02/07/00	FIGURE 2.1.0-1
	REV BY: –	FILE No.: fig2_1_0-1.dwg	



Legend

Project Site

REFERENCE

Polk County 1998 Plat Directory, Florida

N

0 750' 1500'

SCALE: 1" = 1500'

Golder Associates

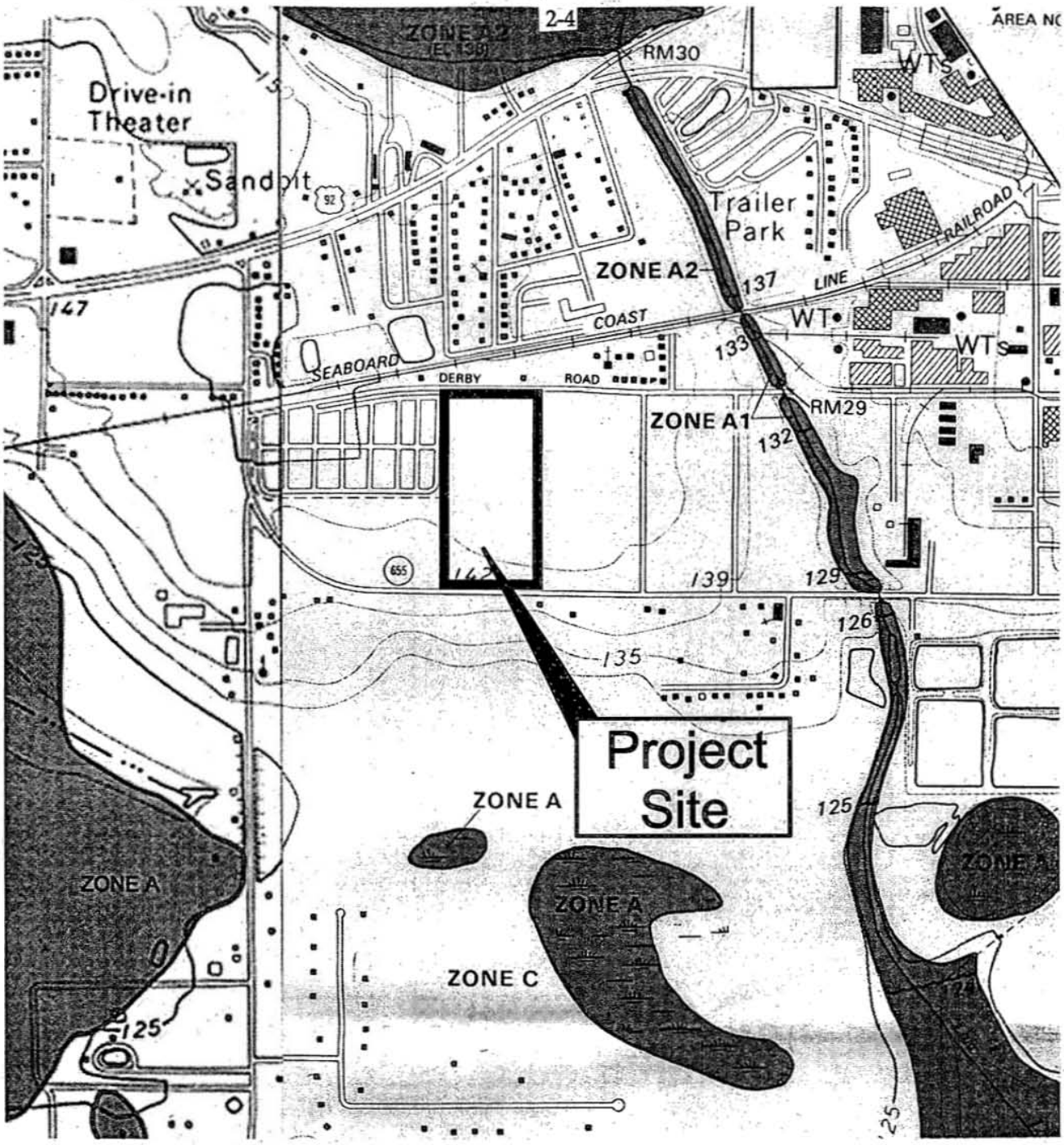
Tampa, Florida

Adjacent and Abutting Properties

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: 1"=1500'	Job No. 993-9570
CHK BY: RZ	DATE: 02/07/00	FIGURE 2.1.0-2
REV BY: –	FILE No.: fig2_1_0-2.dwg	



Legend

100-Year Floodplain

Zone Description

Zone A: Area of 100-year flood; base flood elevations and flood hazard factors not determined.

Zone A1-2: Areas of 100-year flood; base flood elevations and flood hazard factors determined.

Zone C: Areas of minimal flooding (no shading)

N

0 500' 1000' 2000'

1"=2000'

REFERENCE

Flood Insurance Rate Map, Polk County, Florida, Panels 345 and 350 of 1025, January 19, 1983

Golder Associates

Tampa, Florida

FEMA Flood Insurance Rate Map
100-Year Flood Zones

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: 1"=2000'	Job No. 993-9570
CHK BY: CA	DATE: 01/13/00	FIGURE 2.1.0-3
REV BY: -	FILE No.: fig2_1_0-3.dwg	

Construction employee parking will be provided onsite. Part of the Site will be used as a construction laydown, if needed. An additional 10-acre construction laydown area will be located approximately 730 feet east of the southeast corner of the Site. This area is currently a vacant grassy parcel (see **Figure 2.1.0-4** for the location).

2.2 SOCIOPOLITICAL ENVIRONMENT

2.2.1 GOVERNMENTAL JURISDICTIONS

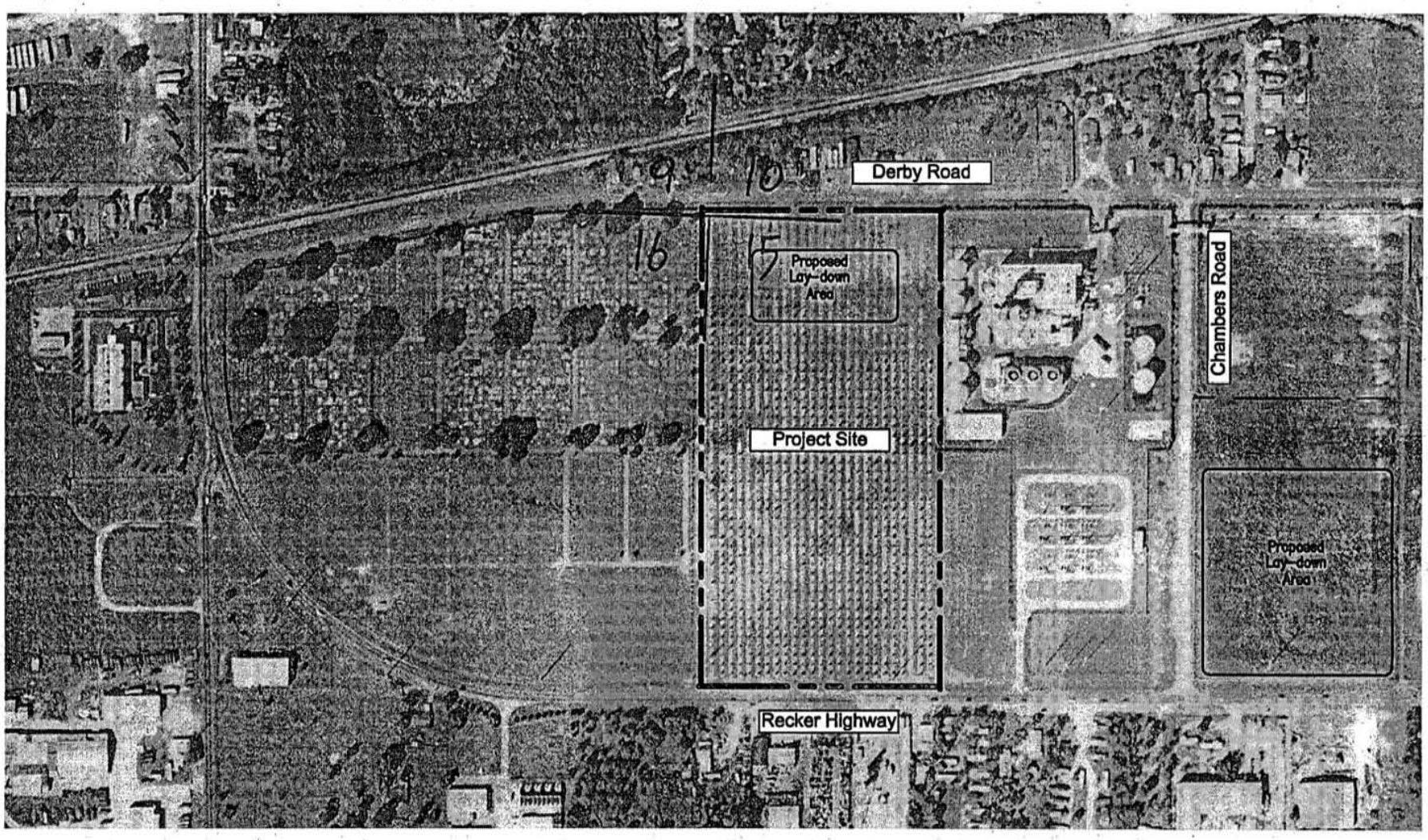
The Osprey Energy Center will occupy a portion of Section 15, Township 28 South, Range 25 East. The Osprey Energy Center Site was annexed into the City of Auburndale, Polk County, in February 2000.

Within 5 miles of the Site, there are three incorporated areas: Auburndale, Lake Alfred (5-miles) and Winter Haven (3.5 to 5.0 miles). Unincorporated communities within a 5-mile radius include Jones Corner, Kossuthville, Fussells Corner, Carters, Carters Corner, and Lynchburg (Florida Department of Transportation Map, 1992; United States Geological Survey Topological Map, 1975; and United States Census Survey, 1990). **Figure 2.2.1-1** (5-mile radius) and **Figure 2.2.1-2** (1-mile radius) depict the Site in relation to these cities and towns.

None of the following local, regional, or federal areas are located within a 5-mile radius of the Site:

1. National parks, forests, seashores, memorials, monuments, marine sanctuaries, estuarine sanctuaries, wild and scenic rivers,
2. Roadless Area Review and Evaluation (RARE) areas, Save Our Rivers lands, archeological landmarks or landmark zones, aquatic preserves, outstanding Florida waters and wild and scenic rivers, and
3. Indian reservations and military lands.

Figure 2.2.1-3 shows the conservation and recreation areas within 5-miles of the Project Site.



Golder Associates

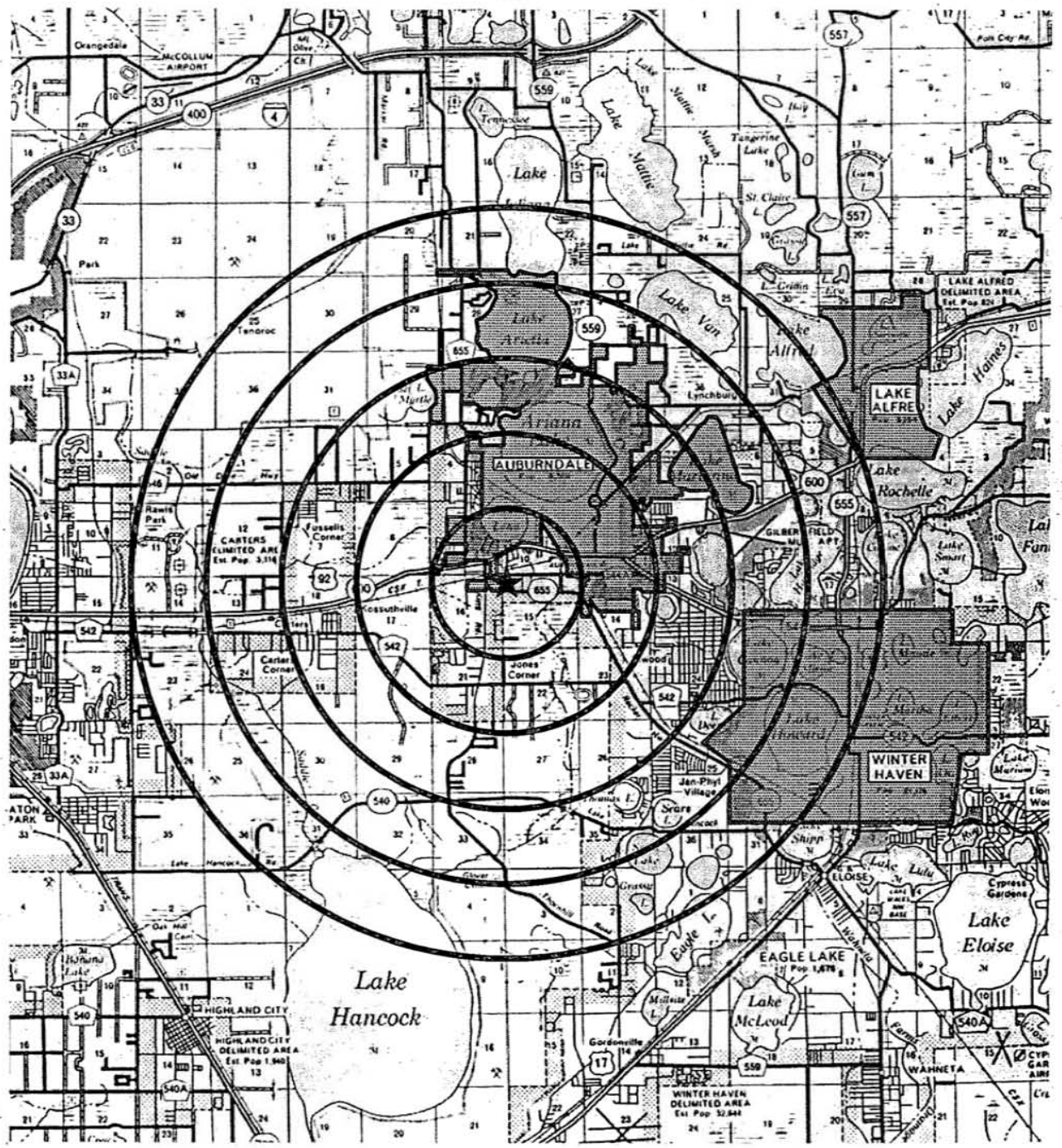
Tampa, Florida

Construction Lay-down

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	1"=400'	Job No.	993-9570
CHK BY:	RAZ	DATE:	03/08/00	FIGURE	2.1.0-4
REV BY:	–	FILE No.:	fig2_1_0-4.dwg		



Legend

★ Project Location

City Boundaries

Incorporated Cities

Auburndale
Lake Alfred
Winter Haven

N

0 2 Miles

SCALE: 1" = 2 Miles

REFERENCE

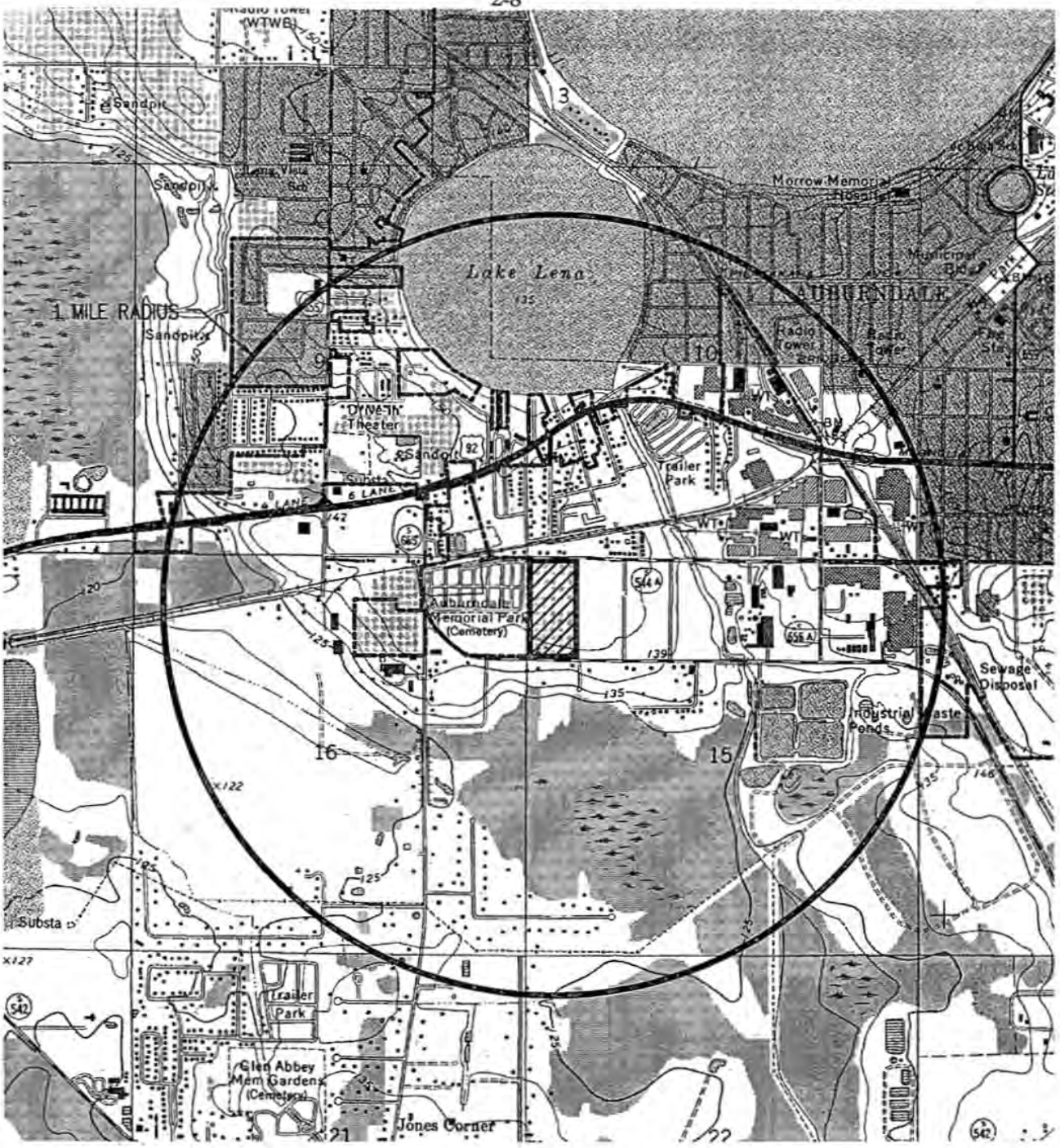
FDOT General Highway Map, Polk County, 1992

Golder Associates

Tampa, Florida

Boundaries of Cities and Towns
5–Mile Radius

Client / Project	CAD BY: CDT	SCALE: 1"=2 Miles	Job No. 993-9570
Calpine Construction Finance Company, L.P. Osprey Energy Center	CHK BY: RAZ	DATE: 02/03/00	FIGURE 2.2.1–1
	REV BY: –	FILE No.: fig2_2_1-1.dwg	



Legend

Project Site

City Boundary

Incorporated Cities

Auburndale

N

0 1000' 2000'

SCALE: 1" = 2000'

REFERENCE

USGS 7.5 Minute Topographical Quadrangle, Auburndale, Florida

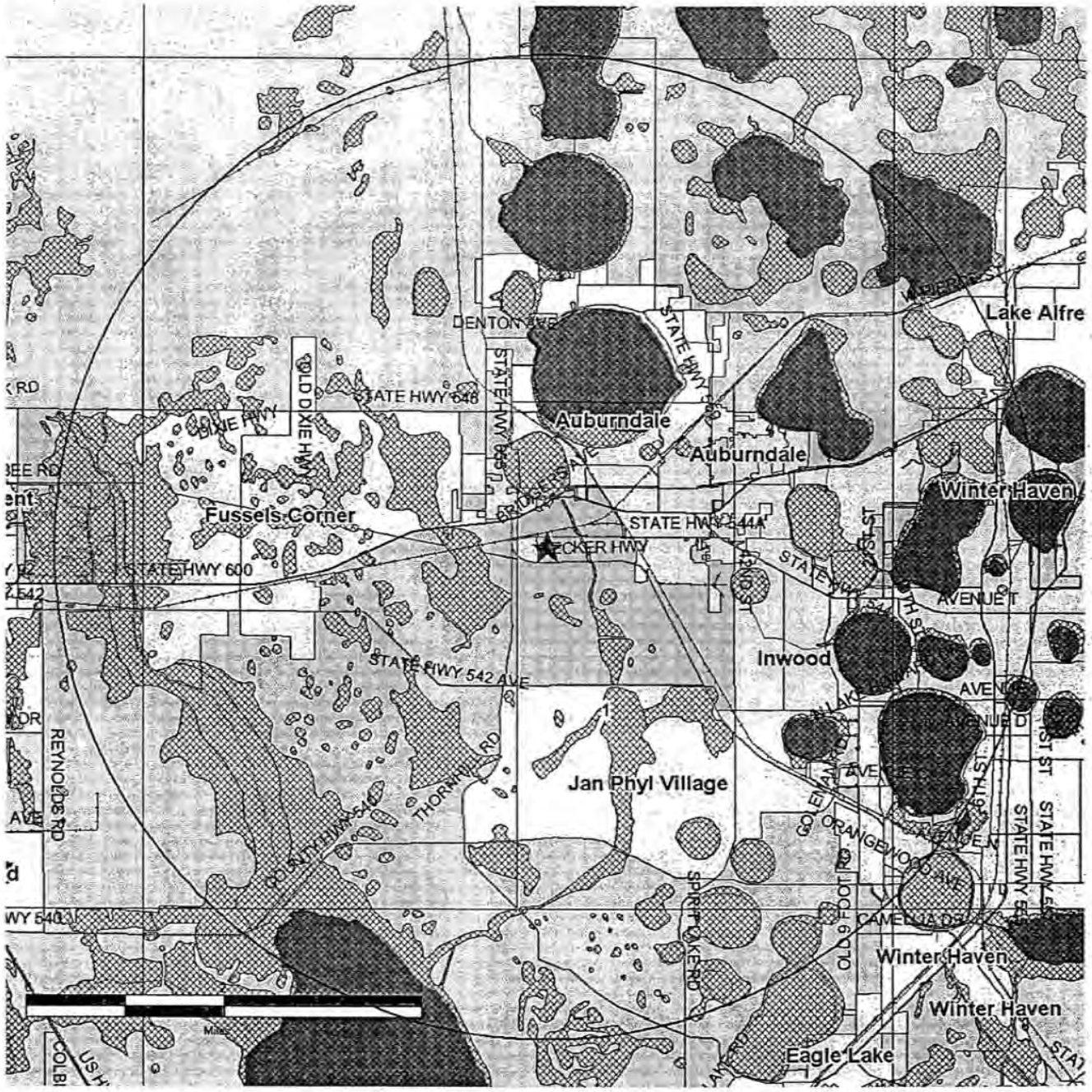
Golder Associates

Tampa, Florida

Boundaries of Cities and Towns
1-Mile Radius

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: 1"=2000'	Job No. 993-9570
CHK BY: RAZ	DATE: 02/03/00	FIGURE 2.2.1-2
REV BY: –	FILE No.: fig2_2_1-2	



Legend

Project Site ★

State Parks and Forests

Notes

No Federal, State or Regional Conservation or Recreational Areas are located whin 1 mile of project site

See Figure 2.2.7-2 and Figure 2.2.7-3 for locations of County and City recreational facilities.

Sites

1. Lake Wales Ridge Ecosystem-Blue Lake
2. Saddle Creek Strip Mine
3. Tenoroc State Recreation Area
4. Saddle Creek Park
5. Lake Hancock Mine
6. Green Swamp

N

0 4000' 8000'
SCALE

REFERENCE

NEPA Profile, State Parks and Forests, EcoSearch, Nov. 1999

Golder Associates
Tampa, Florida

Conservation and Recreation Areas
5-Mile Radius

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: 1"=8000'	Job No. 993-9570	
CHK BY: CA	DATE: 02/03/00	FIGURE 2.2.1-3	
REV BY: -	FILE No.: fig2_2_1-3.dwg		

2.2.2 ZONING AND LAND USE PLANS

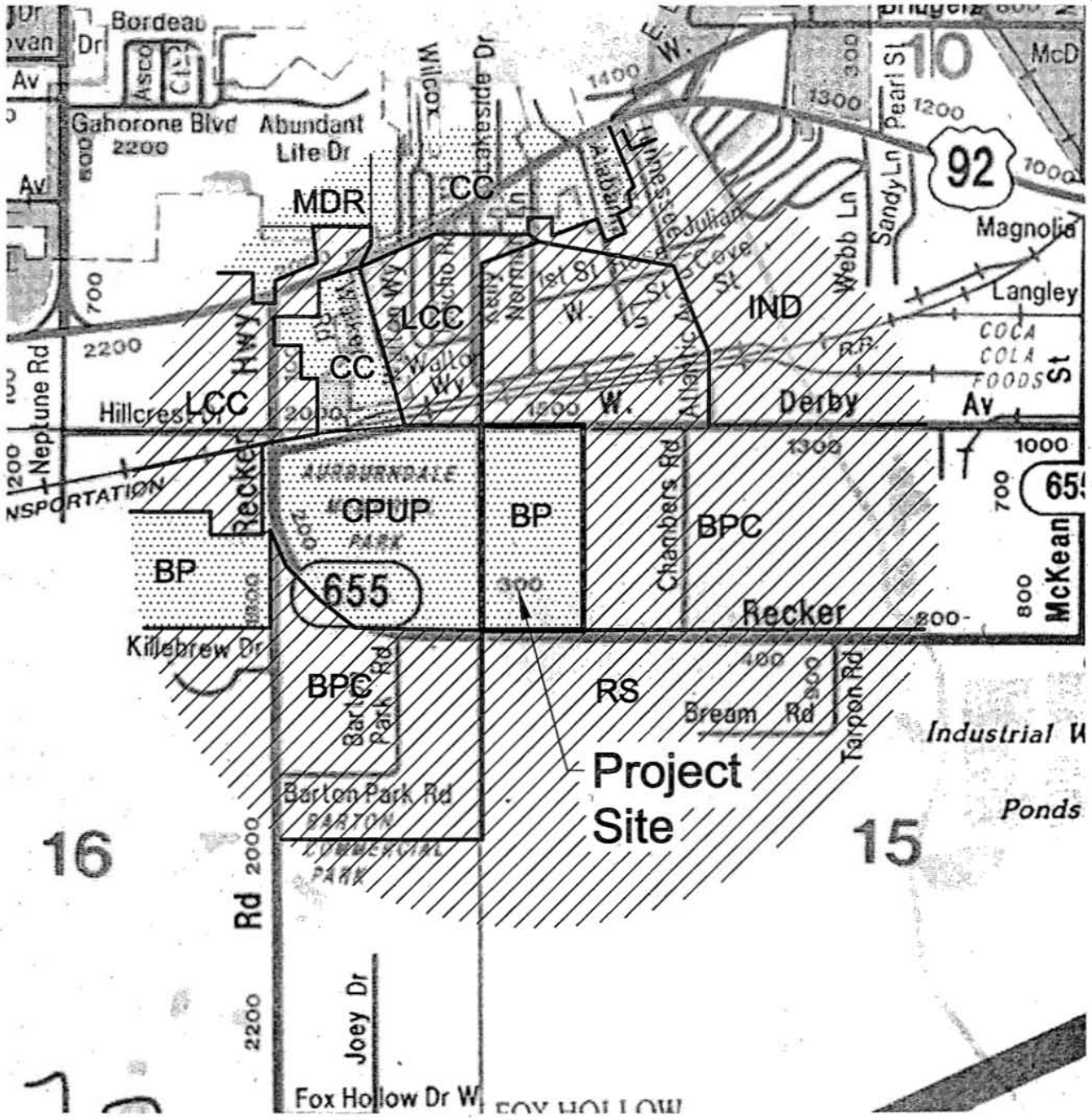
The Project will be located on vacant land and situated adjacent to the Auburndale Power Plant, Tampa Electric Company's Recker Substation, and 230-kV transmission lines. Locating the Project at the proposed Site allows for an efficient interconnection and the use of existing infrastructure (such as potable water, sanitary wastewater, natural gas supply, highway, electrical substation, and transmission lines).

The Project will be constructed within the boundaries identified for the Site (see **Appendix 10.6**, Boundary Survey). The Gulfstream Natural Gas System will supply natural gas by direct pipeline lateral to the Project Site boundary. The Osprey Energy Center will connect to the electrical grid at the existing adjacent Tampa Electric Company's Recker Substation located immediately adjacent to and east of the Site. All Project facilities will be constructed in the 19.5-acre Site that was annexed into the City of Auburndale.

2.2.2.1 Land Use

Local government comprehensive plans applicable to the Osprey Energy Center include the City of Auburndale Comprehensive Plan, as adopted on March 18, 1991 and last amended December 6, 1999. A Future Land Use Plan Map amendment for the City of Auburndale Comprehensive Plan has been sent to the Department of Community Affairs (DCA) to request that the proposed Site be designated as Future Land Use category Business Park. The Osprey Energy Center was found by the Auburndale Planning Commission and the City Commission to be consistent and in compliance with the City of Auburndale Comprehensive Plan and land use designation of Business Park on February 21, 2000 **(see Appendix 10.3)**.

Applicable portions of the City of Auburndale Comprehensive Plan, the Future Land Use Map, and the land use plan amendment transmittal resolution are contained in **Appendix 10.3**, Applicable Land Use and Zoning Information. Four copies of these documents also are being provided as a separate attachment, to meet the requirements of FAC Rule 62-17.121. Copies also are available for public inspection and copying at the main and local business offices of Calpine. Future Land Use designations for the City of Auburndale and Polk County are shown on **Figure 2.2.2-1.**



Auburndale Future Land Use Designations

BP	Business Park
CC	Commercial Corridor
CPUP	City Public Uses Park
MDR	Medium Density Residentual

Polk County Future Land Use Designations

BPC	Business Park Center
IND	Industrial
LCC	Linear Commercial Corridor
RS	Residentual – Suburban

N

0 500' 1000'
SCALE

REFERENCE

City of Auburndale Planning Staff, August, 1999
Polk County, Florida, Generalized 2010 Future Land Use, Nov., 1992

Golder Associates — Tampa, Florida

City of Auburndale and Polk County Future Land Use Designations

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: 1"=1000'	Job No. 993-9570
CHK BY: CA	DATE: 02/04/00	FIGURE 2.2.2-1
REV BY: –	FILE No.: fig2_2_2-1.dwg	

In addition to the local comprehensive plan, the proposed Project will be consistent with the applicable goals and policies of both the State Comprehensive Plan (Ch. 187, FS) and the Central Florida Regional Planning Council's Strategic Regional Policy Plan (April 1997). The proposed Project will be consistent with the goals and policies within the Natural Systems and Recreational Lands, Air Quality, Energy, Land Use, Public Facilities, Water Resources, Economy and Employment Elements of the State Comprehensive Plan. The goals and policies within the Central Florida Regional Planning Council's Strategic Regional Policy Plan that are relevant to the proposed Project are listed below:

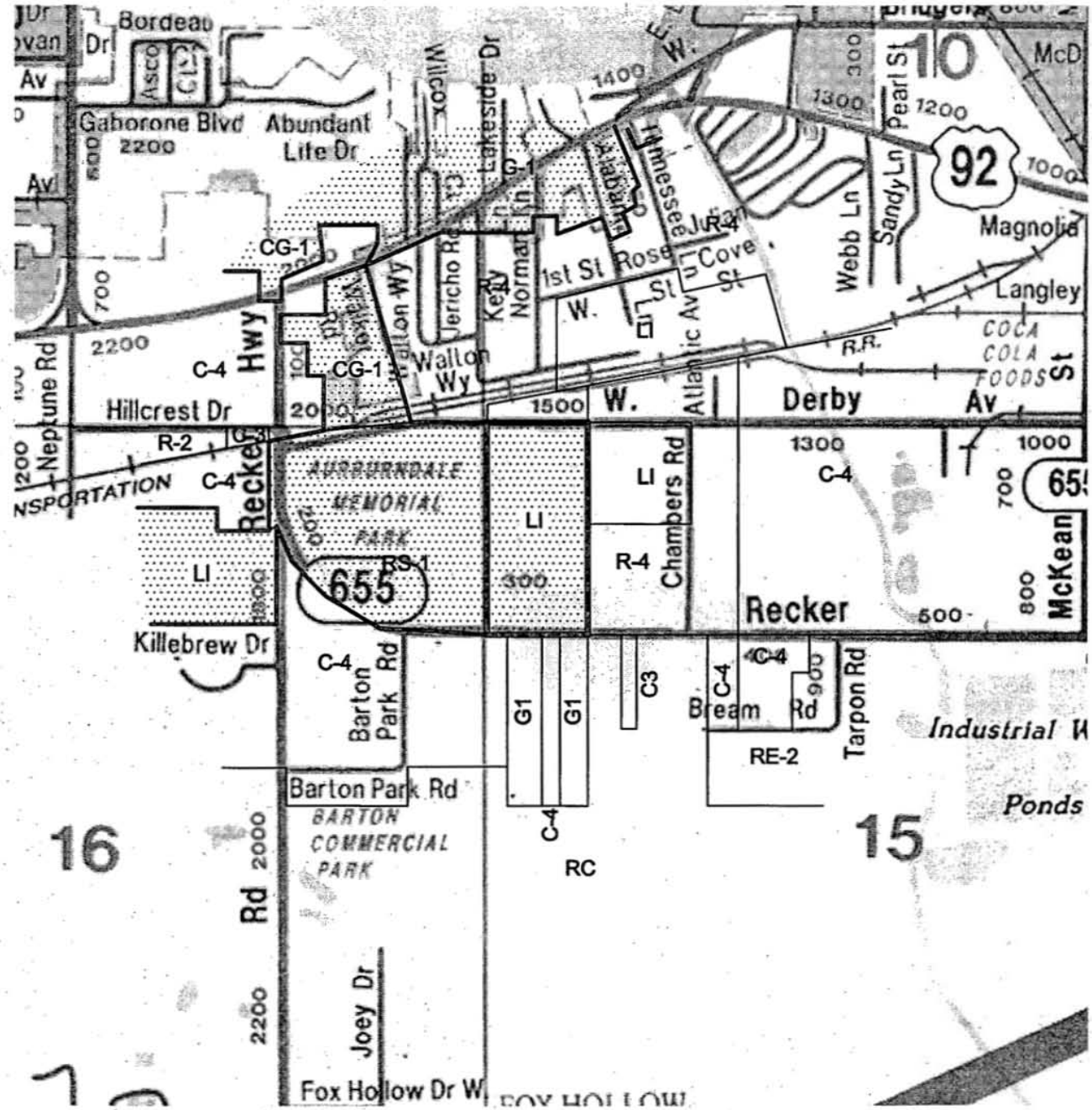
- Natural Resources, Regional Goal 1.1, Policy 1.1.2, pp. 1-17-1-20 and Regional Goal 1.18, Policy 1.18.1 and 1.18.2, pp. 1-64-1-67, and
- Economic Development, Regional Goal 2.4, Policy 2.4.2 and Strategy 2.4c, pp. 2-21.

The compelling reasons underlying the Site selection as the preferred location for the proposed Project include:

- The Project is compatible with existing land uses (including the adjacent Auburndale Power Plant, Cutrale Citrus, Florida Distillers, and SFE Citrus Processors, Ltd.) near the Site,
- There is existing electrical transmission infrastructure (Recker Substation and 230-kV transmission line) to serve the Project,
- There is an available and viable water source (reclaimed water from Allred Wastewater Treatment Plant), wastewater service, and highway access,
- There will be a new natural gas pipeline lateral along SR 655 (approximately 660 ft) to supply fuel to the Project,
- There are no significant natural resources on the Site, and
- It is compatible with the Future Land Use Element.

2.2.2.2 Zoning

The proposed zoning district for the Site is LI - Light Industrial (see **Figure 2.2.2-2)** as defined in Chapter 5, Section 5.6.14, Auburndale Land Development Regulations (LDR), adopted November 4, 1991. The adjacent, combined-cycle power plant, Auburndale Power Plant, is zoned Light Industrial (LI) by Polk County. The Light Industrial (LI) district from the City of



Auburndale Zoning Districts
- LI Light Industry
- RS-1 Single Family Residentual
- GI General Industrial
- CG-1 General Commercial

Polk County Zoning Distiicts
- C-3 Regional Commercial
- C-4 Heavy Commercial
- GI General Industrial
- R-4 Residentual
- RC Rural Conservation
- RE-2 Rural Estates

REFERENCE

City of Auburndale Zoning Map
Polk County Zoning Map, Feb., 2000

N

0 500' 1000'
SCALE

Golder Associates
Tampa, Florida

City of Auburndale and Polk Couny Zoning Districts

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: 1"=1000'	Job No. 993-9570
CHK BY: CA	DATE: 03/04/00	FIGURE 2.2.2-2
REV BY: –	FILE No.: fig2_2_2-2.dwg	

Auburndale is consistent with the Light Industrial zoning district used by Polk County for the adjacent power plant. Applicable portions of the LDR for the Site pertaining to zoning, and the zoning map are included in **Appendix 10.2**, Applicable Land Use and Zoning Information. Four copies of these documents also are being provided as a separate attachment to meet the requirements of FAC Rule 62-17.121.

The designation of the Site as a LI zoning district is consistent with the existing zoning patterns, and existing and future land use patterns, of the adjacent properties and is suitable for the proposed Project. The LDR allow service and commercial activities consistent with the general character and intensity in use in the LI district. The LDR prohibit institutional and residential uses in the LI districts because they are not in character with the activities conducted in the LI districts. The LDR are intended to prevent or minimize incompatibility between different types and intensities of uses in all districts and also to protect other uses. Most of the adjacent land uses in the area are either similar to or supportive of the proposed Project. The combination of future land use classifications and zoning districts on adjacent parcels confirm the suitability of the Site for LI uses. The Site plan and buffers will ensure compatibility with existing land uses adjacent to the Site and will integrate the Project with adjacent natural gas pipeline and transmission line infrastructure.

The LDR [Chapter 5, Section 5.6.14.10, Maximum Height of Structures] state that no structure shall exceed 150 feet except as provided in Section 5.2.4. The Osprey Energy Center will comply with this height limit.

Maximum noise levels, and the method of measurement in Industrial districts, are described in Article 3, Performance Standards, in the City's LDR (see Table 5.7.1-1), LDR Section 5.3.3.4, Maximum Permitted Sound Pressure Level (In Decibels) in Industrial Districts for required noise levels in Industrial Districts). A detailed assessment of Project compliance with the applicable noise standards may be found in Section 5.

There are some single family homes on the north side of Derby Avenue and the south side of Recker highway. These homes are in unincorporated Polk County. The design of the proposed Project, will minimize noise levels for property in unincorporated Polk County. The landscaping plans will comply with the City's landscaping requirements.

The Osprey Energy Center will be located, constructed, and operated in a manner consistent with Auburndale's Comprehensive Plan, Goals, Objectives, and Policies, and the zoning regulations in the LDR.

Parenthetically, the Polk County Planning Department is presently drafting Land Development Regulations that will rezone the R-4/Residential areas near the site to maximize compatibility with the Business Park Center Future Land Use category.

2.2.2.3 Concurrency Management

The proposed Project will not significantly impact roadways (as discussed in Sections 4.6.1 and 5.9.1 Transportation). All other Level of Service (LOS) standards for the City will be met without significant impact from the proposed Project as identified in **Appendix 10.7**, Concurrency Analysis.

Water and wastewater impact fees are calculated based on several factors, including the square footage of occupied buildings. Water and wastewater calculations indicate adequate existing capacity from the City is available for the Project (see **Appendix 10.7**, Concurrency Management System Report and City of Auburndale – Hemphill Property, Current Water and Sewer Capacity Analysis).

2.2.3 DEMOGRAPHY AND ONGOING LAND USE

2.2.3.1 Demography

The Site is located adjacent to the southwest municipal boundary of the City of Auburndale, in the northern region of Polk County, Florida. This region has seen a steady increase in development over the last 20 years. The once prevalent citrus industry has experienced a drastic

decline, making land available for commercial, industrial and residential uses, which in turn has fueled the trend for increased population in the region.

Incorporated municipalities within five-miles of the Site are the Cities of Auburndale, Lake Alfred and Winter Haven. **Table 2.2.3-1** lists the nearest communities and their total residential populations for 1980 and 1990. During that time the majority of population growth occurred northeast of the Site in Auburndale, causing a population increase of approximately 36.2-percent. Lake Alfred had an increase of 14.5-percent, Winter Haven had an increase of 17.1-percent and unincorporated Polk County had an increase of 27.4-percent. When compared to the 1990 populations, estimated 1997 populations show Auburndale with an increase of 5.9-percent, Lake Alfred with an increase of 4.9-percent, and Winter Haven with an increase of 3.7-percent (see **Table 2.2.3-2**).

As previously mentioned, the City has experienced a sizable increase in population. However, the population density is still low in the vicinity of the Site. Residential areas are small and scattered among commercial and light industrial businesses. A small group of homes is north of the Site and a small mobile home park is southwest of the Site. The general trend in the vicinity has been towards commercial and industrial businesses, which are replacing the citrus groves.

The City of Lake Alfred is located approximately five miles northeast of the Site. In 1990, the population was 3,163. Between 1980 and 1990, there was a population increase of 14.5-percent.

The City of Winter Haven, located between 3.5 to 5.0 miles east of the Site, is relatively highly urbanized. Between 1980 and 1990 Winter Haven experienced a population increase of 17.1-percent.

Polk County grew from a total population of 321,652 in 1980 to 405,382 in 1990, an increase of 26-percent (U.S. Bureau of the Census, 1990). In 1990, more than 67-percent of Polk County's population resided in incorporated communities with a majority of that population located in the north-central portion of the County.

Table 2.2.3-1. Historic Populations for Selected Communities and Unincorporated Areas in Polk County

Community	Population		Percent Change (1980-1990)
	1980	1990	
Unincorporated Polk County	190,071	242,195	27.4
Auburndale	6,501	8,858	36.2
Lake Alfred	3,163	3,622	14.5
Winter Haven	21,119	24,725	17.1

Note: The 1990 population counts are subject to adjustment for undercount or over count by the U.S. Bureau of the Census.

Sources: U.S. Bureau of the Census, 1990; Florida Almanac 1998-1999, by Del-Marth.

Table 2.2.3-2. Estimated Populations for Selected Communities and Unincorporated Areas in Polk County

Community	Population 1990	Estimated Population 1997	Percent Change (1990-1997)
Polk County	405,382	459,010	13.2
Unincorporated Polk County	242,123	284,960	17.7
Auburndale	8,858	9,378	5.9
Lake Alfred	3,622	3,799	4.9
Winter Haven	24,725	25,638	3.7

Source: Florida Statistical Abstract, 1998.

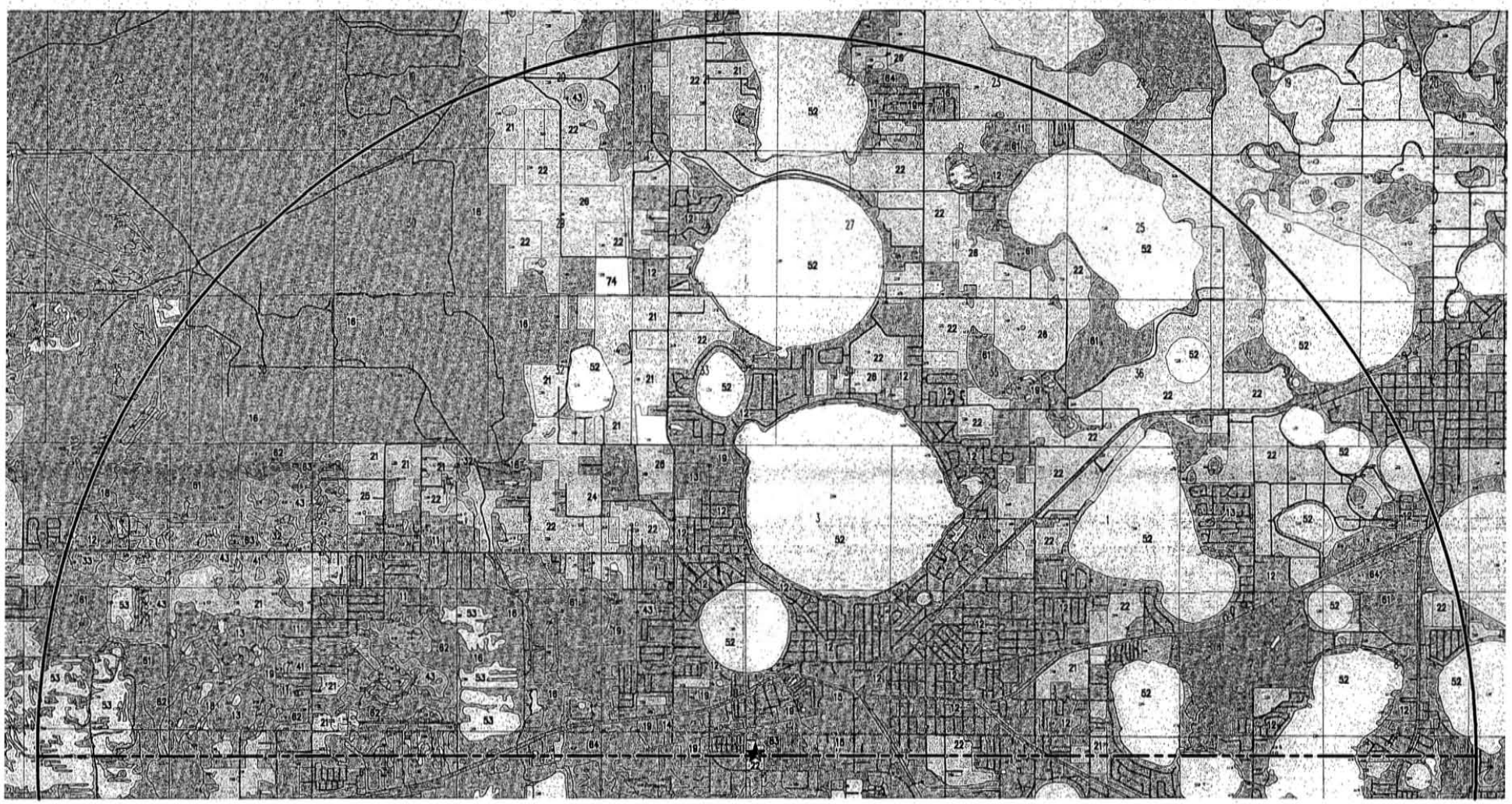
2.2.3.2 Ongoing Land Use

Reclaimed phosphate mining land, wetlands, citrus groves, and the developed areas of Auburndale, Lake Alfred and Winter Haven occupy significant tracts of land in the 5-mile radius. Citrus groves are the predominant agricultural activity in the area and occupy pockets of land south and southeast of the Site as well as throughout the study area. **Figures 2.2.3-1 through 2.2.3-3** depict the Florida Land Use, Cover, and Classification System (FLUCCS) map that indicates existing land use within an approximate 5-mile radius of the proposed plant [as determined by the Southwest Florida Water Management District (SWFWMD), updated in 1995]. Map data was verified with field reconnaissance by Golder planners during February 2000.

The on-going land use within a 5-mile radius of the Site varies considerably. A review of historical aerials and random field surveys on public right-of-way disclose no significant changes in the area's land use have occurred in the past 30 years except for the decline of acreage in citrus production. Changes in the near future, based on trends over the most recent years, will include:

- Decreased citrus grove activities outside urban areas,
- Increased industrial land use in Auburndale,
- Increased commercial development, particularly west of Auburndale, near the Polk Parkway and Highway 92, and
- Residential growth in the north part of Auburndale.

These changes are based on information obtained from the local and regional planning councils and discussions with local agencies. The City of Auburndale has patterns of industrial land use near the Site, and to the north and northeast, with residential land use areas located further north (see City of Auburndale and Polk County Existing Land Use Maps, **Figure 2.2.2-1**). Review of Auburndale's October 1998 Evaluation and Appraisal Report (EAR) disclosed an increase in industrial land use in the City. The industrial land use increased from 48 acres in 1977 to 170 acres in 1988 and increased further to 239 acres in 1997. Reclassification of land use (via development) accounted for 115 acres of industrial use; 12 acres of industrial land use were annexed into the City.



and Built-Up
d-Low Density
d-Medium Density
d-High Density
ial and Services
Recreational
(Urban)
ture
and Pastureland
an Lands (Rural)
and
d Brushland
ngeland
Forest
niferous Forests
niferous/Hardwood

Water
52 Lakes
53 Reservoirs

Wetlands
61 Wetland Hardwood Forest
62 Wetland Coniferous Forests
63 Wetland Forested Mixed
64 Vegetated Non-Forested Wetlands

Barren Land
74 Disturbed Land

Transportation, Communications and Utilities
81 Transportation
83 Utilities

★ Project Site Location

N

0 2000' 4000'
SCALE: 1" = 4000'

REFERENCE

1995 SWFMD Florida Land Use Cover and Forms Classification System

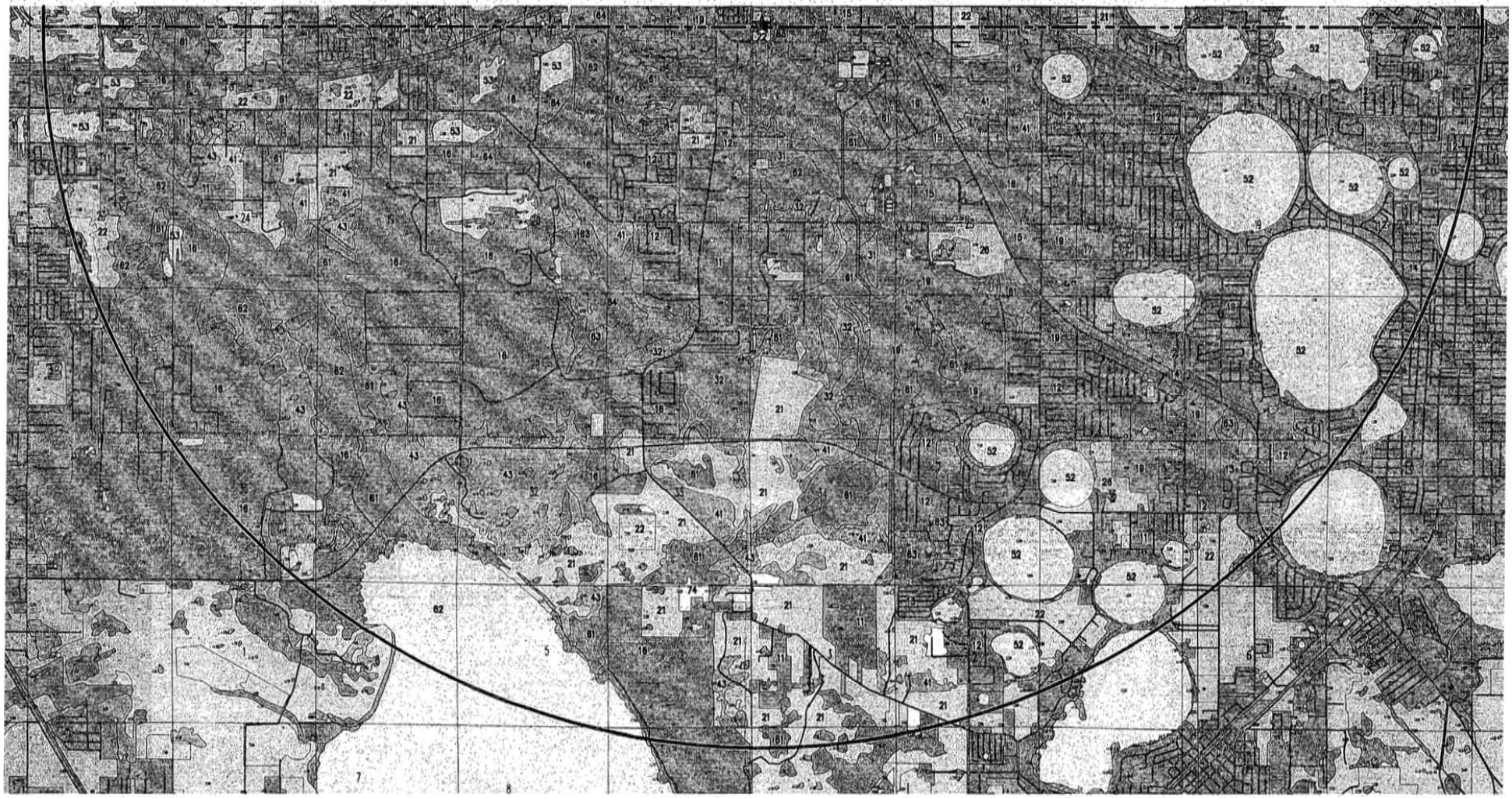
Golder Associates — Tampa, Florida

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

Existing Land Use
And Land Cover
5-Mile Radius North of Project

CAD BY:	CDT	SCALE:	1"=4000'
CHK BY:	RAZ	DATE:	03/10/00
REV BY:	—	FILE No.:	fig2_2_3-1.dwg

Job #
FIGUR



and Built-Up
-Low Density
-Medium Density
-High Density
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Recreational
ial
d (Urban)
lture
and Pastureland
e
en Lands (Rural)
land
us
d Brushland
ngeland
Forest
niferous Forests
niferous/Hardwood

Water
52 Lakes
53 Reservoirs

Wetlands
61 Wetland Hardwood Forest
62 Wetland Coniferous Forests
63 Wetland Forested Mixed
64 Vegetated Non-Forested Wetlands

Barren Land
74 Disturbed Land

Transportation, Communications and Utilities
81 Transportation
83 Utilities

★ Project Site Location

N

0 2000' 4000'
SCALE: 1" = 4000'

REFERENCE

1995 SWFMD Florida Land Use Cover and Forms Classification System

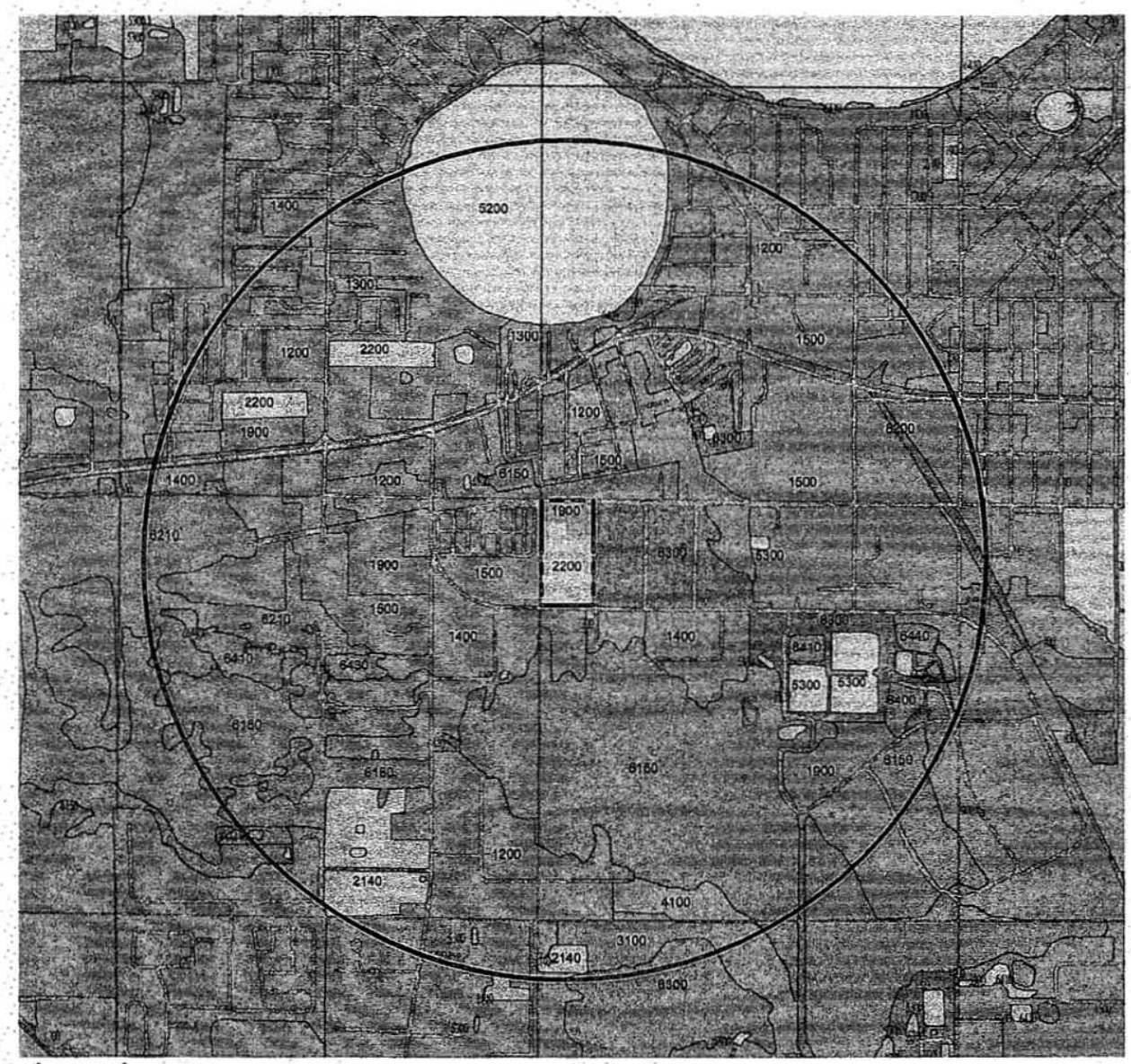
Golder Associates — Tampa, Florida

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

Existing Land Use
And Land Cover
5-Mile Radius South of Project

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Job
FIGUI



Legend

- Urban and Built-Up
  - 1200 Residentual – Medium Density
  - 1300 Residentual – High Density
  - 1400 Commercial and Service
  - 1500 Industrial
  - 1900 Open Land (Urban)
- Agriculture
  - 2140 Row Crops
  - 2200 Tree Crops
- Rangeland
  - 3100 Herbaceous
- Upland Forests
  - 4100 Upland Coniferous Forests
- Water
  - 5200 Lakes
  - 5300 Reservoirs
- Wetlands
  - 6150 Stream and Lake Swamp
  - 6210 Cypress
  - 6300 Wetland Forested Mix
  - 6400 Vegetated Non-Forested Wetlands
  - 6410 Freshwater Marshes
  - 6430 Wet Prairies
  - 6440 Aquatic Vegetation
- Transportation, Communications and Utilities
  - 8200 Communications
  - 8300 Utilities

Project Site Boundary

N

0 500 1000 2000

1"=2000'

REFERENCE

1995 SWFMD Florida Land Use Cover and Forms Classification System Map

Golder Associates

Tampa, Florida

Existing Land Use
And Land Cover
1 Mile Radius of Project Site

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: 1"=2000'	Job No. 993-9570
CHK BY: RAZ	DATE: 02/18/00	FIGURE 2.2.3-3
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2.2.4 EASEMENTS, TITLE, AGENCY WORKS

Donald Hemphill owns the property on which the proposed Project will be constructed. No titles or agency works will be obtained from any government agency for this Project.

No easements will be required to be obtained. The Project will require:

- Right-of-way access for a temporary driveway (for construction) to Recker Highway from FDOT,
- Right-of-way access for a driveway to Derby Avenue from Polk County, and
- Right-of-way use permits for connection to the 12-inch force main in Recker Highway right-of-way from Florida Department of Transportation (FDOT).

The City of Auburndale will require from FDOT right-of-way use permits for the reclaimed water and wastewater pipes planned for Recker Highway right-of-way.

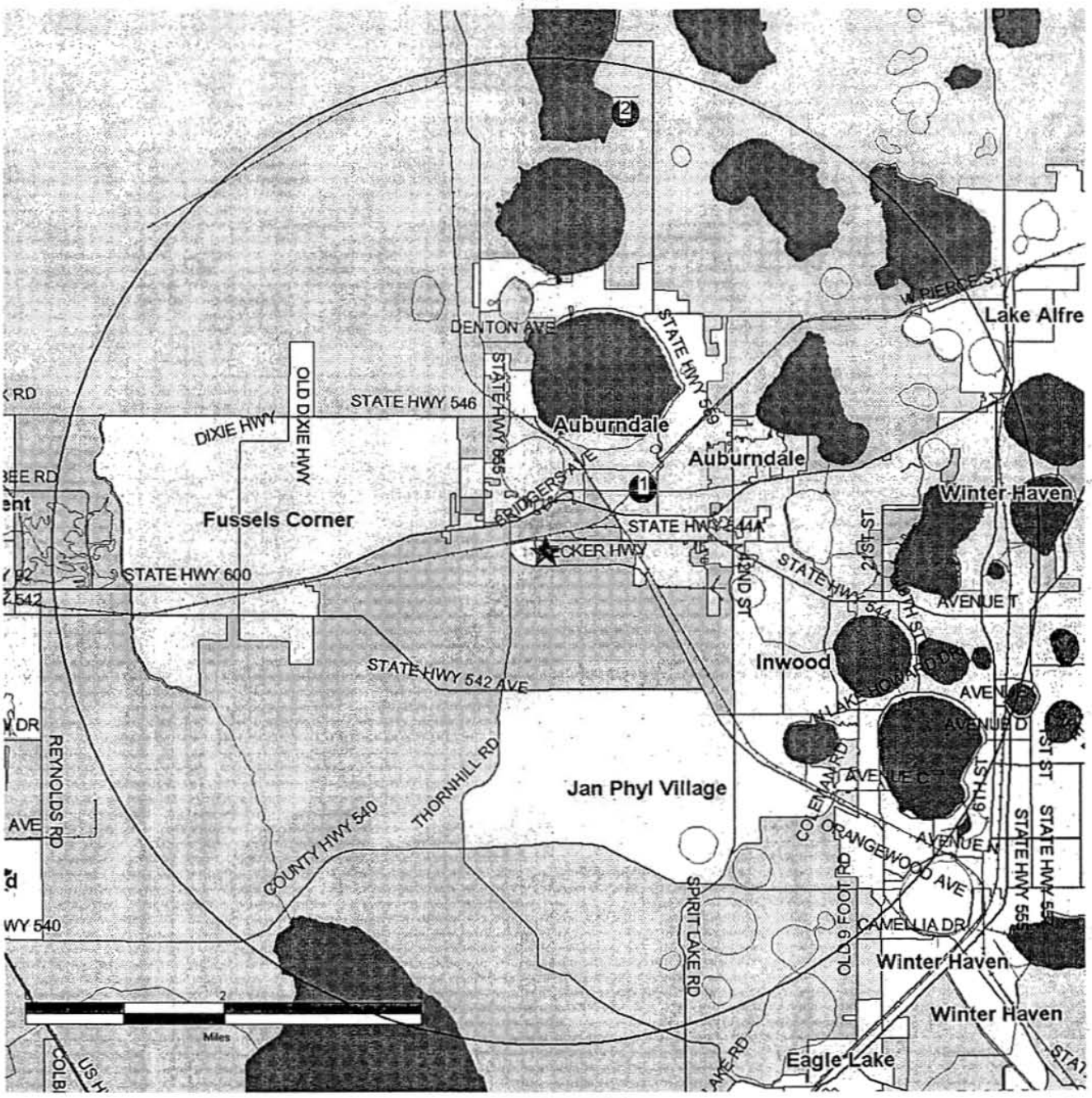
2.2.5 REGIONAL SCENIC, CULTURAL AND NATURAL LANDMARKS

There are no federal, state, regional, or local scenic or cultural or natural landmarks within a 5-mile radius of the proposed Project.

2.2.6 ARCHAEOLOGICAL AND HISTORIC SITES

The Florida Department of State, Division of Historic Resources has provided a letter stating that there are no significant archaeological or historical resources on the Site (see **Appendix 10.6,** Correspondence with Historical Agencies). The 5-mile radius includes two archaeological sites and two historical properties on the National Register of Historic Places (NRHP). The archeological sites are not mapped but have Reference Numbers 1538 and 1539 for Archeological Site Po-89 and Po-90, respectively.

Two NRHP sites located northeast of the Project are shown on **Figure 2.2.6-1.** The Auburndale Citrus Growers Association Packing House (NRHP Reference Number 97000794) at 2124 Orange Street in Auburndale is identified on the map approximately 0.5 mile northeast of the proposed Site. The Holland Jenks House (NRHP Reference Number 96000254) at 119 Raintree Court in Auburndale is shown on the map, approximately 4.6 miles north-northeast of the proposed Site.



Legend

Project Site ★

Nationally Registered Historic Place (12)

Historic Locations

1. Auburndale Citrus Growers Association Packing House
   214 Orange St.
   Auburndale, Florida
2. Jenks, Holland, House
   119 Raintree Ct.
   Auburndale, Florida

REFERENCE

NEPA Profile, National Register of Historic Places, EcoSearch, Nov. 1999

N

0 4000' 8000'
SCALE

Golder Associates
Tampa, Florida

National Register of Historic Places
5-Mile Radius

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	1"=8000'	Job No.	993-9570
CHK BY:	CA	DATE:	02/07/00	FIGURE	2.2.6-1
REV BY:	-	FILE No.:	fig2_2_6-1.dwg		

Each site's level of significance is considered to be "local" in terms of National Register of Historic Places criteria.

The Division of Historical Resources (DHR) concluded that no significant archaeological or historical sites are considered likely to be present at the Site, nor is it anticipated that the Project will impact any significant archaeological or historical sites. The proposed Project will not affect any sites listed, or eligible for listing, in the National Register of Historic Places, or any sites that are otherwise of national, state, or local significance (see **Appendix 10.8**). As discussed in Chapter Four, Section 4.5, the Project will not have any significant air quality or other impacts on areas listed with the NRHP.

2.2.7 SOCIO-ECONOMICS AND PUBLIC SERVICES

2.2.7.1 Social And Economic Characteristics

Polk County's labor force totaled 197,467 in 1998, an increase of 1.2-percent from a 1996 labor force of 195,064. This percentage increase is lower than the statewide labor force increase of 3.9-percent. The 1998 count represents 76-percent of the Central Florida Region's total labor force (see **Table 2.2.7-1**). Approximately three out of every four jobs in the Central Florida Region are located within Polk County. The Central Florida Region consists of DeSoto, Hardee, Highlands, Polk, and Okeechobee Counties. Polk County had the lowest annualized unemployment rate in the region (5.5-percent).

Average monthly employment statistics for Polk County and the Central Florida Region by major industry group are presented in **Table 2.2.7-2**. Between 1996 and 1998, employment in Polk County increased in each employment group with the exception of the agriculture, mining, and manufacturing industries, all of which experienced decreases. Most employment in Polk County and the Central Florida Region occurs in services and retail trade industries. These categories employ proportionately the same number of people when Polk County is compared to the region. Employment in transportation, communication, public utilities, and construction industry employment categories is similar on a percentage basis when compared to regional and state employment characteristics.

Table 2.2.7-1 1998 Labor Force, Employment, and Unemployment for Polk County, the Central Florida Region, and Florida

Area	Labor Force	Employment	Unemployment	Unemployment Rate (%)
Polk County	197,467	186,646	10,821	5.5
Central Florida Region	259,113	243,005	16,108	6.2
Florida	7,228,000	6,918,000	310,000	4.3

Source: Florida Department of Labor and Employment Security, Bureau of Labor Market and Performance

Information, ES-202 Program, in cooperation with the U.S. Department of Labor, Bureau of Labor Statistics.

Table 2.2.7-2 1998 Average Monthly Employment by Major Industry Group for Polk County, the Central Florida Region, and Florida

Industry	Polk County	Central Florida Region	Florida
Agriculture, Forestry, and Fishing	9,832	17,059	155,668
Mining	3,044	3,044	6,729
Construction	9,779	10,614	348,345
Manufacturing	20,570	22,184	493,015
Transportation, Communication and Public Utilities	8,811	9,941	328,892
Wholesale Trade	8,438	9,938	357,208
Retail Trade	40,562	49,835	1,324,769
Finance, Insurance and Real Estate	8,150	9,476	423,391
Services	43,263	53,625	2,210,111
Government	27,552	38,108	934,690
Other	383	541	29,961
TOTAL	180,384	224,365	6,612,779

Source: Florida Department of Labor Employment Security, Bureau of Labor Market and Performance Information, ES-202 Program, in cooperation of the U.S. Department of Labor, Bureau of Labor Statistics.

The service sector is also the largest industry in the Central Florida Region and the state. In 1998, approximately 46-percent of the County labor force was engaged in either the service sector or the retail trade industries. Approximately 11-percent of the labor force was employed by the manufacturing industry. While a significant portion of land in Polk County is dedicated to the mining industry, less than 2-percent of the county's workforce is employed in mining.

Personal income data for 1996 and 1998 are presented in **Table 2.2.7-3 and Table 2.2.7-4,** respectively. The majority of employment groups in private, non-farm industries in Polk County experienced an increase in personal income between 1996 and 1998. The largest increase came from the finance, insurance, and real estate segment. With the exception of the mining industry, all major employment groups experienced increases in personal incomes within Polk and the Central Florida Region. Wholesale trade showed the slowest personal income growth from 1996 to 1998, posting only an 11-percent increase. This pattern is also consistent with regional trends that depict decreased mining income growth and increased finance, insurance and real estate income for the same period. The largest industry in Polk County and the Region is the service sector, which generated 29- and 30.6-percent, respectively, of the total personal income in 1998. Additional income characteristics for Polk County is presented in **Table 2.2.7-5.**

Table 2.2.7-3 1996 Personal Income for the Major Private, Non-farm Industries in Polk County and the Central Florida Region

Private Nonfarm Industries	Income ($)	
	Polk County	Central Florida Region
Manufacturing	688,391,112	748,381,368
Mining	168,596,772	168,596,772
Contract Construction	246,132,592	291,105,340
Wholesale Trade	247,703,488	282,705,512
Retail Trade	698,381,572	831,653,916
Finance, Insurance, and Real Estate	224,470,684	262,828,008
Transportation, Communication, and Public Utilities	253,412,636	284,787,092
Services	1,069,605,148	1,269,286,548
Other	4,709,292	5,352,428
TOTAL	3,601,403,296	4,144,696,984

Source: Florida Department of Labor and Employment Security, Bureau of Labor Market and Performance Information, ES-202 Program, in cooperation with the U.S. Department of Labor, Bureau of Labor Statistics.

Table 2.2.7-4. 1998 Personal Income for the Major Private, Non-Farm Industries in Polk County, the Central Florida Region, and Florida

	Income ($)		
Private Non-Farm Industries	Polk County	Central Florida Region	Florida
Manufacturing	783,696,384	830,968,516	17,452,189,105
Mining	148,545,084	148,545,084	276,147,411
Contract Construction	325,359,820	369,142,860	10,097,209,100
Wholesale Trade	286,718,400	327,250,708	13,860,477,915
Retail Trade	856,095,008	1,003,708,600	22,763,423,028
Finance, Insurance, and Real Estate	290,862,120	324,929,964	17,225,450,733
Transportation, Communication, and Public Utilities	311,121,340	345,846,436	11,583,660,132
Services	1,231,568,604	1,481,426,900	60,092,504,733
Other	9,581,440	11,606,856	763,339,485
TOTAL	4,243,548,200	4,843,425,924	154,114,401,642

Source: Florida Department of Labor and Employment Security, Bureau of Labor Market and Performance Information, ES-202 Program, in cooperation with the U.S. Department of Labor, Bureau of Labor Statistics.

Table 2.2.7-5 1999 Income Characteristics for Polk County

Income Characteristics	Polk County ($)
Per Capita Income (1999)	$17,456
Median Income - Household	$32,496
Median Household Wealth	$70,743

Note: For comparative purposes, Project wages are estimated at $41,600 for construction employees and $40,000 for operation employees.

Source: Claritas, Inc., 1999 - Arlington, VA

In addition to the private, nonfarm industries depicted in **Tables 2.2.7-3 and 2.2.7-4** farm and government industries contribute to personal income. In the farm industry, Polk County posted a 2.4-percent decrease in total personal income from 1996 to 1998.

In Polk County, government industry personal income increased 19-percent between 1996 and 1998. Polk County government industries generated 72.7-percent of the region's personal income in the government sector in 1998.

In 1999, Polk County had an estimated total of 178,430 households, with an average size of 2.59 people per household. This represents a 14-percent increase in the number of households from those counted in the 1990 census. The average household size is somewhat above the average for the state (2.47 people per household). The number of households is projected to increase to 193,250 by 2004. This is an 8.3-percent increase over current levels.

The estimated median housing value for Polk County is $78,079 with most housing (61.9-percent) valued between $50,000 and $124,999. Polk County permitted 3,323 housing units in 1998. This represents a 27-percent increase over the 2,626 units permitted in 1996. Eighty-six percent of the housing units permitted in 1998 were single family dwellings. The majority of the permitted units (72-percent) are located in the unincorporated areas. Of the incorporated municipalities, Lakeland had the largest number of permitted units (532), which included 204 single family dwellings.

2.2.7.2 Transportation

Access in and around the area surrounding the Site is dominated by private vehicles. Public transit facilities serving the local area (five-mile radius) include:

- Citrus Connection Bus Transportation, providing buses to and from Winter Haven, and
- Polk County Transportation Department, providing response on demand by disabled local residents.

Figure 2.2.7-1 shows the major rail lines and road routes to and surrounding the Site. The following paragraphs describe the routes that the construction and operation work forces are expected to travel.

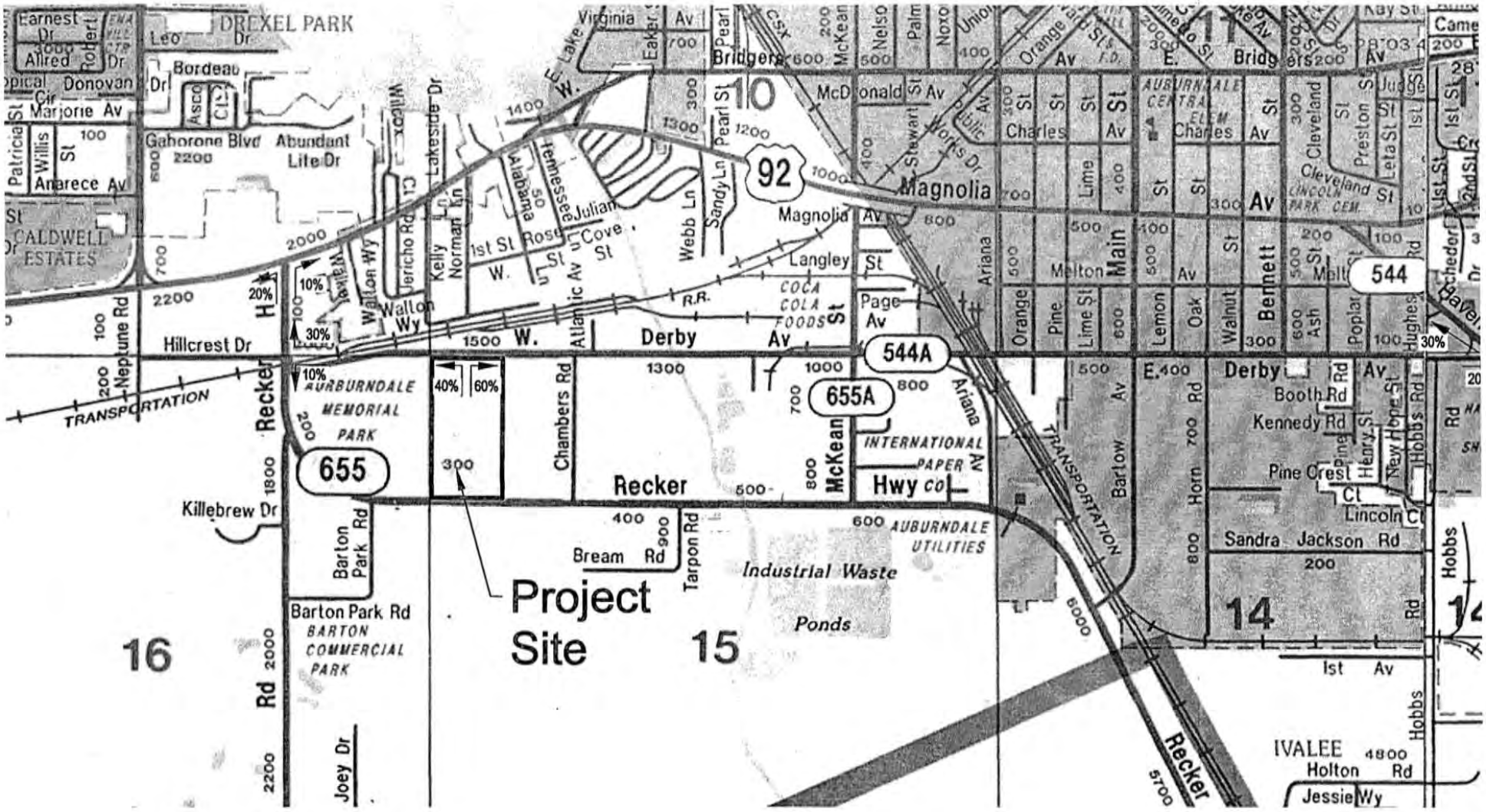
The Project will be located on the south side of CR 544A (Derby Avenue). The Site extends south to the north right-of-way of SR 655 (Recker Highway). The only transportation access to the Site will be from driveways connecting to Derby Avenue, a two-lane undivided roadway classified as a Major Collector. The current average daily traffic on Derby Avenue is approximately 436 trips during the peak hour of the peak season. Even with the existing traffic, there is adequate capacity for the projected traffic that will be created by the Osprey Energy Center.

The heavily developed portions of Auburndale are located to the north of the Site, both to the east and west. Access to these areas will be obtained by traveling west on Derby Avenue and then north on Recker Highway or east on Derby Avenue and then north on any of the local streets that connect to Derby Avenue.

Winter Haven is located to the southeast of the Site. Workers from the Site will obtain access to this community by traveling east along Derby Avenue and then southeast along Havendale Boulevard, a six lane divided Major Arterial highway.

The City of Lakeland is located west of the Site. Access from the Site to this community will be provided by traveling west on Derby Avenue, north on Recker Highway (a two-lane undivided Major Arterial highway), and then west on US 92, a four-lane divided Principal Arterial. CSX Transportation operates a rail line, which runs in an east-west direction north of the Site. Travelers on Havendale Boulevard need to travel over an at-grade crossing with this railroad track in order to reach US 92.

Winter Haven Municipal Airport (Gilbert Field – S. Gilbert Airport) is a public licensed airport or airfield located within a five-mile radius of the proposed Site. It is over 1.5 miles from the Site. The airport is depicted on **Figure 2.2.1-1.**



0% of the eastbound traffic on Derby Avenue is ssumed to use local roads.

NCE

ıter Haven–Bartow, Street Atlas of Polk County, Florida; ıbe Store, 1997–1998

Golder Associates — Tampa, Florida

Client / Project: Calpine Construction Finance Company, L.P. Osprey Energy Center

Major Transportation Ro

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2.2.7.3 Medical Facilities

The nearest hospital to the Site is Winter Haven Hospital. There are also three convalescent/nursing homes within a five-mile radius of the Project Site (see **Table 2.2.7-6**).

In addition to the 562 bed Winter Haven Hospital (located four miles to the east) there is the Lakeland Regional Medical Center (located 12 miles to the west) and the Heart of Florida Regional Medical Center (located approximately 10 miles to the east). The regional medical centers provides specialized medical treatment to the residents of Auburndale.

2.2.7.4 Firefighting Facilities

Fire fighting equipment and services are available via 32 stations located throughout Polk County. The City of Auburndale has one fire station that serves the City. Auburndale also has subcontracted with the Polk County Fire Department. The City of Auburndale fire station and the nearby Polk County fire stations provide on-call backup support for each other. Fire hydrants are in place in the vicinity of the Site and can provide a sufficient source of water for emergency fire fighting requirements and can supplement the tankers provided by both agencies. **Table 2.2.7-7** lists the available fire fighting equipment in the Site vicinity.

The primary responder to the Site is the Auburndale Fire Station (City of Auburndale) located approximately 1.5 miles to the northeast. The station is equipped with four pumpers and two tankers (one tanker carries 3,000 gallons of water). It is staffed daily with seven people and has a total of 17 career fire fighters (full-time employees) plus volunteers. The estimated response time from the station is approximately three to four minutes.

First backup support is provided by the Jan-Phyl Village Fire Station (Polk County Fire Station #15, located approximately 3.75 miles to the southeast in Winter Haven). The station is equipped with two pumpers and one tanker. It has two career fire fighters and 12 volunteers. The estimated response time from the station is approximately six minutes.

Second backup support is the Eagle Lake Fire Station (Polk County Fire Station #32, located approximately 5.75 miles to the southeast in the city of Eagle Lake and is the specialty station for

Table 2.2.7-6. Medical Facilities Within a 5-Mile Radius of Osprey Energy Center

Hospital
Winter Haven Hospital 200 NE Avenue F Winter Haven, FL 33881
Convalescent and Nursing Homes
Integrated Health Services of Florida 919 Old Winter Haven Road Auburndale, FL 33823
Mariner Health of Winter Haven 1540 NW 6th Street Winter Haven, FL 33881
Winter Haven Health and Rehabilitation Center 202 NE Avenue O Winter Haven, FL 33881

Table 2.2.7-7 Fire Fighting Equipment Available to the Communities within Approximately 10 miles of the Osprey Energy Center

Community	Equipment	
	Pumpers	Tankers
City of Auburndale 107 Tampa Street Auburndale, FL 33823	4	2[a]
Polk County Jan-Phyl Village (Station #15) 21 Coleman Road S.W. Winter Haven, FL 33881	22[b] 2	28[c] 1
Eagle Lake (Station #32) 185 3rd Street S. Eagle Lake, FL 33839	1[d]	N/A[e]
Rifle Range (Station #25) 118 Rifle Range Road N. Winter Haven, FL 33880	1	1
Buckeye (Station #5) 250 Buckeye Loop Road Winter Haven, FL 33880	N/A[f]	N/A

[a] One tanker carries 3,000 gallons of water.
[b] These 22 Polk County tankers carry a minimum of 1,500 gallons of water, plus all equipment and fire fighters throughout the county provide backup support.
[c] Polk County pumpers provide a minimum of 1,000 gpm of water.
[d] Plus one-95 foot aerial truck, and one HAZ-MAT truck and team.
[e] Plus two rescue vehicles available.
[f] There are no pumpers or tankers at this location, but it houses a 50-foot ladder truck.

Sources: City of Auburndale Fire Department, January 2000.
Polk County Fire Department Administrative Offices, January 2000.

Polk County). It houses the HAZ-MAT team and truck, the 95-foot aerial truck, and one pumper.

Other nearby backup support will be available from the Rifle Range Fire Department (Polk County Station #25, located approximately 7.5 miles southeast on Rifle Range Road North) and the Buckeye Station (Polk County Station #5, located approximately 6.5 miles to the east on Buckeye Loop Road near Winter Haven). Station #25 has one pumper and one tanker. Station #5 has one of three ladder trucks available in the county.

If needed, any of the equipment or staff in the 32 Polk County Fire Department stations can be called to the Site (see **Table 2.2.7-7**). The available equipment includes twenty-two tankers, two rescue trucks, one HAZ-MAT truck, three ladder trucks, one aerial truck, and 28 pumpers that provide a minimum of 1,000 gallons per minute (gpm). The staff includes 145 career fighters (one third of which have special training in "Level A Entry" for hazardous materials), one HAZ-MAT specialty team (located at the Eagle Lake Station) and 305 volunteer fire fighters.

On-site fire protection will be addressed by complying with applicable fire codes and providing an interconnection to the City of Auburndale's water main. The connection with the water main will be for both potable and fire protection use. Additionally, the plant will have a water storage tank with a dedicated storage volume of water for fire protection uses.

The fire protection system (tanks, pumps, hydrants, extinguishers etc.) shall be in accordance with NFPA 24 and NFPA 850 (National Fire Protection Association) and to provide protection for the facility. A fire detection system will be provided to activate alarms upon sensing the presence of a fire within the designated zones throughout relevant portions of the facility. Detection systems will be in accordance with NFPA standards and will be capable of sensing a fire by one or both of the following methods:

- Ionization smoke detectors, and
- Rate-compensated heat detectors.

Ionization smoke detectors will be employed in those zones where fire would result in the rapid accumulation of smoke or vapors. Such zones would include all electrical room and electrical structures. Rate-compensated heat detectors shall be employed in those zones where intense radiant and convective heat would be generated by fire. Fire generating warning horns separate from the facility enunciator will be stationed in several locations within the facility. To allow manual initiation of a fire alarm, manual pull stations will be equipped with a dual action releasing lever to reduce chances of accidental operation.

2.2.7.5 Police Protection

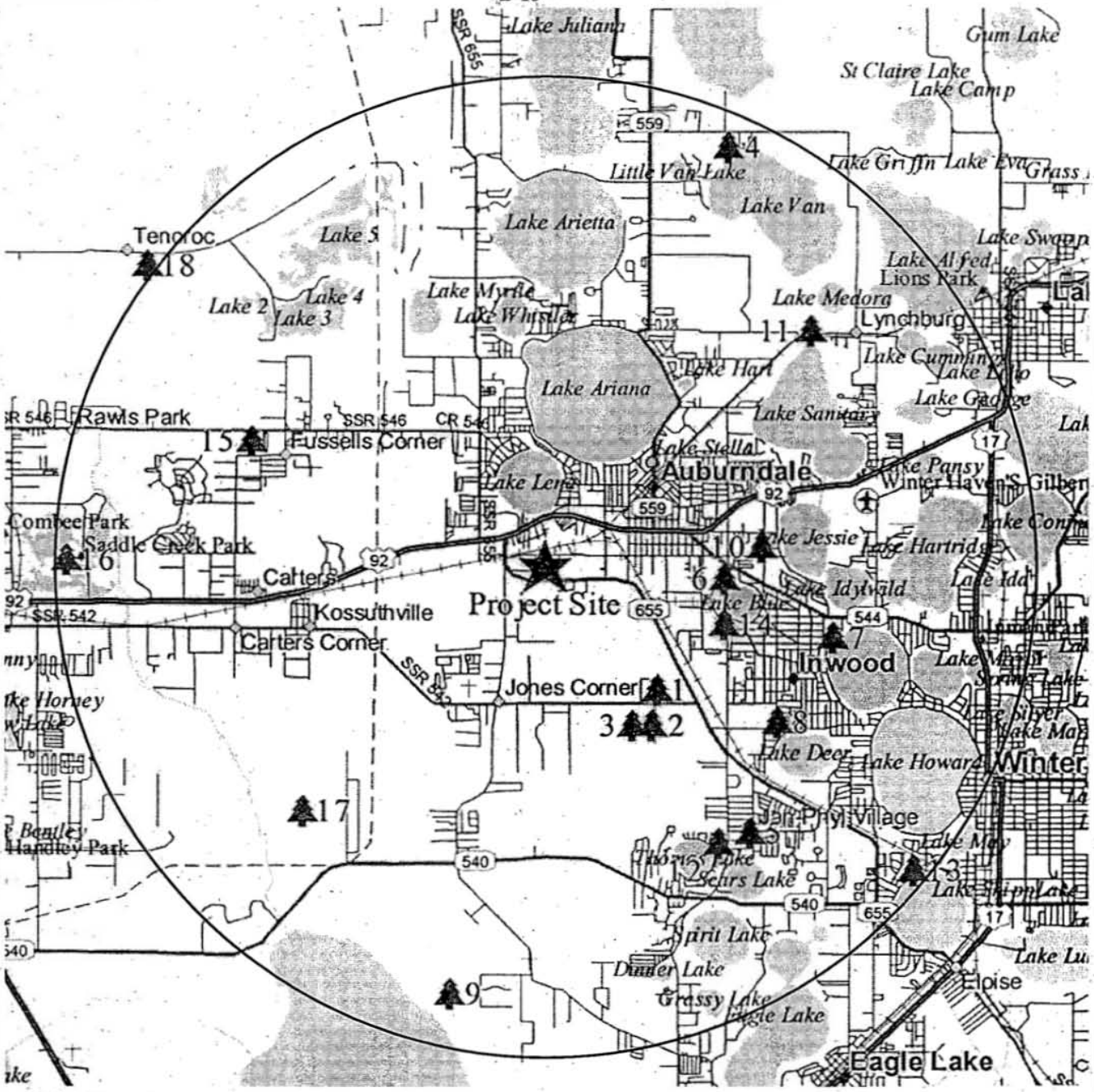
The Site is situated in Auburndale's municipal city limits on the city's southwestern boundary. Unincorporated Polk County borders the Site on the east, south, and north. Police protection services will be provided by both the City of Auburndale Police Department and the Polk County Sheriff's Department upon request.

The City of Auburndale Police Department offers a variety of policing services to the Auburndale community and will be the primary responder to the Site. The Auburndale police department has one station, located at 105 Tampa Street (approximately 2.5 miles northeast of the Project Site). Estimated emergency response time is approximately 2 minutes. This station has a total of 28 officers.

The Polk County Sheriff's Department primary response area is unincorporated Polk County. However, it also provides assistance to municipalities within the county upon request. The Project Site is located in the sheriff department's East Region, Central District service area. The closest sub-station is in "K-ville" (close to Kossuthville and within two miles of the Project Site). Response time will vary, depending upon the location of patrol cars when they receive the call.

2.2.7.6 Recreation Facilities

Federal, state, county and city parks and recreational facilities located in the 5-mile radius area are depicted on **Figure 2.2.7-2.**





0 4000' 8000'

SCALE: 1" = 8000'

Legend

Park / Recreation

Federal, State, County and City Parks and Recreational Areas Within a 5 Mile Radius

1. Auburndale Youth Soccer Association
2. Auburndale Youth Softball Complex
3. Fairgrounds Park
4. Green Swamp
5. Jan-Phyl Village Park
6. Lake Blue Boat Launch
7. Lake Cannon Park
8. Lake Deer Boat Launch
9. Lake Hancock Mine
10. Lake Jessie Boat Launch
11. Lake Mariana Boat Launch
12. Lake Sears Boat Launch
13. Lake Shipp Park
14. Lake Wales Ridge Ecosystem – Blue Lake
15. Midway Gardens
16. Saddle Creek Park
17. Saddle Creek Strip Mine
18. Tenoroc State Recreation Area

REFERENCE

NEPA Profile, State Parks and Forests, EcoSearch, Nov., 1999
City of Auburndale Parks Department, Dec., 1999
Polk County Parks Department, Dec., 1999

Note: See Figure 2.2.7-3 for City Recreation Areas

Golder Associates — Tampa, Florida

Federal, State, County and City Parks and Recreational Areas 5-Mile Radius

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: 1"=8000'	Job No. 993-9570	
CHK BY: RAZ	DATE: 03/10/00	FIGURE 2.2.7-2	
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Polk County contains two state parks (Lake Kissimmee and Lake Arbuckle), one special water area, and several state-owned fish management areas. None of these facilities are located within five miles of the proposed Site.

Twenty-one community parks and recreation areas operated by the City of Auburndale (see **Figure 2.2.7-3**) and 11 public parks operated by Polk County are within a 5-mile radius of the Project. There are six state parks and forest, but no federal recreation areas within this same five-mile radius. Plus, there are approximately 52 other county parks, and 11 state and federal parks, recreation and conservation areas available within a 25-mile radius.

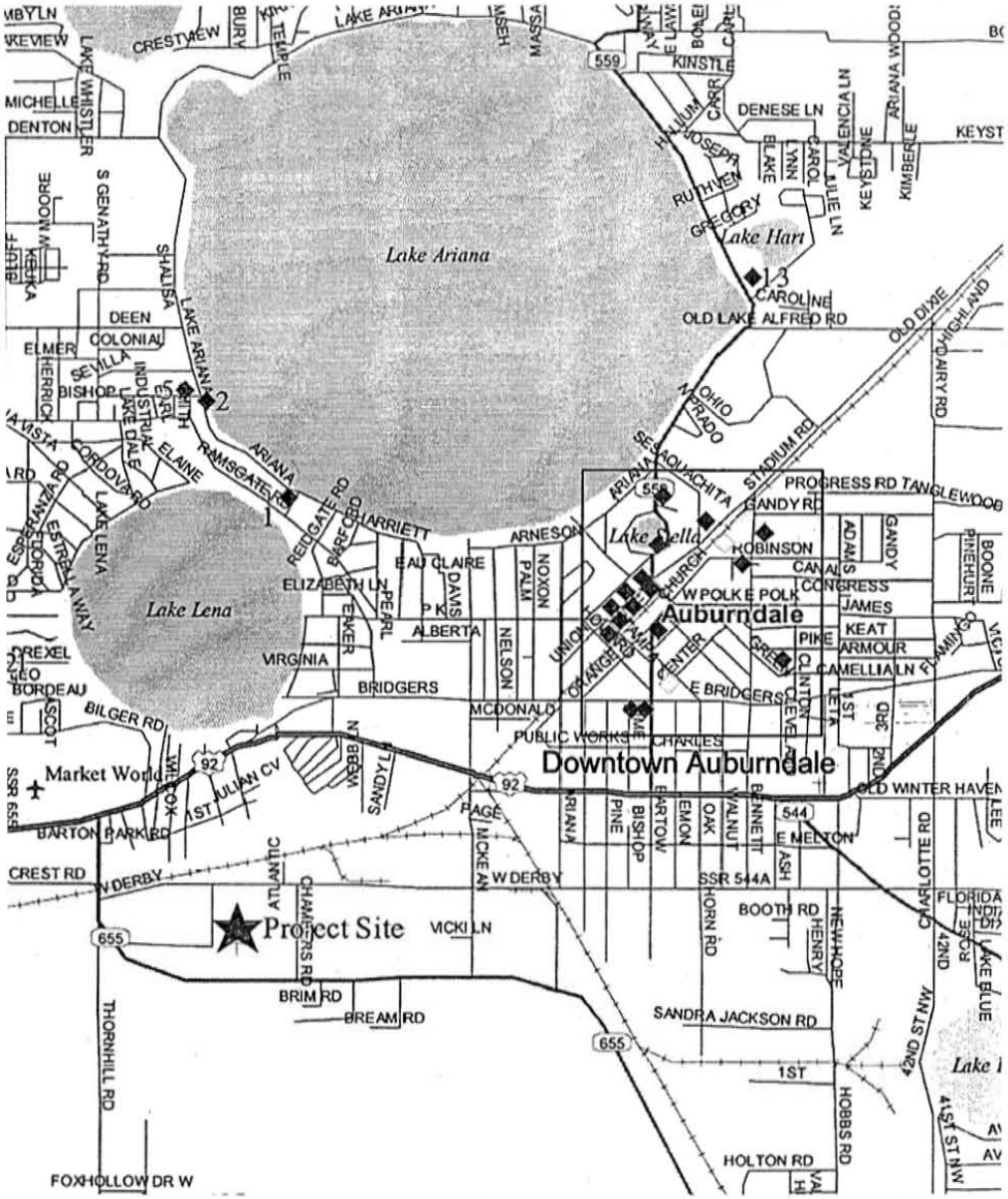
2.2.7.7 Electric And Gas

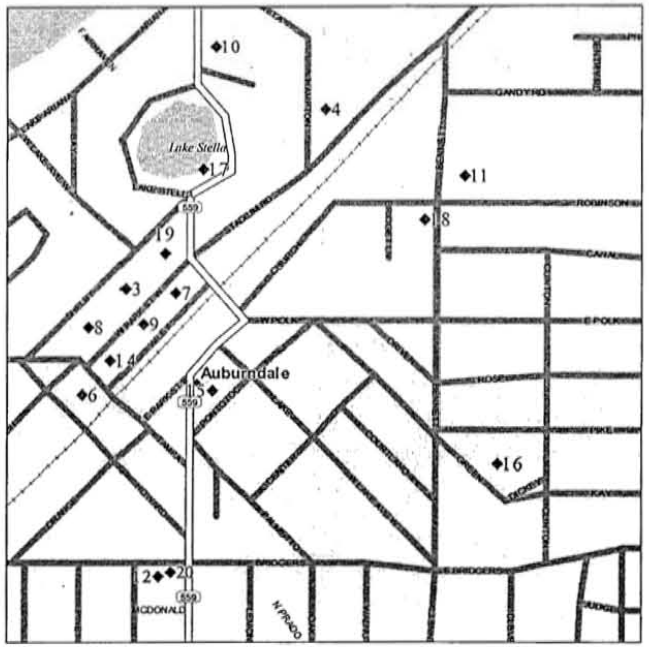
Electric power service will be required on site during the construction phase of the Project. Tampa Electric Company will provide this service. The basic electrical requirement for service to the Site during construction will be one or two 3-phase circuits stepped down to 4160 V/480V/120V. During normal day-to-day operations of the Osprey Energy Center, the plant will supply its own internal electrical needs, independent of outside service. Additionally, power will be available from Tampa Electric Company to allow start-up of the plant.

No gas service will be required during construction. During plant operation, Gulfstream Natural Gas System will supply natural gas transport by direct pipeline lateral to the Project.

2.2.7.8 Water Supply Facilities

The City of Auburndale has a municipal treatment and distribution system for City residences and businesses. The City's potable water supply is proposed to be used to supply the Project's potable needs only. Wastewater effluent (reclaimed water) and on-site wells will be used to the greatest extent possible to minimize use of the City's potable water resources. The City potable water main runs along the southern boundary of the Site, in the Recker Highway right-of-way. This water main is a 12-inch diameter pipe buried approximately 3.5 feet below ground surface. The available capacity is identified in **Appendix 10.7**, Concurrency Management System Report. The City's facilities are designed for 6.46 million gallons per day (mgd) capacity. Remaining plant capacity is 2.9 mgd (45-percent).





Downtown Auburndale

City of Auburndale Parks and Recreations Facilities

1. Ariana Beach Clubhouse
2. Ariana Beach Yacht Club
3. Auburndale Civic Center
4. Auburndale Little League Baseball
5. Auburndale Municipal Beach
6. Auburndale Municipal Racquetball Courts
7. Auburndale Munipal Tennis Courts
8. Auburndale Senior Center
9. Auburndale Shuffleboard Courts
10. Auburndale Youth Basketball League
11. Auburndale Youth Football League
12. Bridgers Basketball Courts
13. Carol Boulevard Neighborhood Park
14. Downtown Basketball Courts
15. Downtown City Park
16. Lake Dickey Park
17. Lake Stella Park
18. Miss Auburndale Youth Softball
19. Recreation Hall
20. Rev. Earl Wright Park
21. Tropical Acres Neighborhood Park

Note: The Auburndale Youth Soccer Association and Youth Softball Complex located in the Polk County Fairgrounds Park (See Figure 2.2.7-2).

NCE

urndale Parks and Recreation Department, Dec., 1999

Golder Associates — Tampa, Florida

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

City of Auburndale Parks and Recreatio Facilities

CAD BY:	CDT	SCALE:	1"=2000'
CHK BY:	RAZ	DATE:	02/07/00
REV BY:	–	FILE No.:	fig2_2_7-3

2.2.7.9 Sewage Treatment Facilities

Calpine will initially fund a capital improvement for additional ultraviolet treatment at the Allred Wastewater Treatment Plant for the purpose of meeting "highly disinfected" water standards as defined in Chapter 62-610, FAC. This will allow the reclaimed water to be used in areas with unrestricted public access, if the reclaimed water is not used at the Project (e.g., during times of plant maintenance).

A City sewer main runs along the southern boundary of the Site. The water main is a 12-inch diameter pipe buried approximately 3.5 feet below the ground surface. The total plant capacity for Auburndale is 1.4 million gallons per day (mgd), with 0.66 mgd of plant capacity (47.2-percent) unused on average. It is anticipated that three connections with the City's wastewater treatment facilities will be required. These are described below:

1. The domestic sewage discharge from the Project will go to the Allred Wastewater Treatment Plant via an existing pipeline.
2. Non-contact cooling water blowdown and other process wastewater will be directed via new pipelines to the City's facilities at the Allred Wastewater Treatment Plant or the Regional Wastewater Treatment Plant. These two wastewater treatment facilities are operating under permits issued by the FDEP under provisions of Chapter 403, Florida Statutes.
3. A new reclaimed water supply line will be built from the Allred Wastewater Treatment Plant to the Project.

2.2.7.10 Solid Waste Disposal

During both the construction and operational phases of the Project, contract services for solid waste/trash collection and management will be used. The local, solid waste disposal site for non-hazardous materials (serving the Auburndale area) is the Polk County North Central Landfill, located on Highway 540 near Lakeland, Florida. This landfill is approximately 3.5 miles to the west/southwest of the Site.

As required by law, any hazardous wastes (paints, solvents, used oil, etc.) will be collected and transported (under manifest by a duly licensed waste management contractor) to a certified

hazardous materials transfer station for eventual management at an FDER and/or EPA-approved facility.

2.2.8 EDUCATION

There are a number of schools and learning facilities that range in levels from pre-school through junior college located in the Auburndale and Winter Haven areas. There are also three public libraries and one college library located in Auburndale and Winter Haven. The majority of the facilities are located more than 5 miles from the Site.

Within in a 5-mile radius of the Site there are five public elementary schools, two public middle schools, one public high school, one public adult school, and one public technical school (see **Table 2.2.7-8**). There is also a private vocational school (accredited as a junior college), and two private pre-kindergarten through eighth grade schools. However, there are no educational facilities within a 1-mile radius of the Site.

Six miles east of the Site is the Winter Haven campus of Polk Community College. To the west, in the City of Lakeland, is a satellite campus that offers various courses, including courses for the Power Generation Process Technology degree program. The availability of such training increases the likelihood that local residents will be qualified and hired as employees at the Osprey Energy Center.

The City of Auburndale Public Library is located approximately two miles to the east, the Winter Haven Public Library is approximately 5.5 miles to the east, southeast; and the City of Eagle Lake Public Library is approximately 5.5 miles to the south, southeast.

Table 2.2.7-8 Educational Facilities Within a 5-Mile Radius of Osprey Energy Center Public Schools

PUBLIC SCHOOLS
Auburndale Central Elementary, 320 Lemon Street, Auburndale, FL 33823
Boswell Elementary, 2820 K-Ville Avenue, Auburndale, FL 33823
Caldwell Elementary, 141 Dairy Road, Auburndale, FL 33823
Inwood Elementary, 2200 NW Avenue G, Winter Haven, FL 33880
Lena Vista Elementary, 208 S. Berkley Road, Auburndale, FL 33823
Stambaugh Middle School, 226 N. Main Street, Auburndale, FL 33823
Westwood Middle School, 3520 NW Avenue J, Winter Haven, FL 33881
Auburndale High School, 1 Bloodhound Trail, Auburndale, FL 33823
East Area Adult & Community School, 300 E. Bridgers Avenue, Auburndale, FL 33823
Ridge Technical Center, 7700 State Road 544, Winter Haven, FL 33881
PRIVATE SCHOOLS (PRE-KINDERGARTEN – EIGHTH GRADE)
St. Joseph's Catholic School, 535 NW Avenue M, Winter Haven, FL 33881
Winter Haven Christian School, 1801 Havendale Boulevard, Winter Haven, FL 33881
COMMUNITY AND PRIVATE COLLEGES
Florida Technical College, 298 Havendale Boulevard, Auburndale, FL 33823
Polk Community College, 999 NE Avenue H, Winter Haven, FL 33881
PUBLIC LIBRARIES
City of Auburndale Public Library, 100 Bridgers Avenue W., Auburndale, FL 33823
City of Eagle Lake Public Library, 75 N. 7th Street, Eagle Lake, FL 33839
Winter Haven Public Library, 1 Library Lane, Winter Haven, FL 33880

2.3 BIOPHYSICAL ENVIRONMENT

2.3.1 GEOHYDROLOGY

The geohydrology of the Osprey Energy Center Site was determined by performing Site-specific geologic and soil studies designed to determine the suitability of the Site. Site-specific data were collected in order to describe the geologic and hydrogeologic units and their properties. Previously published geologic, hydrogeologic, and soil studies were also used to supplement the collected Site data.

2.3.1.1 Geologic Description Of The Site Area

Regional Stratigraphy

The Osprey Energy Center Site lies within Polk County. Approximately 4,200 feet of Tertiary sediments and rocks underlie the Site (Miller, 1986). For the purposes of this study, the near surface sediments of Holocene age, clastic sediments of Miocene age, and carbonate rocks (limestones and dolomites) of Oligocene to Middle Eocene age are the most significant. The combined thickness of these units is approximately 2,000 feet (Miller, 1986).

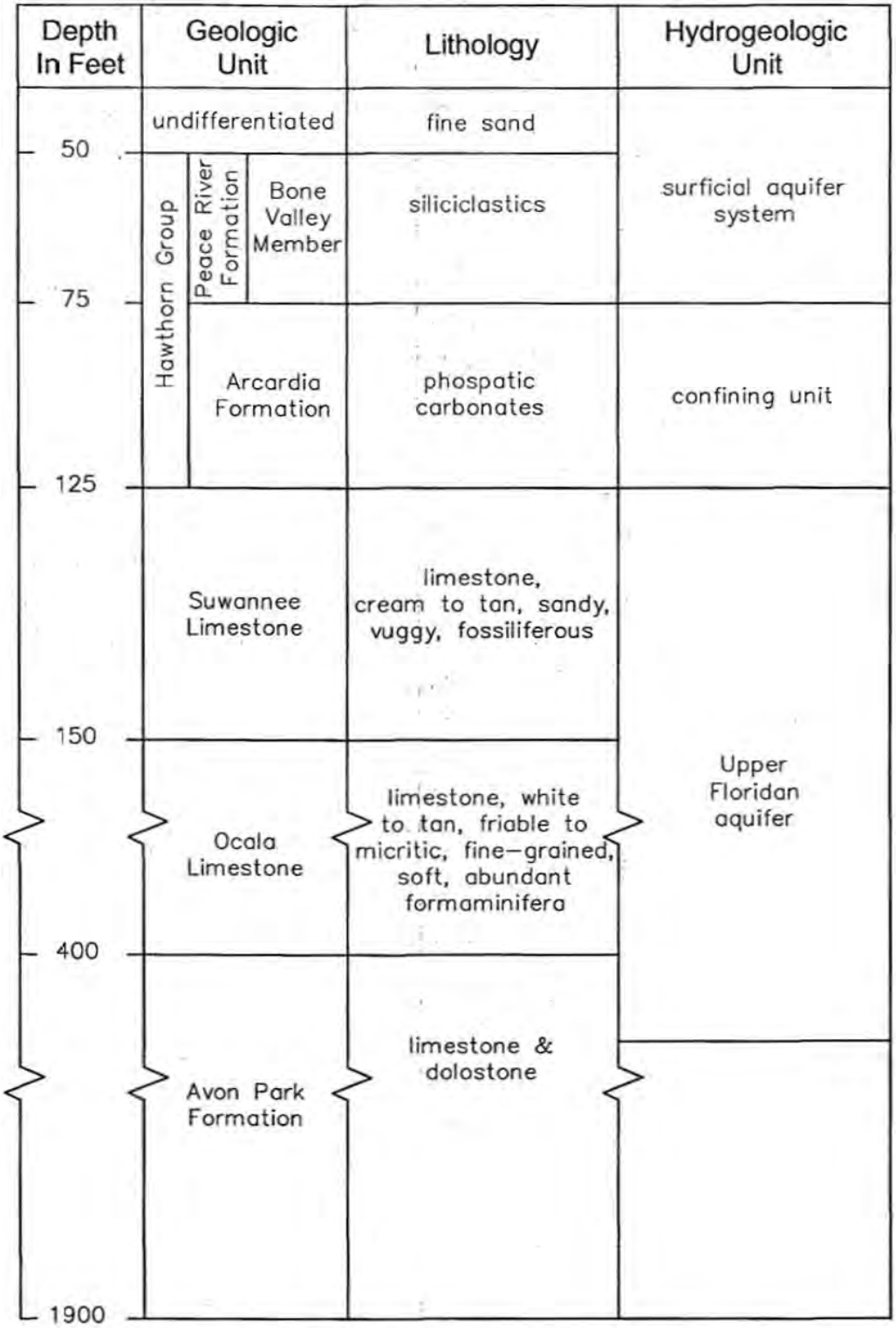
A generalized stratigraphic section for the region near the Site is shown in **Figure 2.3.1-1**. The deepest described formation is the Avon Park Formation which overlies rocks deeper than 2,000 feet below land surface (bls). The Ocala Limestone overlies the Avon Park Formation. The Oligocene-age Suwannee Limestone overlies the Ocala Limestone. Overlying the Suwannee Limestone are the carbonates, clays, sands, and phosphates of the Pliocene-Miocene-age Hawthorn Group. Undifferentiated Holocene-age sands overlie the Hawthorn Group and extend to the land surface.

Lithology

Generalized descriptions of the geologic units mentioned above are summarized in ascending order.

Avon Park Formation

The Avon Park Formation (Middle Eocene age) is generally composed of fossiliferous limestone and dolostone (Gilboy, et al, 1988). The limestone is moderate brown to dark-yellow brown, to rusty-yellow brown, porous, and very fine to medium grained. The top of the Avon Park



Golder Associates

Tampa, Florida

Generalized Regional Hydrogeological Column

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	NTS	Job No.	993-9530
CHK BY:	AW	DATE:	01/21/00	FIGURE	2.3.1-1
REV BY:	–	FILE No.:	fig2_3_1-1.dwg		

Formation may contain peat and the bottom may contain small lenses of evaporite (Gilboy, *et al.*, 1988). The Avon Park Formation is the deepest potable water-bearing formation in the region, and comprises a portion of the Upper Floridan aquifer. The top of the Avon Park Formation is encountered approximately 400 feet bls in the vicinity of the Site, and is approximately 1,500 feet thick (Miller, 1986).

Ocala Limestone

The Ocala Limestone generally consists of muddy (carbonate) to finely pelletal limestone (Miller, 1986). The Upper Eocene-age Ocala Limestone typically consists of upper and lower subdivisions. The upper unit is composed primarily of soft, granular limestone with numerous foraminifera (Copeland, 1991). The lower unit is composed of granular limestone and may be partially to completely dolomitized in some areas (Copeland, 1991). The Ocala Limestone is also part of the Upper Florida aquifer. The top of the Ocala Limestone is encountered approximately 150 feet bls in the vicinity of the Site, and is approximately 250 feet thick (Miller, 1986).

Suwannee Limestone

The Suwannee Limestone is the uppermost carbonate unit comprising the Upper Floridan aquifer in the vicinity of the Site. The Suwannee Limestone generally consists of muddy (carbonate) limestone (Copeland, 1991). The Suwannee Limestone is very thin to absent in the study area and, if present, the formation pinches out to the north. The top of the Suwannee Limestone, if present, is encountered approximately 125 feet bls in the vicinity of the Site, and this unit may be approximately 25 feet thick (Miller, 1986).

Hawthorn Group

The Hawthorn Group sediments are composed primarily of sandy clay, clay, marl, sand, and phosphate beds. More specifically, the lower portion of the Hawthorn Group consists of phosphatic carbonates, and the upper section consists of siliciclastics (Copeland, 1991). In the vicinity of the Site, the Hawthorn Group is further divided into an upper unit known as the Peace River Formation, and a lower unit known as the Arcadia Formation (Scott, 1988). The Pliocene-age Bone Valley Member of the Peace River Formation forms the upper 25 feet of the Peace River Formation (Scott, 1988). The top of the Peace River Formation is encountered approximately 50 feet bls in the vicinity of the Site, and is approximately 25 feet thick (Scott,

1988). The top of the Arcadia Formation is encountered approximately 75 feet bls in the vicinity of the Site, and is approximately 50 feet thick (Scott, 1988).

In the vicinity of the Site, the relatively impermeable clays of Hawthorn Group generally serve as a confining unit that hydraulically separates the underlying Upper Floridan aquifer from the overlying surficial aquifer system. In certain parts of peninsular Florida (particularly to the south and southwest of the Site), there are permeable sands and carbonates within the Hawthorn Group that comprise the intermediate aquifer system. In these areas, the intermediate aquifer system serves as an important local source of potable water. The intermediate aquifer system/intermediate confining unit is thin in the vicinity of the Site.

Undifferentiated Surficial Sands

Unconsolidated sands are present in the vicinity of the Site from land surface to approximately 50 feet bls (Scott, 1988). The portion of the sands that are saturated with groundwater under water table conditions comprise the surficial aquifer system. The water table is generally encountered approximately 15 feet bls in the vicinity of the Site. The surficial aquifer system extends to the top of the relatively impermeable clays in the Hawthorn Group.

Site Physiography

The area falls into the Winter Haven Ridge Physiographic Subprovince of the Central Physiographic Division (White, 1970). The Winter Haven Ridge is a general north-northwest to south-southeast trending highland dissected by numerous lakes. The lakes formed as a result of the dissolution of underlying limestone by corrosive downward percolating groundwater. The origin of the Winter Haven Ridge (and associated highland ridges including the Lake Wales Ridge to the east and the Lakeland Ridge to the west) is debated. However, its parallel lineation with the Atlantic Coast suggests a relict beach ridge origin resulting from historical marine transgressive/regressive sequences, and subsequent reduction in elevation by solution-subsidence (White, 1970).

2.3.1.2 Detailed Site Lithologic Description

A geotechnical investigation was conducted to characterize subsurface conditions at the Osprey Energy Center Site. The geotechnical investigation consisted of advancing 14 standard

penetration test (SPT) borings at the Site and completing geotechnical classification testing in the laboratory. The SPT borings (ASTM D 1586) were advanced using mud rotary drilling. There was no loss of circulation at any of the SPT borings. Loss of circulation is typically indicative of subsurface voids or high permeability zones. Each boring (with the exception of B-1, B-3, B-8, and B-9) were abandoned by grouting with Portland cement. Piezometers were constructed in borings B-1, B-3, B-8, and B-9 (see Section 2.3.2.1).

Borings B-1 through B-5, B-7 through B-9, and B-11 through B-14 were sampled continuously for the first 10 feet and then at five-foot depth intervals using a split-barrel sampler. Borings B-6 and B-10 were sampled at five-foot depth intervals using a split-barrel sampler. Borehole depths ranged from 55 to 90 feet bls. A Golder technician monitored the drilling on a full time basis. During drilling, the technician recorded the SPT N-values and visually characterized the soil types, thickness', and depths of the various geologic materials encountered. The data were recorded on Soil Boring Logs. The soil boring logs are in **Appendix 10.10.** Representative soil samples from each split-barrel sample were placed in plastic bags for subsequent laboratory geotechnical classification testing.

Representative soil samples obtained from the soil borings were transported to Golder's Tampa, Florida laboratory facility for subsequent classification and testing. The primary purpose of the laboratory-testing program was to classify the representative soil samples according to the Unified Soil Classification System (USCS). The hydraulic conductivity of one undisturbed sample of clayey sand (SC) soil obtained from Boring B-6 at a depth of 66 to 67 ft bls was measured in Golder's Atlanta, Georgia laboratory facility. A summary of the completed laboratory data is provided in **Table 2.3.1-1**. The following ASTM methods were used in the analyses: Natural Moisture Content– ASTM D2216; Gradation Analysis–ASTM D422; Per Cent By Weight Passing the No. 200 Sieve– ASTM D1140; Organic Content– ASTM D2974; Atterberg Limits– ASTM D4318; and Permeability– ASTM D5084.

Based on the soils encountered in the borings, the Site is covered by an approximately 1 to 2 ft layer of topsoil consisting of loose fine sand. Based on the boring logs and the laboratory classification testing, it appears that the topsoil layer is underlain by about 5 to 10 feet of fine sand with trace amounts of clays [poorly graded sand (SP)]. The upper sand deposits are

TABLE 2.3.1-1
SUMMARY OF SOIL DATA

Boring Id	Sample Type	Sample Depth	Soil Classification	Natural Moisture %	Atterberg Limits				Grain Size Distribution			Compaction		Gs	Unit Weight		Permeability (cm/sec)	Organic Content %
					L.L.	P.L.	P.I.	L.I.	% Finer No. 4 Sieve	% Finer No. 200 Sieve	% Finer .005 mm	Maximum Dry Density (lb/cuft)	Optimum Moisture %		Moisture %	Dry (lb/cuft)		
B - 1	Bag	15'	SC	18.8	-	-	-	-	-	15.7	-	-	-	-	18.8	-	-	-
B - 1	Bag	45'	SC	26.9	-	-	-	-	100.0	14.7	-	-	-	-	26.9	-	-	-
B - 1	Bag	55'	SC	38.8	-	-	-	-	-	15.2	-	-	-	-	38.8	-	-	-
B - 2	Bag	2-4'	SP	17.3	-	-	-	-	-	3.9	-	-	-	-	17.3	-	-	-
B - 2	Bag	8-10'	(SP)	18.0	-	-	-	-	-	-	-	-	-	-	18.0	106.8	-	3.97
B - 2	Bag	20'	SC	17.1	-	-	-	-	-	17.4	-	-	-	-	17.1	-	-	-
B - 2	Bag	50'	SC	36.4	-	-	-	-	100.0	16.9	-	-	-	-	36.4	-	-	-
B - 2	Bag	75'	SC	59.6	-	-	-	-	-	43.4	-	-	-	-	59.6	64.5	-	1.9
B - 3	Bag	8-10'	SC	20.0	49	20	29	0.01	-	43.7	-	-	-	-	20.0	-	-	-
B - 3	Bag	25'	SP-SC	17.4	-	-	-	-	-	8.7	-	-	-	-	17.4	-	-	-
B - 3	Bag	45'	SC	28.4	-	-	-	-	-	14.0	-	-	-	-	28.4	-	-	-
B - 3	Bag	60'	SC	47.6	-	-	-	-	-	21.4	-	-	-	-	47.6	-	-	-
B - 4	Bag	20'	SC	18.3	-	-	-	-	-	16.7	-	-	-	-	18.3	-	-	-
B - 4	Bag	45'	SC	29.1	-	-	-	-	-	13.6	-	-	-	-	29.1	-	-	-
B - 4	Bag	70'	SC	56.2	98	47	51	0.18	100.0	29.7	-	-	-	-	56.2	-	-	-
B - 4	Bag	80'	(SP)	128.5	-	-	-	-	-	-	-	-	-	-	128.5	38.0	-	5.45
B - 5	Bag	8-10'	SP-SC	5.5	-	-	-	-	-	7.3	-	-	-	-	5.5	-	-	-
B - 5	Bag	25'	SC	17.2	-	-	-	-	-	16.4	-	-	-	-	17.2	-	-	-
B - 5	Bag	45'	SC	26.9	-	-	-	-	-	14.4	-	-	-	-	26.9	-	-	-
B - 5	Bag	80'	MH	80.9	167	71	96	0.11	100.0	51.4	-	-	-	-	80.9	-	-	-
B - 6	Bag	6-8'	SP-SC	23.2	-	-	-	-	-	5.3	-	-	-	-	23.2	-	-	-
B - 6	Bag	20'	SP-SC	20.4	-	-	-	-	-	6.0	-	-	-	-	20.4	-	-	-

TABLE 2.3.1-1
SUMMARY OF SOIL DATA

Boring Id	Sample Type	Sample Depth	Soil Classification	Natural Moisture %	Atterberg Limits				Grain Size Distribution			Compaction		Gs	Unit Weight		Permeability (cm/sec)	Organic Content %
					L.L.	P.L.	P.I.	L.I.	% Finer No. 4 Sieve	% Finer No. 200 Sieve	% Finer .005 mm	Maximum Dry Density (lb/cuft)	Optimum Moisture %		Moisture %	Dry (lb/cuft)		
B - 6	Bag	35'	SP-SC	27.7	-	-	-	-	-	11.4	-	-	-	-	27.7	-	-	-
B - 6	UD	66.0-67.0'	(SC)	26.2	40	24	16	0.11	-	-	-	-	-	2.78	26.2	99.2	6.5E-06	-
B - 7	Bag	8-10'	SC	18.9	-	-	-	-	-	39.9	-	-	-	-	18.9	-	-	-
B - 7	Bag	45'	SC	26.2	-	-	-	-	-	14.0	-	-	-	-	26.2	-	-	-
B - 8	Bag	15'	SP-SC	22.5	-	-	-	-	-	7.5	-	-	-	-	22.5	-	-	-
B - 8	Bag	35'	SP	17.5	-	-	-	-	100.0	4.9	-	-	-	-	17.5	-	-	-
B - 8	Bag	55'	SC	30.5	-	-	-	-	100.0	12.9	-	-	-	-	30.5	-	-	-
B - 8	Bag	60'	SC	32.1	-	-	-	-	-	16.1	-	-	-	-	32.1	-	-	-
B - 8	Bag	65'	SC	42.5	-	-	-	-	-	13.1	-	-	-	-	42.5	-	-	-
B - 9	Bag	8-10'	(SP-SC)	18.5	-	-	-	-	-	-	-	-	-	-	18.5	111.7	-	1.5
B - 9	Bag	30'	SP-SC	17.6	-	-	-	-	100.0	6.4	-	-	-	-	17.6	-	-	-
B - 9	Bag	50'	SC	31.1	-	-	-	-	-	12.7	-	-	-	-	31.1	-	-	-
B - 9	Bag	70'	(CH)	19.7	-	-	-	-	-	66.2	-	-	-	-	19.7	-	-	-
B - 10	Bag	20'	SP-SC	21.2	-	-	-	-	-	5.3	-	-	-	-	21.2	-	-	-
B - 10	Bag	50'	SP-SC	25.5	-	-	-	-	-	11.0	-	-	-	-	25.5	-	-	-
B - 10	Bag	60'	SC	39.4	-	-	-	-	100.0	15.7	-	-	-	-	39.4	-	-	-
B - 11	Bag	4-6'	SP	12.4	-	-	-	-	-	3.4	-	-	-	-	12.4	-	-	-
B - 11	Bag	25'	SP-SC	17.3	-	-	-	-	-	8.3	-	-	-	-	17.3	-	-	-
B - 11	Bag	30'	SP-SC	17.8	-	-	-	-	-	6.0	-	-	-	-	17.8	-	-	-
B - 11	Bag	50'	SC	15.8	-	-	-	-	-	19.7	-	-	-	-	15.8	-	-	-
B - 11	Bag	55'	SC	34.2	-	-	-	-	-	16.1	-	-	-	-	34.2	-	-	-
B - 11	Bag	65'	SC	51.6	-	-	-	-	-	25.9	-	-	-	-	51.6	-	-	-

TABLE 2.3.1-1
SUMMARY OF SOIL DATA

Boring Id	Sample Type	Sample Depth	Soil Classification	Natural Moisture %	Atterberg Limits				Grain Size Distribution			Compaction		Gs	Unit Weight		Permeability (cm/sec)	Organic Content %
					L.L.	P.L.	P.I.	L.I.	% Finer No. 4 Sieve	% Finer No. 200 Sieve	% Finer .005 mm	Maximum Dry Density (lb/cuft)	Optimum Moisture %		Moisture %	Dry (lb/cuft)		
B - 12	Bag	8-10'	SC	21.9	-	-	-	-	-	40.5	-	-	-	-	21.9	104.9	-	3.7
B - 12	Bag	25'	SP-SC	20.2	-	-	-	-	-	8.7	-	-	-	-	20.2	-	-	-
B - 12	Bag	30'	SP-SC	16.9	-	-	-	-	-	8.5	-	-	-	-	16.9	-	-	-
B - 12	Bag	50'	SC	26.6	-	-	-	-	-	21.7	-	-	-	-	26.6	-	-	-
B - 12	Bag	60'	SC	42.1	-	-	-	-	-	21.7	-	-	-	-	42.1	-	-	-
B - 13	Bag	25'	SP-SC	19.7	-	-	-	-	-	9.2	-	-	-	-	19.7	-	-	-
B - 13	Bag	30'	SP-SC	16.0	-	-	-	-	-	9.8	-	-	-	-	16.0	-	-	-
B - 13	Bag	65'	SC	53.4	-	-	-	-	100.0	15.1	-	-	-	-	53.4	-	-	-
B - 13	Bag	55'	SC	27.4	-	-	-	-	-	19.1	-	-	-	-	27.4	-	-	-
B - 13	Bag	70'	(SC)	74.3	-	-	-	-	-	-	-	-	-	-	74.3	56.3	-	2.7
B - 14	Bag	6-8'	SP	16.3	-	-	-	-	-	4.5	-	-	-	-	16.3	-	-	-
B - 14	Bag	50'	SC	27.1	-	-	-	-	-	13.1	-	-	-	-	27.1	-	-	-
B - 14	Bag	35'	SP-SC	19.4	-	-	-	-	100.0	6.5	-	-	-	-	19.4	-	-	-
B - 14	Bag	60'	SC	37.9	-	-	-	-	-	21.5	-	-	-	-	37.9	-	-	-

typically underlain by sequences of fine sands with increasing amounts of clay with depth [poorly graded sand with clay (SP-SC) and clayey sand (SC)]. Saturated soils indicating the water table were typically encountered between 15 and 20 feet bls (see Geologic Boring Log Profiles, **Appendix 10.10**). A perched water table condition was recorded at boring B-1. The clay contents of the soils in deep zones (greater than about 65 feet below land surface) in borings B-5 and B-9 were greater than 50-percent [fat clay/fat clay with sand (CH) and elastic silt/elastic silt with sand (MH)]. Based on the laboratory flexible-wall permeability test completed at 66 to 67 feet bls at SB-6, the vertical hydraulic conductivity of the clayey sand specimen was low (6.5×10^{-6} cm/sec; see **Table 2.3.1-2** for flexible wall permeability and **Table 2.3.1-3** for Atterburg limits of SB-6). Based on the laboratory test results, the fine-grained fraction of the soils encountered generally exhibited medium to medium-high plasticity. The clayey sand and sandy clay deposits were about 60 to 80 feet in thickness and were underlain by fractured limestone. Borings B-2, B-4, B-5, B-9, B-11, and B-13 were advanced until a relatively hard fractured limestone layer was encountered.

Geologic cross sections for the Osprey Energy Center Site were developed from the boring logs. The geologic cross section transects are represented in **Figure 2.3.1-2**. **Figure 2.3.1-2** also depicts the locations of the 14 SPT borings that were advanced at the Site. Two north-south cross sections are presented in **Figures 2.3.1-3 and 2.3.1-4**.

As the geologic cross sections indicate, the geology beneath the Site is rather uniform, particularly in the central and southern portions of the Site (see **Figure 2.3.1-3**). The Site is generally underlain by surficial layer of fine sand (5 to 10 feet thick), which overlies a layer of fine clayey sand that is approximately 5 to 10 feet thick across the majority of the Site. This clayey sand layer thickens in the northern and northeastern portions of the Site, which leads to a perched water table condition at boring B-1 (discussed further in Section 2.3.2.1). Fine clayey sand with little clay underlies the fine clayey sand throughout most of the Site (see **Figure 2.3.1-3**). This layer is approximately 20 to 33 feet thick in the central and southern portions of the Site, and discontinuous in the northern portion of the Site (see **Figure 2.3.1-4**).

A discontinuous sandy clay layer is present in the east-central portion of the Site (see **Figure 2.3.1-4**). This unit contains sand and pebble-size phosphate and is indicative of the

3/10/00

TABLE 2.3.1-2
FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	CC/ OSPREY ENERGY CENTER SCA /FL	BOARD #	10
PROJECT NUMBER	993-9570	CELL #	10
SAMPLE ID	B - 6 - 66.0-67.0' -	Flow Pump Speed	4
SAMPLE TYPE	UD	Technician	DA

COMMENTS

Sample Data, Initial				Sample Data, Final	
Height, inches	2.961	B-Value, f	0.99	Height, inches	2.953
Diameter, inches	2.865	Cell Pres.	105.0	Diameter, inches	2.841
Area, cm²	41.59	Bot. Pres.	60.0	Area, cm²	40.90
Volume, cm³	312.81	Top Pres.	60.0	Volume, cm³	306.76
Mass, g	627.70	Tot. B.P.	60.0	Mass, g	622.88
Moisture Content, %	26.23	Head, max.	71.04	Moisture Content, %	25.26
Dry Density, pcf	99.20	Head, min.	71.04	Dry Density, pcf	101.15
Spec. Gravity	2.784	Max. Grad.	9.47	Volume Solids, cm³	178.61
Volume Solids, cm³	178.62	Min. Grad.	9.47	Volume Voids, cm³	128.15
Volume Voids, cm³	134.19			Void Ratio	0.72
Void Ratio	0.75			Saturation, %	98.0%
Saturation, %	97.2%				

WATER CONTENTS		Trimmings Initial	Sample Final
Wt Soil & Tare, i	g	627.70	674.33
Wt Soil & Tare, f	g	497.27	548.76
Wt Tare	g	0.00	51.74
Wt Moisture Lost	g	130.43	125.57
Wt Dry Soil	g	497.27	497.02
Water Content	%	26.23%	25.26%

DESCRIPTION: Gray, MEDIUM TO FINE SAND, some silty clay.

Flow Pump Rate: 2.50E-03 cm³/sec

USCS: (SC)

TIME FUNCTIONS, SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
12/1/99	36495	9	35	19.7	0	0	0	0	1.01	71.04	9.47	6.5E-06
12/1/99	36495	9	40	19.7	5	5	300	300	1.01	71.04	9.47	6.5E-06
12/1/99	36495	9	45	19.7	5	10	300	600	1.01	71.04	9.47	6.5E-06
12/1/99	36495	9	50	19.7	5	15	300	900	1.01	71.04	9.47	6.5E-06 *
12/1/99	36495	9	55	19.7	5	20	300	1200	1.01	71.04	9.47	6.5E-06 *
12/1/99	36495	10	0	19.7	5	25	300	1500	1.01	71.04	9.47	6.5E-06 *
12/1/99	36495	10	5	19.7	5	30	300	1800	1.01	71.04	9.47	6.5E-06 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 6.5E-06 cm/sec **

DATE 12/1/99
CHECK
REVIEW

TABLE 2.3.1-3
ATTERBERG LIMITS
ASTM D-4318

PROJECT TITLE	CC/ OSPREY ENERGY CENTER SCA /FL	SAMPLE ID	B - 6
PROJECT NUMBE	993-9570	SAMPLE TYPE	UD
		SAMPLE DEPTH	66.0 - 67.0'

SAMPLE PREPARATION

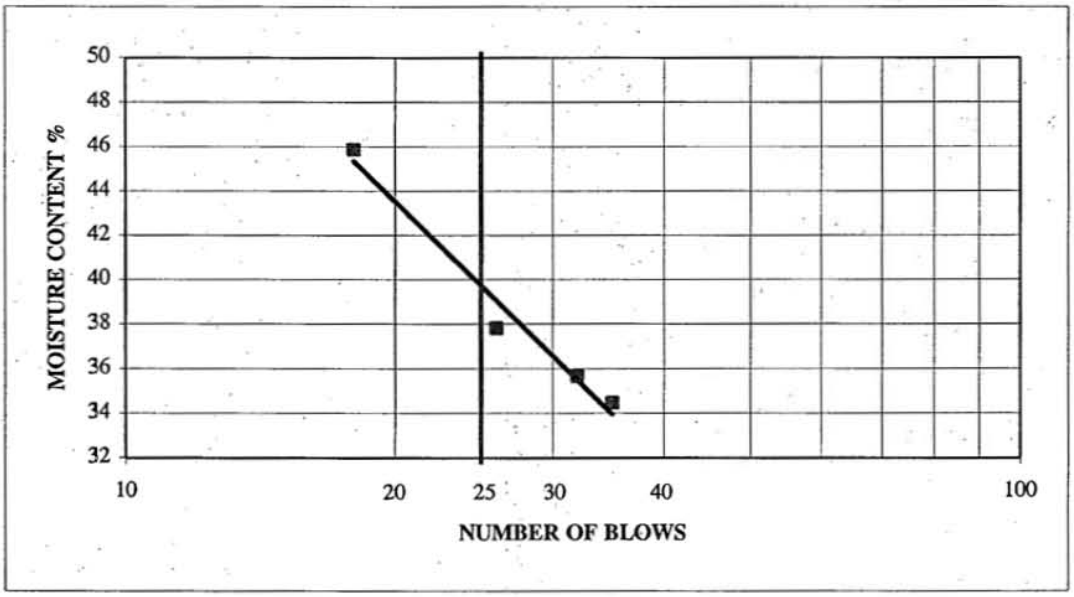
Wet or Dry: Dry

Minus #40 Sieve: Yes

		PLASTIC LIMIT DETERMINATION			NATURAL MOISTURE
Weight of Wet Soil & Tare (gm)	(W1)	18.70	20.36	20.00	627.70
Weight of Dry Soil & Tare (gm)	(W2)	17.26	18.60	18.29	497.27
Weight of Tare (gm)	(W3)	11.39	11.40	11.24	0.00
Weight of Water (gm)	(W4=W1-W2)	1.44	1.76	1.71	130.43
Weight of Dry Soil (gm)	(W5=W2-W3)	5.87	7.20	7.05	497.27
Water Content %	(W4/W5)*100	24.53	24.44	24.26	26.23

		LIQUID LIMIT DETERMINATION			
Number of Blows		35	32	26	18
Weight of Wet Soil & Tare (gm)	(W6)	24.84	20.17	24.56	21.51
Weight of Dry Soil & Tare (gm)	(W7)	19.58	16.00	19.00	16.06
Weight of Tare (gm)	(W8)	4.32	4.31	4.30	4.18
Weight of Water (gm)	(W9=W6-W7)	5.26	4.17	5.56	5.45
Weight of Dry Soil (gm)	(W10=W7-W8)	15.26	11.69	14.70	11.88
Water Content %	(W9/W10)*100	34.47	35.67	37.82	45.88

NOTE:



LIQUID LIMIT (WI)	39.72	40
PLASTIC LIMIT (Wp)	24.41	24
PLASTICITY INDEX (Ip)		16
LIQUIDITY INDEX (I)		0.11
MOISTURE CONTENT		26.23

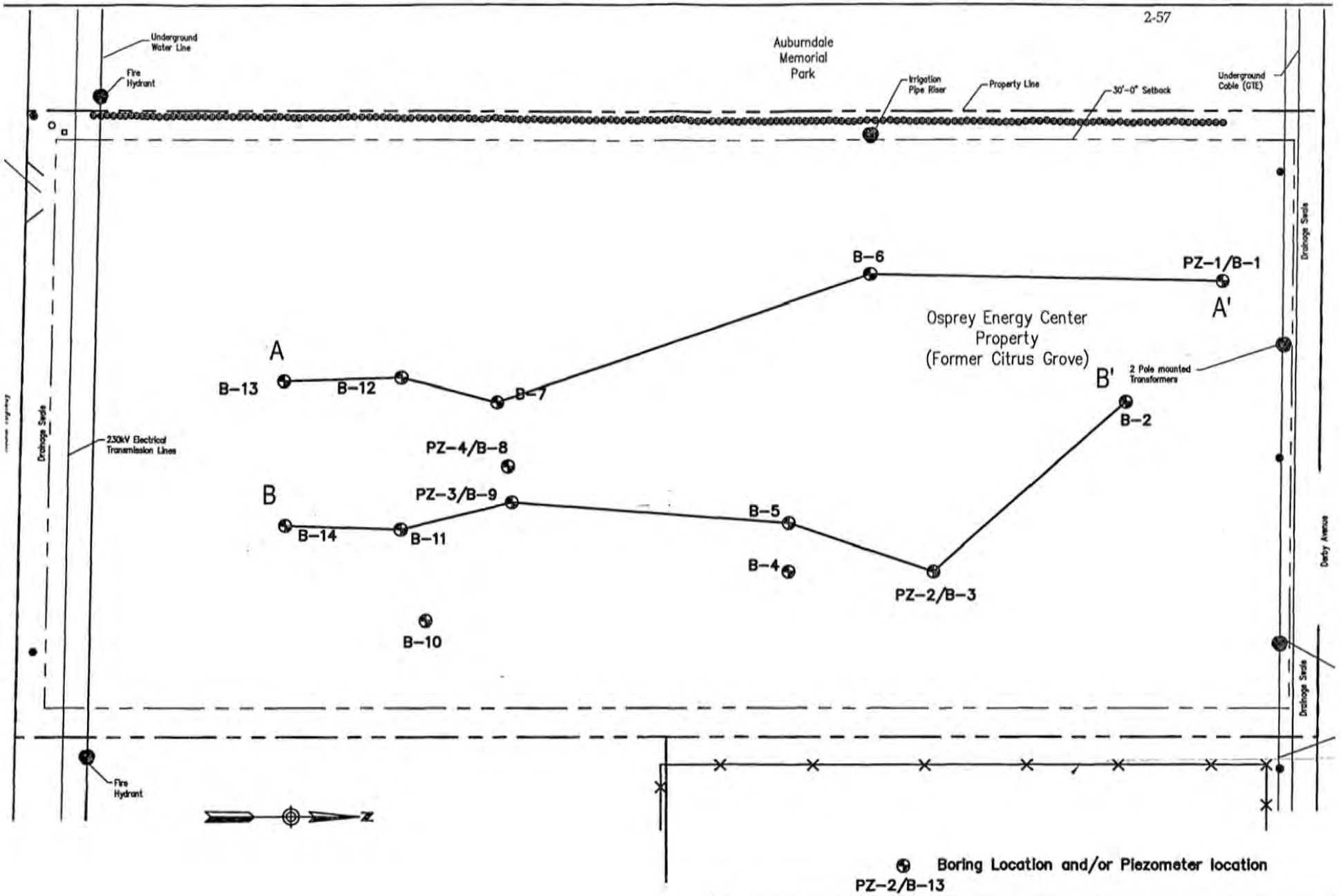
DESCRIPTION: Gray, MEDIUM TO FINE SAND, some silty clay.

USCS: (SC)

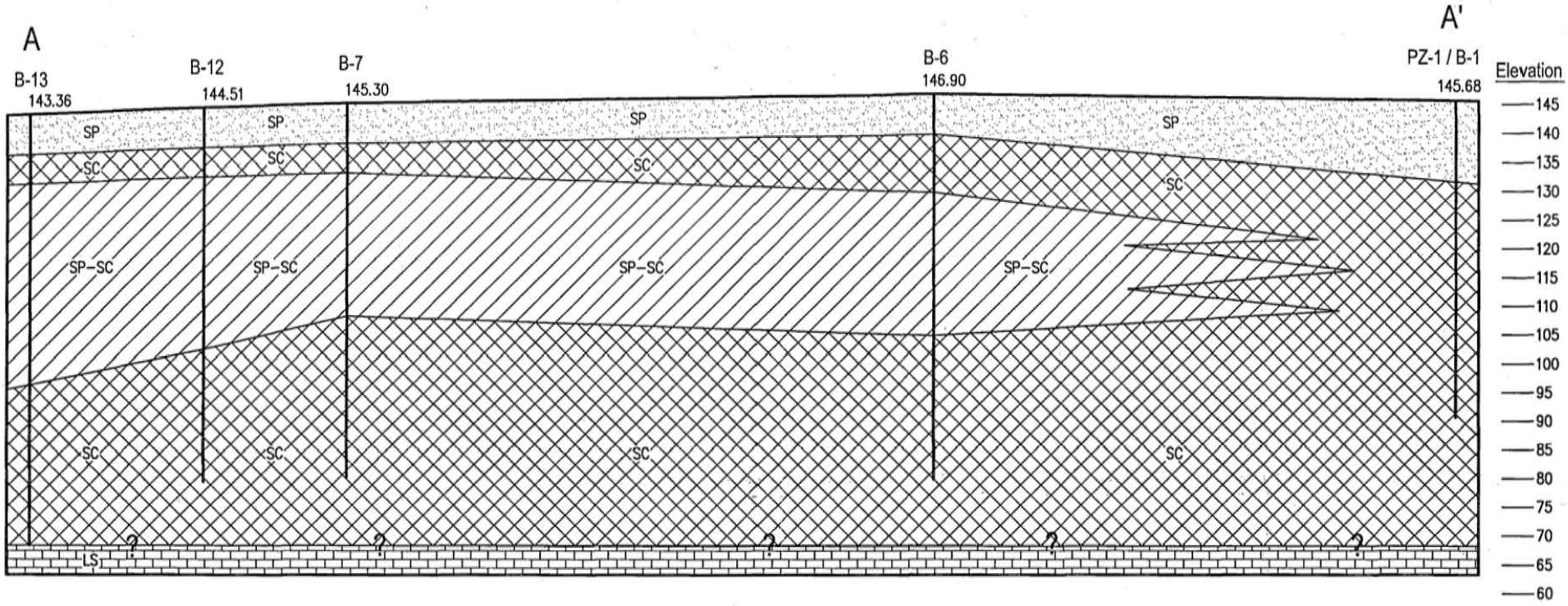
TECH	DH
DATE	12/2/99
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REVIEW	

IMAGE QUALITY

AS YOU REVIEW THE NEXT FEW PAGES, PLEASE NOTE THAT THE ORIGINAL DOCUMENT WAS OF POOR QUALITY.



Golder Associates Tampa, Florida			Geologic Cross-section Trans
Client / Project: Calpine Construction Finance Company, L.P. Osprey Energy Center	CAD BY: CDT	SCALE: 1"=100'	Job
	CHK BY: --	DATE: 01/26/00	FIG
	REV BY: AW	FILE No.: fig2_3_1-2.dwg	



.egend

·13 Boring ID and location

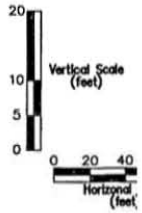
—— Gradational Contact

Fine sand with occasional trace to little clay and silt (SP)

Fine clayey sand with little clay (SP–SC)

Fine clayey sand (SC)

Fractured limestone (LS)

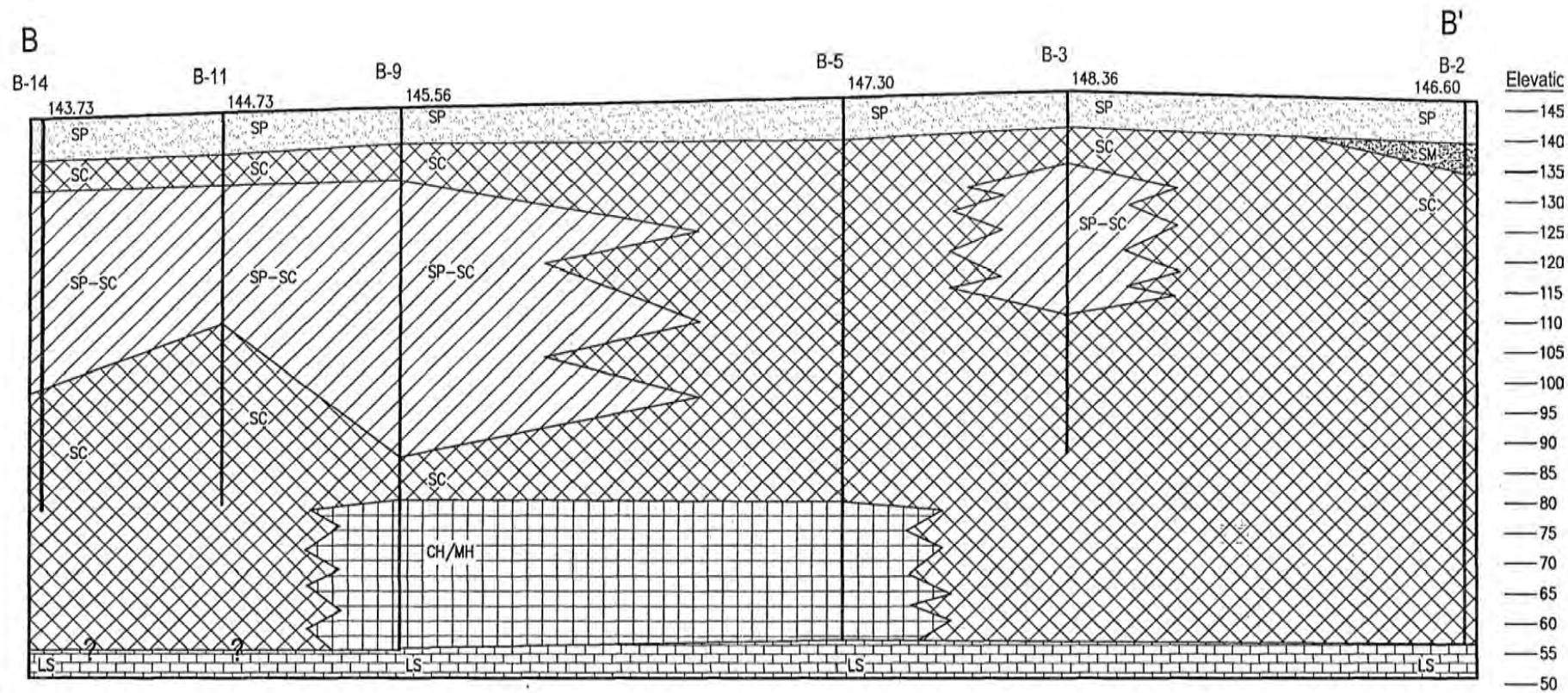


Golder Associates — Tampa, Florida

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

Geologic Cross Section A–A

CAD BY:	CDT	SCALE:	As Shown
CHK BY:	—	DATE:	01/24/00
REV BY:	AW	FILE No.:	fig2_3_1-3.dwg



Legend

-11 Boring ID and location

—— Gradational Contact

Fine sand with occasional trace to little clay and silt (SP)

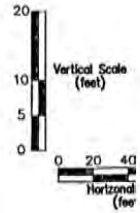
Fine sand (SM)

Fine clayey sand with little clay (SP-SC)

Fine clayey sand (SC)

Sandy clay (CH/MH)

Fractured limestone (LS)



Golder Associates — Tampa, Florida

Client / Project: Calpine Construction Finance Company, L.P. Osprey Energy Center

Geologic Cross Section B–B

CAD BY: CDT	SCALE: As Shown	Jo
CHK BY: —	DATE: 03/04/00	Fig
REV BY: AW	FILE No.: fig2_3_1-4.dwg	

Pliocene-age Bone Valley Member of the Peace River Formation (see **Figure 2.3.1-1**). Fractured limestone underlies the Site (see **Figures 2.3.1-2 through 2.3.1-4**). The limestone was the deepest geologic unit penetrated at the Site. The fractured limestone is indicative of the top of the Miocene-age Arcadia Formation of the Hawthorn Group (see **Figure 2.3.1-1**).

Geologic Maps

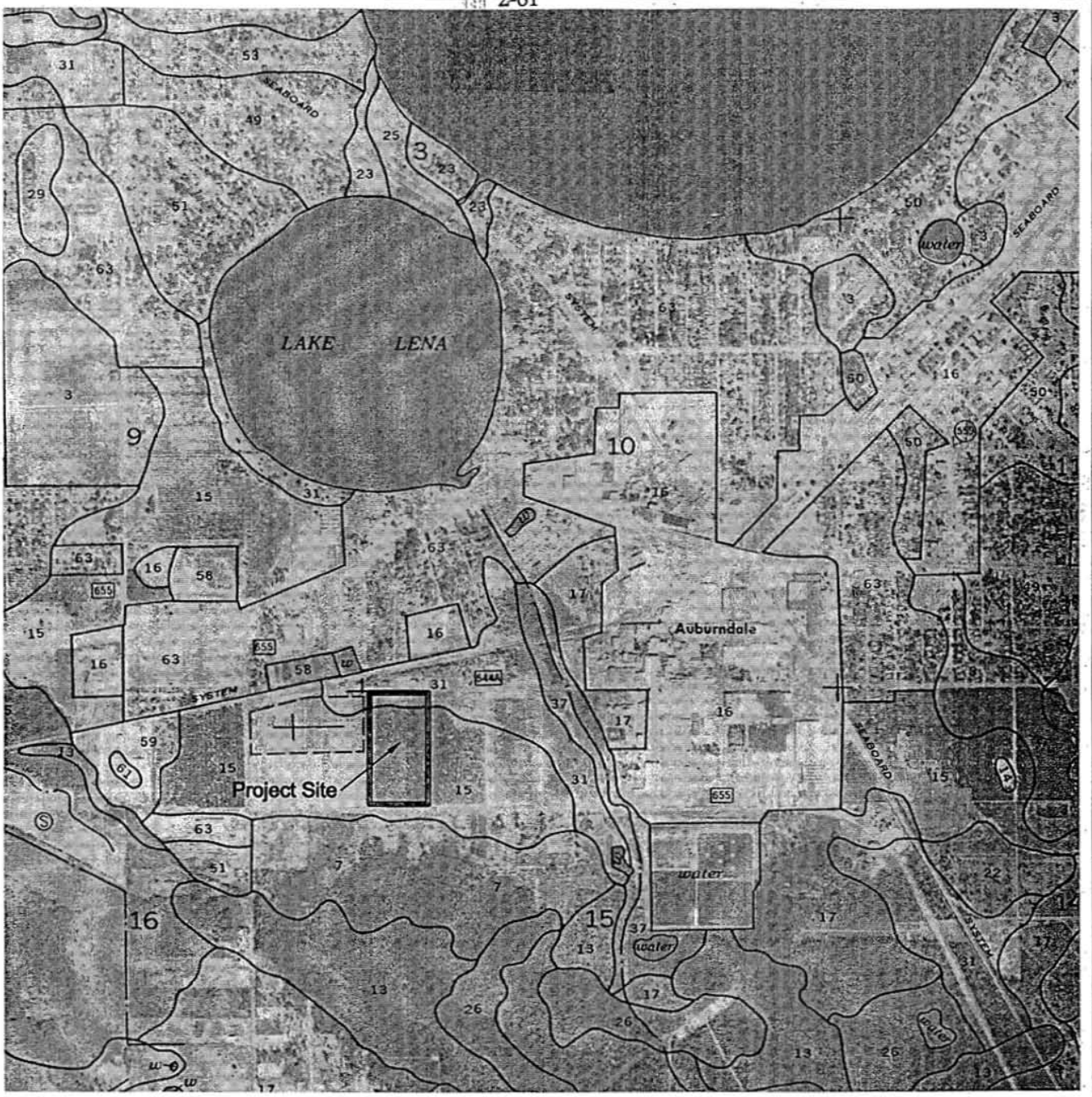
Soils have been mapped in Polk County by the U.S. Department of Agriculture in cooperation with the county Soil Conservation Service (USDA, 1990). According to the Soil Survey of Polk County, Florida (USDA, 1990), Tavares fine sand is present on the southern and central portions of the subject property, and Adamsville fine sand is present on the northernmost portion of the subject property (see **Figure 2.3.1-5**).

According to the soil survey, Tavares fine sand is moderately well-drained, and is typically found on broad uplands and knolls on flatwoods. The seasonal high water table is at a depth of four to seven feet below land surface for several months in most years. Additionally, the permeability is rapid to very rapid, and the available water capacity is low. Most areas of this soil are used for citrus.

According to the soil survey, Adamsville fine sand is somewhat poorly drained soil typically found on low ridges on flatwoods and in low areas on uplands. The seasonal high water table is at a depth of two to four feet below land surface for two to six months in most years. Additionally, the permeability is rapid, and the available water capacity is low. Most areas of this soil are used for citrus.

The surface elevation of the subject property is approximately 140 to 145 feet above the NGVD of 1929 based on the USGS 7.5 Minute Topographic Quadrangle Map for Auburndale, Florida. Based on this map and Site observations, the interpreted regional topographic gradient is to the southeast and south.

The lowest point on the Osprey Energy Center Site is at an elevation of approximately 142 ft (NGVD 1929) at the southern end of the Site. The land slopes gently to the south from an



MAP SYMBOL AND SOIL NAME	HYDROLOGIC GROUP	FLOODING			HIGH WATER TABLE			PERMEABILITY INCHS /HR
		FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	
#15(TAVARES)	A	NONE	-	-	3.5-6.0	APPARENT	JUN-DEC	>6.0
#31(ADAMSVILLE)	C	NONE	-	-	2.0-3.5	APPARENT	JUN-NOV	6.0-20

N

0 500' 1000' 2000'

Scale: 1"=2000'

Reference: USDA / SCS Soil Survey, Polk County, Florida

Golder Associates

Tampa, Florida

USDA Soil Survey Map

Client / Project

CAD BY: CDT	SCALE: 1"=2000'	Job No. 993-9570
CHK BY: RAZ	DATE: 02/07/00	FIGURE 2.3.1-5
REV BY: -	FILE No.: fig2_3_1-5.dwg	

elevation of approximately 148 feet (NGVD 1929) at the northern end of the Site. The geologic units present beneath the Site (including thickness) are documented in Section 2.3.1.2.

2.3.1.3 Bearing Strength

The geotechnical investigation consisted of advancing 14 standard penetration test (SPT) borings at the Site. A Golder technician monitored the drilling on a full time basis. During drilling, the technician recorded the SPT N-values and visually characterized the soil types, thickness, and depths of the various geologic materials encountered. The Site subsurface conditions are described in Section 2.3.1.2.

The SPT N-values and the results of the laboratory classification testing were utilized to evaluate the suitability of the Site soils to support the proposed development. In general, the subsurface at the Site consists of fine sands with increasing clay content with depth, underlain by fractured limestone at depths approximately ranging from 70 to 90 ft bls. The visual classification of the soils encountered and the SPT N-values obtained from the borings indicated the following:

- The soils in the upper 10 feet of the Site consisted of loose to dense fine sand with trace to little clay. With the exception of borings B-2 and B-6, N-values less than 10 blows per foot (bpf) were recorded in the upper 5 to 10 feet.
- The soils between depths of approximately 10 to 40 ft. bls generally consisted of compact to dense fine sands with variable amounts of clay. The N-values recorded in the soils within this zone were frequently above 20 to 30 bpf. In borings B-1 and B-2, refusal was reached at some of the sampling intervals within this zone.
- The soils between depths of about 40 to 55 ft bls generally consisted of loose to dense fine sands with increasing clay content with depth. With the exception of boring B-13, N-values less than 10 bpf were recorded within this zone.
- The clayey fine sand and sandy clay layers encountered between the relatively loose zone and top of limestone generally exhibited increasing N-values and clay content with depth. The N-values recorded in the soils within this zone were frequently above 20 to 30 bpf.

Based on the conditions encountered at the boring locations and published correlations between SPT N-values and shear strength of soils, the Site soils appear to be generally suitable to support the anticipated bearing pressures induced by the proposed development founded on properly designed shallow and/or deep foundations.

2.3.2 SUBSURFACE HYDROLOGY

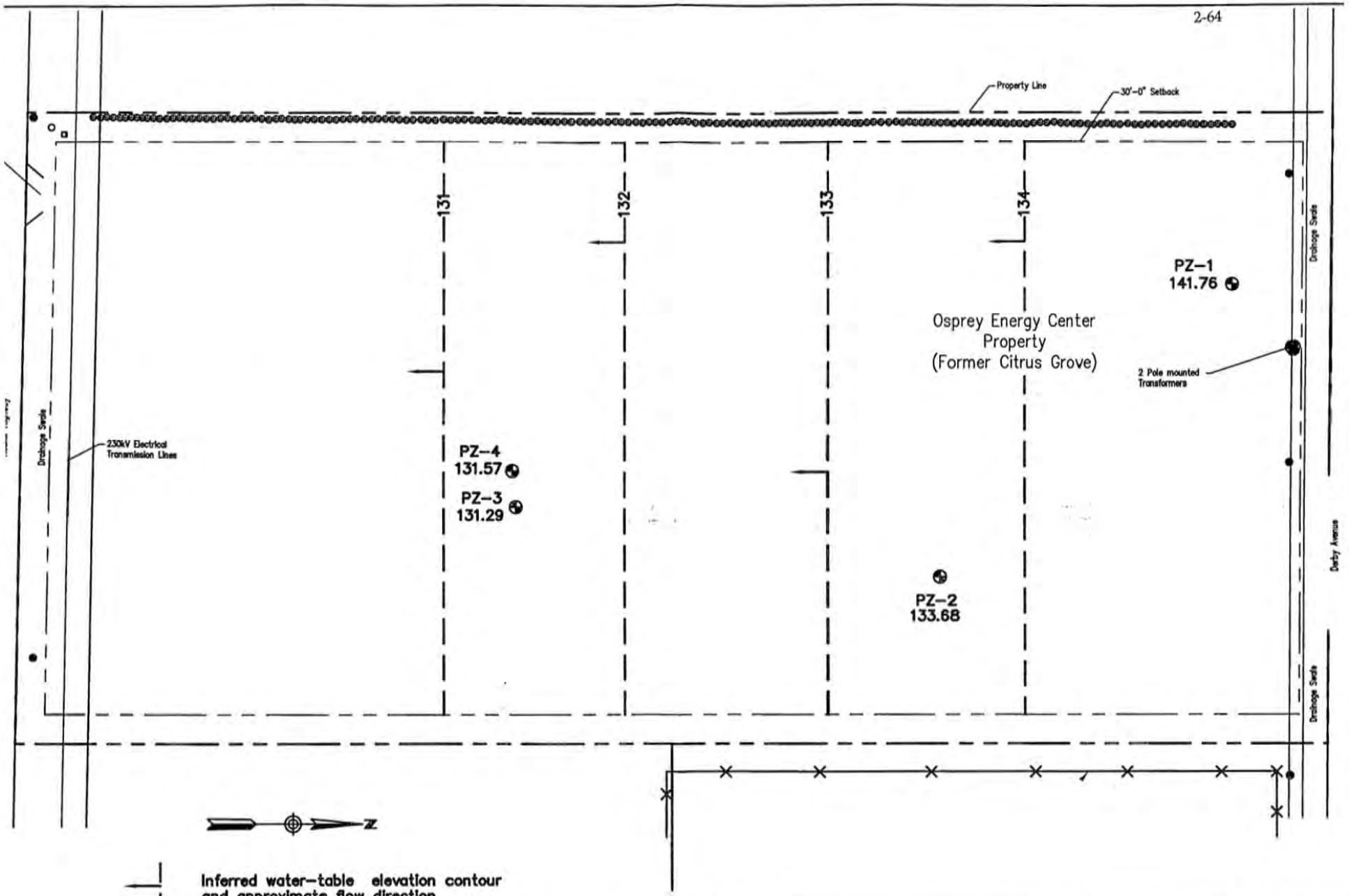
Three hydrogeologic units underlie the Osprey Energy Center Site. In descending order, they are the surficial aquifer system, the intermediate aquifer system, and the Upper Floridan aquifer. No confining unit separates the intermediate aquifer system from the surficial aquifer system beneath the Site. A confining unit within the intermediate aquifer system restricts flow between the intermediate aquifer system and the underlying Upper Floridan Aquifer. The following sections describe the hydrogeologic units underlying the Site and their characteristics.

2.3.2.1 Subsurface Hydrologic Data For The Site

Surficial Aquifer System

Quaternary deposits of sand, silty sand, and clay comprise the surficial aquifer system in Polk County. Less permeable beds of the Bone Valley Member of the Peace River Formation form the base of the surficial aquifer system. Thickness of the surficial aquifer system near the Site varies from 25 to 50 feet (SWFWMD, 1988).

The surficial aquifer system at the Osprey Energy Center Site was characterized at four locations (see **Figure 2.3.2-1**) using one- and two-inch diameter PVC piezometers (PZs). Construction specifications for the piezometers are illustrated in **Table 2.3.2-1**. Groundwater levels, displayed in **Table 2.3.2-2**, were measured on December 9, 1999 at the Site subsequent to the Phase II geotechnical-testing program. The water levels were used to construct a water-table surface-contour map also presented in **Figure 2.3.2-1**. The water-table elevation at PZ-1 was not considered when constructing this contour map because it is much higher than the water table at the other piezometers and represents a perched water table. Groundwater flow is predominantly southward. Water table fluctuation in the surficial aquifer system is usually less than five feet, and water levels are generally lowest in the spring and highest in late summer (SWFWMD, 1993). Groundwater-flow velocity in the surficial aquifer system was calculated using the following equation.



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Osprey Energy Center

Location of Piezometers and Inferred Water-Table Elevation Conto

CAD BY: CDT	SCALE: 1"=100'	Job
CHK BY: —	DATE: 02/01/00	FIG.
REV BY: AW	FILE No.: fig2_3_2-1.dwg	

TABLE 2.3.2-1
PIEZOMETER CONSTRUCTION SPECIFICATIONS

Osprey Energy Center Site
Auburndale, Florida

Piezometer No.	Diameter (inches)	Screen Length (feet)	Screen Interval (feet bls)[1]	Total Piezometer Depth (feet)	Casing Length (feet bls)	Casing Length (stick-up)[2]
PZ-1/B-1	1	49	1 - 50	50	1	2
PZ-2/B-3	1	43	12 - 55	55	12	2
PZ-3/B-8	2	47	13 - 60	60	13	2
PZ-4/B-9	2	5	77 - 82	82	77	2

[1]feet bls: Feet Below Land Surface.

[2]stick-up: Length of PVC casing above land surface measured by Golder Associates Inc.

TABLE 2.3.2-2
GROUND ELEVATION AND WATER TABLE ELEVATION DATA
(DECEMBER 9, 1999 DATA)

Osprey Energy Center Site
Auburndale, Florida

Boring/Piezometer Number	Top of Casing Elevation[1] (feet)	Water Level[2]	Water Table Elevation (feet)	Total Depth (ft)	Screen Interval (fbls)
B-1/PZ-1	148.39	6.63	141.76	50	1 - 50
B-3/PZ-2	151.70	18.02	133.68	55	12 - 55
B-8/PZ-4	148.40	16.83	131.57	60	13 - 60
B-9/PZ-3	148.52	17.23	131.29	82	77 - 82

[1]Top of Casing Elevation: Elevations professionally surveyed to NGVD, 1929 datum by Chastain-Skillman, Inc.
[2]In feet below top of casing, north side.

$$V = Ki/S_y$$

where

V = groundwater velocity (feet per day, ft/d)

K = hydraulic conductivity of the surficial aquifer system (ft/d)

i = hydraulic gradient (unitless)

S_y = the specific yield of the aquifer (unitless)

Substituting v Substituting values from the field at Osprey Energy Center Site for hydraulic gradient (i) and values from SWFWMD (1994) for specific yield (S_y) and hydraulic conductivity (K) yields:

$$V = \frac{(12.3\ ft/d)(0.005\ ft/ft)}{0.26}$$

$$V = 0.22\ ft/d$$

Groundwater in the surficial aquifer system aquifer is classified as G-II according to the provisions of Rule 62-520.410, F.A.C. **Table 2.3.2-3** lists the background levels in the surficial aquifer system for calcium, magnesium, sodium, iron, sulfate, chloride, total phosphate, total nitrate, and total dissolved solids. These values are based on "Florida's Groundwater Quality Monitoring Program: Background Hydrogeochemistry" (Florida Geological Survey, 1992).

Intermediate Aquifer System

Miocene sediments of sandy clay, clay, marl, sand, and phosphate beds comprise the intermediate aquifer system in Polk County. The intermediate aquifer system usually contains at least two distinct water-bearing zones, which are separated from each other by low-permeability sandy clays, clay, and marl (SWFWMD, 1993). In the vicinity of the Site, the relatively impermeable clays of intermediate aquifer system serve as a confining unit that hydraulically separates the underlying Upper Floridan aquifer from the overlying surficial aquifer system. Thickness of the intermediate aquifer system near the Site is approximately 75 ft (SWFWMD, 1988).

TABLE 2.3.2-3
PUBLISHED BACKGROUND WATER CHEMISTRY[1]

Osprey Energy Center Site
Auburndale, Florida

Constituent[2]	Hydrogeologic Unit		
	surficial aquifer system	intermediate aquifer system	Upper Floridan aquifer
Calcium (Ca^{2+})	20.00	60.13	50.00
Magnesium (Mg^{2+})	5.78	18.25	10.00
Sodium (Na^{+})	10.00	7.33	10.00
Iron ($Fe^{2+,3+}$)	1.12	1.71	0.10
Sulfate (SO_4^{2-})	100.00	5.70	10.00
Chloride (Cl^{-})	4.70	10	10.00
Total phosphate (PO_4^{3-})	0.10	0.37	0.20
Total nitrate (NO_3^{-})	12.63	0.02	0.62
Total Dissolved Solids (TDS)	250	321	250.00

[1]Source: Florida's Groundwater Quality Monitoring Program: Background Hydrogeochemistry, Florida Geological Survey Special Publication no. 34, 1992.
[2]All values in milligrams per liter.

Figures 2.3.2-2 and 2.3.2-3 display the potentiometric surfaces of the intermediate aquifer system in May of 1998 and September of 1998, respectively (U.S. Geological Survey, 1999a and 1999b, resp). Groundwater flow in the intermediate aquifer system is predominantly west and southwestward. Seasonal potentiometric-surface fluctuation in the intermediate aquifer system can be as much as 30 feet. Recharge to the intermediate aquifer system from overlying units in the area ranges from low to moderate depending on seasonal groundwater use in the area (SWFWMD, 1993).

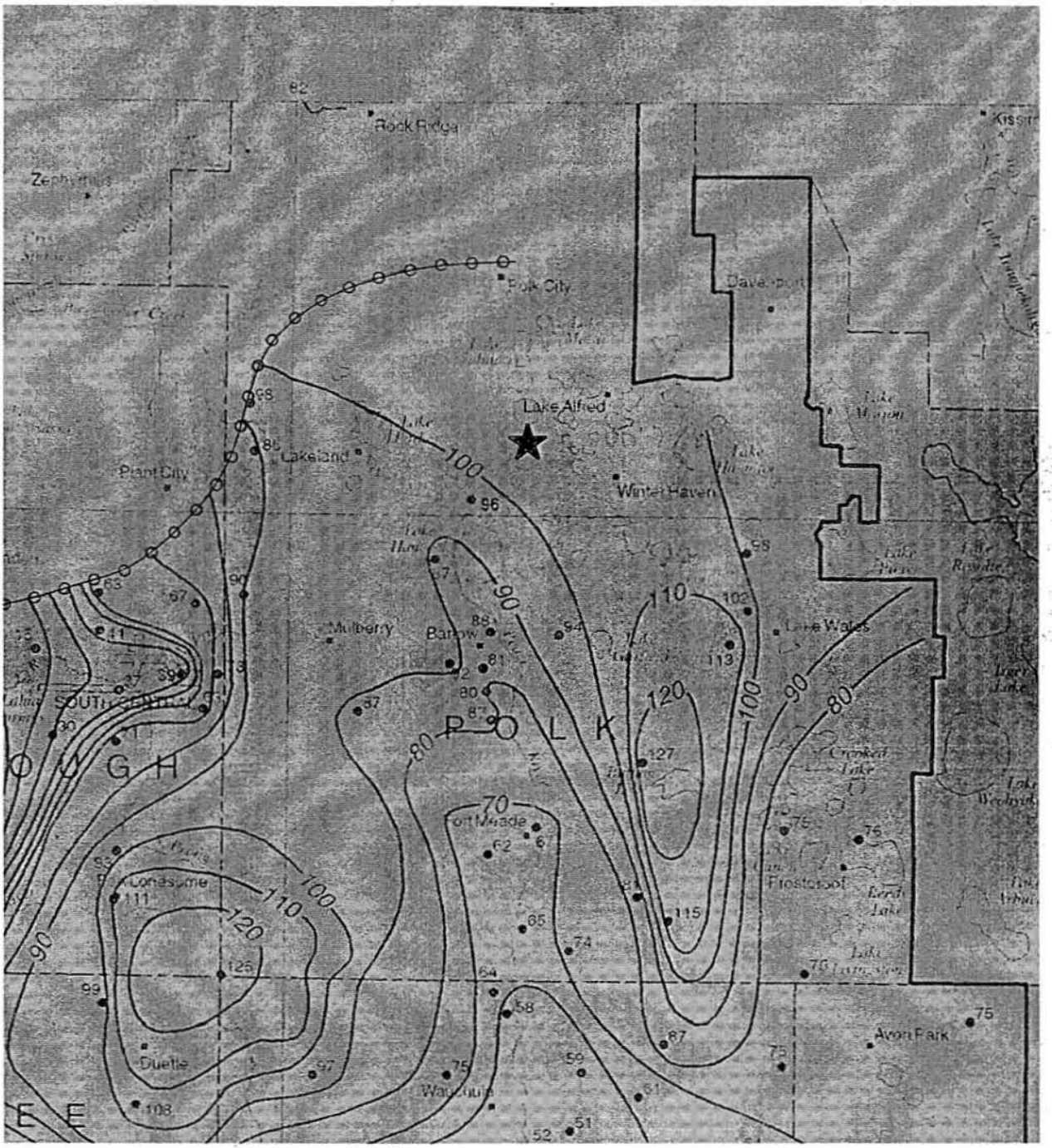
The transmissivity of the intermediate aquifer system in the vicinity of the Osprey Energy Center Site is approximately 668 ft^2/day (SWFWMD, 1994). Storativity of the intermediate aquifer system ranges from 1.0×10^{-4} to 4.2×10^{-5} in Polk County. This aquifer system is primarily used for domestic supply and is used to a lesser degree for stock watering, irrigation, and small public supplies (SWFWMD, 1988).

Groundwater in the intermediate aquifer system aquifer is classified as G-II according to the provisions of Rule 62-520.410, F.A.C. **Table 2.3.2-3** lists the background levels in the intermediate aquifer system for calcium, magnesium, sodium, iron, sulfate, chloride, total phosphate, total nitrate, and total dissolved solids. These values are based on "Florida's Groundwater Quality Monitoring Program: Background Hydrogeochemistry" (Florida Geological Survey, 1992).

Upper Floridan Aquifer

Oligocene and Eocene carbonates (limestone) comprise the Upper Floridan aquifer in the area of the Osprey Energy Center Site. Thickness of this hydrogeologic unit is approximately 1,000 feet beneath the Site.

The potentiometric surface of the Upper Floridan aquifer in the area of the Site for May and September 1998 is presented in **Figures 2.3.2-4 and 2.3.2-5**, respectively (U.S. Geological Survey, 1999c and 1999d). Direction of groundwater flow in the Upper Floridan aquifer is toward the south-southwest in the vicinity of the Osprey Energy Center Site. The potentiometric surface in the Upper Floridan aquifer can fluctuate as much as 40 feet seasonally. Recharge to the Upper



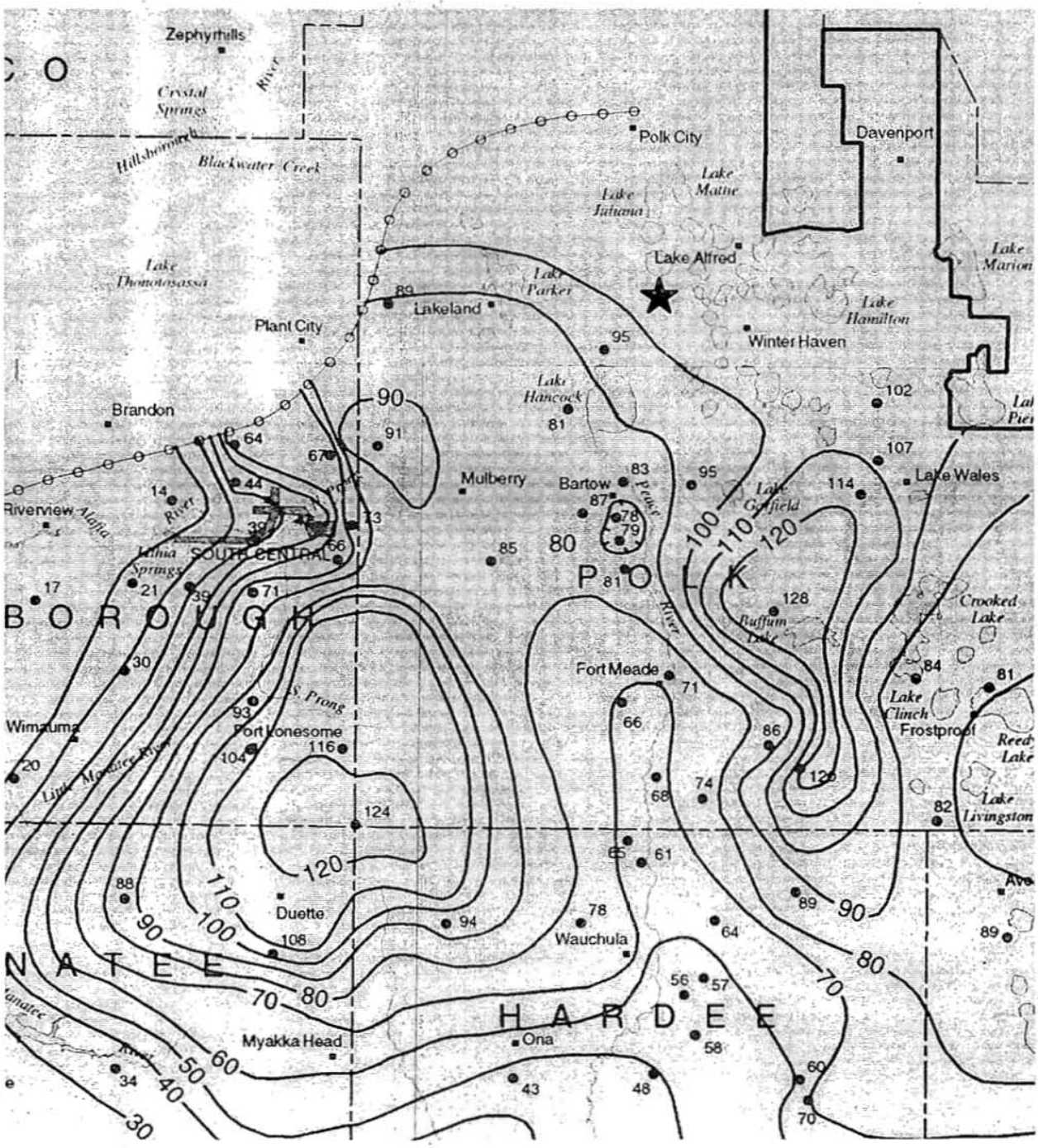
Source: U.S. Geological Survey Open File Report 99-58

Golder Associates — Tampa, Florida

Potentiometric Surface of the Intermediate Aquifer System, West-Central Florida, May 1998

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	1"=8 Miles	Job No.	993-9570
CHK BY:	AW	DATE:	02/01/00	FIGURE	2.3.2-2
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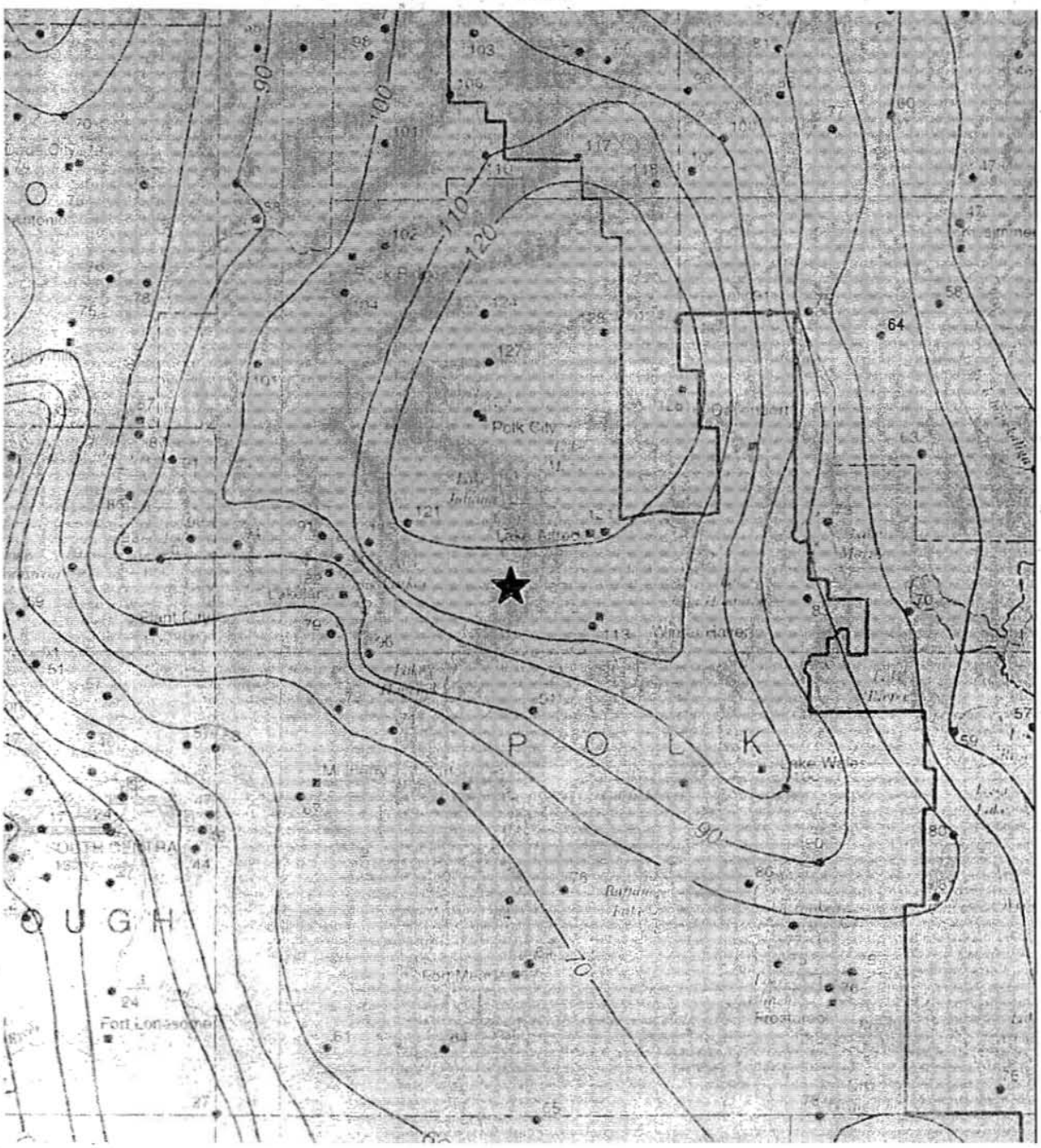
Source: U.S. Geological Survey Open File Report 99-224

Golder Associates — Tampa, Florida

Potentiometric Surface of the Intermediate Aquifer System, West-Central Florida, September 1998

Client / Project: Calpine Construction Finance Company, L.P. Osprey Energy Center

CAD BY: CDT	SCALE: 1"=8 Miles	Job No. 993-9570
CHK BY: AW	DATE: 02/01/00	FIGURE 2.3.2-3
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Boundary of Southwest Florida Water Management District

Potentiometric Contour

64 Observation Wells

Site Location

N

0 4 8 Miles

Source: U.S. Geological Survey Open File Report 99-59

Golder Associates

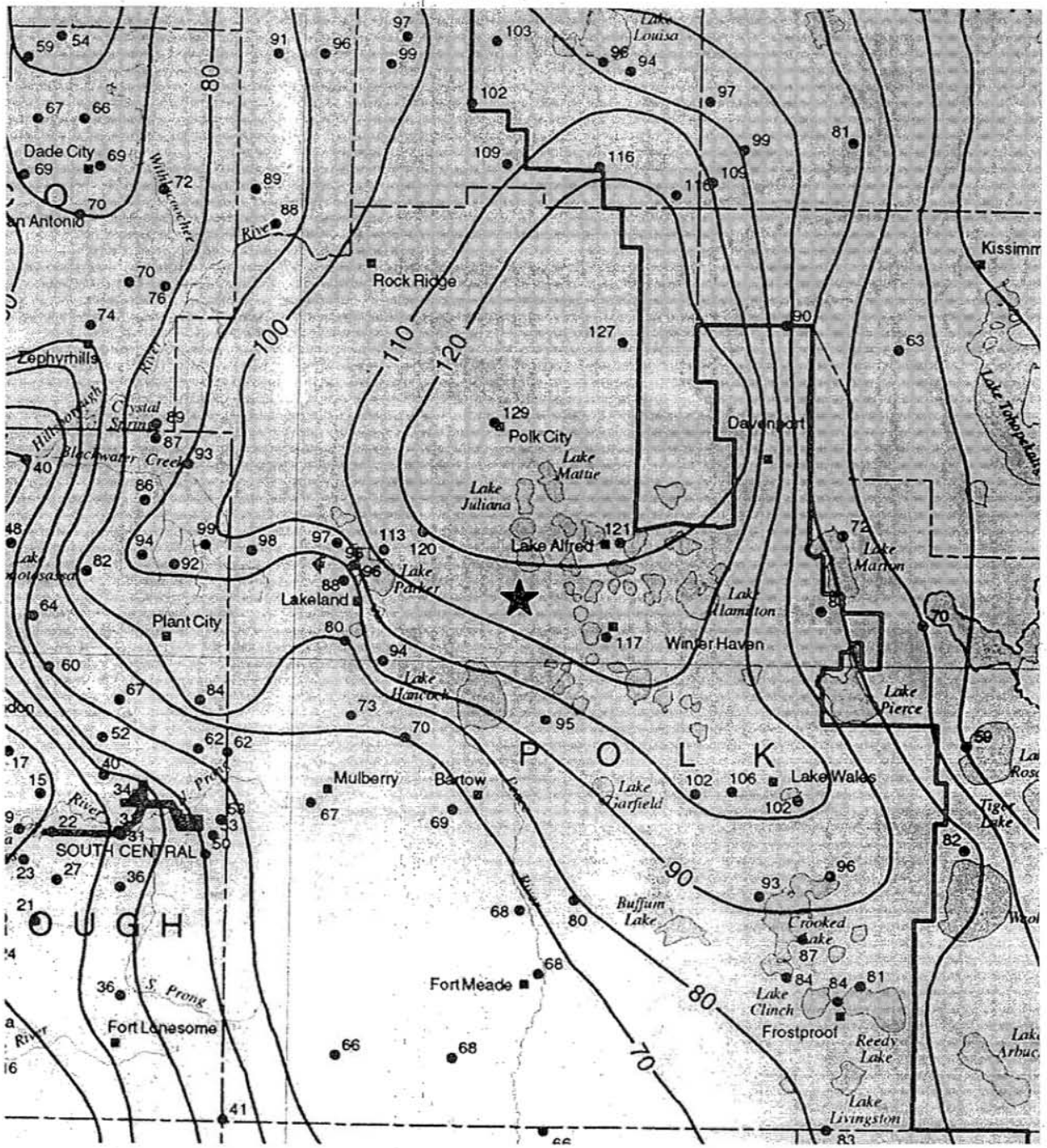
Tampa, Florida

Potentiometric Surface of the Upper Floridan Aquifer System, West-Central Florida, May 1998

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: 1"=8 Miles	Job No. 993-9570
CHK BY: AW	DATE: 02/01/00	FIGURE 2.3.2-4
REV BY: -	FILE No.: fig2_3_2-4.dwg	



Boundary of Southwest Florida Water Management District

Potentiometric Contour

63 Observation Wells

Site Location

N

0 4 8 Miles

Source: U.S. Geological Survey Open File Report 99-225

Golder Associates

Tampa, Florida

Potentiometric Surface of the Upper Floridan Aquifer System, West-Central Florida, September 1998

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: 1"=8 Miles	Job No. 993-9570
CHK BY: AW	DATE: 02/01/00	FIGURE 2.3.2-5
REV BY: -	FILE No.: fig2_3_2-5.dwg	

Floridan aquifer from overlying units is very low, from zero to one inch per year, due to the confining units of the intermediate aquifer system (SWFWMD, 1993).

The transmissivity of the Upper Floridan aquifer in the vicinity of the Osprey Energy Center Site is approximately 96,255 ft^2/day (SWFWMD, 1994). Storativity of the Upper Floridan aquifer ranges from 4.7×10^{-2} to 9.0×10^{-4} in Polk County. This aquifer system provides nearly all the water used in Polk County for municipal and industrial supplies (SWFWMD, 1988).

Groundwater in the Upper Floridan aquifer is classified as G-II according to the provisions of Rule 62-520.410, F.A.C. **Table 2.3.2-3** lists the background levels in the Upper Floridan aquifer system for calcium, magnesium, sodium, iron, sulfate, chloride, total phosphate, total nitrate, and total dissolved solids. These values are based on "Florida's Groundwater Quality Monitoring Program: Background Hydrogeochemistry" (Florida Geological Survey, 1992).

Characteristic Confining Units

Confining beds of the intermediate aquifer system make up the confining unit in the area of the Osprey Energy Center Site. Leakance of this unit varies from 6.9×10^{-4} to 6.7×10^{-5} ft/day/ft. Thickness of the confining unit varies from 25 to 50 feet near the Site.

2.3.2.2 Karst Hydrogeology

Three major types of sinkholes common to Florida are solution sinkholes, cover-collapse sinkholes, and cover subsidence sinkholes. They are a natural phenomenon that is induced by the rise or fall of the groundwater levels. The types of sinkholes are described as follows (Sinclair and Stewart, 1985):

- Solution sinkholes occur in areas where limestone is exposed or covered by thin layers of permeable soils and the potentiometric surface of the limestone aquifer is at or near the top of rock. This type of sinkhole usually forms as a bowl-shaped depression with the slope of its sides determined by the rate of subsidence relative to the rate of erosion of the walls of the depression from surface runoff.

- Cover-collapse sinkholes occur where a large solution cavity develops in the limestone to such size that the overlying cover material can no longer support its own weight. Collapse is generally abrupt when this occurs and is sometimes catastrophic. They generally develop in areas where limestone is near the land surface and the limestone aquifer is under water-table conditions (i.e., below the top of rock). In plan view, the sinkholes are generally circular in shape and the walls may be round and smooth, but mostly the walls are irregular in shape because of the influence of joints and fractures in the rock.
- Cover-subsidence sinkholes occur where the cover material is relatively incohesive and permeable, such that it can migrate downward freely to occupy space formerly held by the dissolved limestone. In areas where sand cover is 50 to 100 feet thick, subsidence sinkholes generally are only a few feet in diameter and depth. Spilling of sand into solution cavities that have developed along joints in the limestone may cause subsidence due to upward migration of the cavities (a process known as piping) to form cylindrical holes at the land surface.

The Site vicinity is mapped by Sinclair and Stewart as an "Area III", which is described as having cover material 30 to 200 feet thick and consisting mainly of cohesive clayey sediments of low permeability. According to Sinclair and Stewart (1985), sinkholes in this area are numerous, of varying size, and they develop abruptly. Cover-collapse sinkholes dominate this area, when present (Sinclair and Stewart, 1985).

The evaluation of a specific area for sinkhole risk is very difficult to economically assess utilizing presently available exploration methods and engineering knowledge. The most common methods used for such evaluations include:

- Personnel's local experience,
- Review of regional and site specific geology (such as well logs),
- Review of regional and site specific hydrologic information (such as well test data),
- Review of historical sinkhole occurrences, and
- Review of aerial photographs, topographic maps, and infrared photographs.

In addition, a field study may be conducted which includes an exploration program of test borings, site reconnaissance, and geophysical techniques. These testing techniques would assess the condition of the overburden and underlying limestone at the proposed Site.

Sinkhole Potential

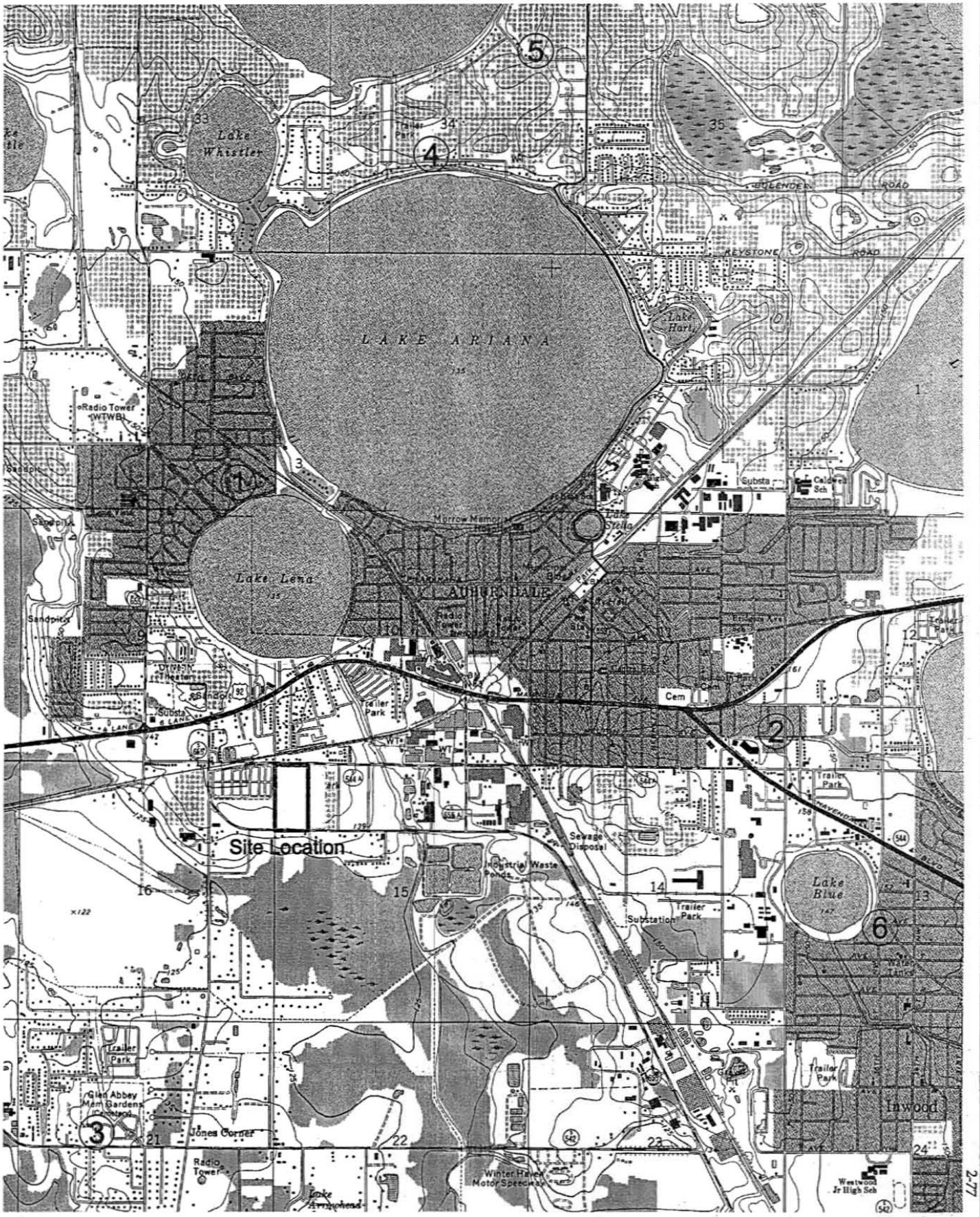
The first step in evaluating the sinkhole potential of any area should be a determination of previous sinkhole formation. By plotting past occurrences, areas with high incidences of sinkhole formation will be readily identified and areas with the least potential will be conspicuous by the relative absence of sinkhole activity. Review of the USGS 7.5-Minute Topographic Quadrangle map for Auburndale, Florida, and a review of the ***Florida Sinkhole Index*** (Spencer and Lane, 1995) indicates that there are six sinkholes reported within three miles of the proposed Site. These sinkholes are plotted on **Figure 2.3.2-6**. Additionally, review of the USGS 7.5-Minute Topographic Quadrangle map for Auburndale, Florida indicates that most of the lakes in the vicinity of the proposed Site may have been formed by sinkholes, including Lake Lena (approximately 2,000 ft north- northeast of the proposed Site).

Based upon the above information, the potential for development of a cover-collapse sinkhole in the vicinity of this study area is moderate. The essential ingredient required for this type of sinkhole is active solution weathering of the underlying limestone creating large cavities. Based on available geologic information and observed conditions in the area, naturally occurring solution cavities likely exist within the limestone in the vicinity of the proposed Site.

In summary, the geologic, hydrologic, and visual evidence available to date suggest that the type of conditions favorable for the development of cover-collapse sinkholes likely exist in the vicinity of this proposed Site. Our conclusions from this study are also in agreement with those presented by the Florida Geological Survey in various maps and publications produced for the area.

Onsite Sinkhole Evaluation

In order to assess the presence/absence of karstic features beneath the Site, a geophysical investigation was performed by SDII Global Corporation (SDII). The geophysical investigation consisted of ground penetrating radar (GPR) and seismic reflection (SR). The purpose of this



2-77

Legend

(1) Reported Sinkhole Location
(Source: Spencer and Lane, 1995)

0 500' 1000' 2000'
SCALE: 1" = 2000'

N

investigation was to utilize GPR and SR techniques to help identify subsurface conditions that may be related to the presence of karst (sinkhole) features at the project Site. Specifically, the survey attempted to identify topographic lows (depressions), discontinuities, and down-warping in the sediment layers and/or bedrock underlying the Site.

GPR has been used in similar investigations and is used to identify and map the boundaries of sinkholes, as well as characterize their size and geometry. In certain cases, subsurface features may exist at a site that are not detected by the GPR instrumentation due to soil conditions. Conversely, features that appear to be karstic in nature from GPR data may not be due to the soil conditions. Seismic reflection permits deeper penetration and has been used successfully in the Tampa Bay area to define potential sinkhole features by delineating depressions in stiffer layers (including bedrock), which are typically below the maximum depth of investigation of the GPR.

GPR Field Procedures

The GPR investigation was performed over the period October 26-27, 1999 using a Geophysical Systems Survey Inc. Subsurface Interface Radar (GSSI SIR) System-3 digital GPR recorder. The GPR survey was performed across accessible areas of the property. The GPR transects (Figure 1, **Appendix 10.11**) were constructed by SDII personnel using a fiberglass measuring tape and were indicated on 25-foot intervals using survey spray paint and pin flags.

The GPR investigation was performed by towing the antenna along each transect line. All lines were run in both an east-west as well as north-south directions (Figure 1, **Appendix 10.11**) for a total coverage of approximately 70,000 linear-feet.

Seismic Reflection Field Procedures

Data acquisition was accomplished over the time period October 28-November 2, 1999 using a Geometrics ES 2401, 24-channel seismograph system. SDII acquired seismic reflection data using a basic, 24 geophone spread. Twenty-four geophones were placed in a line with a ten-foot spacing between each of the geophones (total spread length = 230 ft). Into this geophone spread, a single 12-gauge shotgun shell was fired ten-feet off the end of the geophone spread. After recording this shot, the entire geophone spread was moved up the line a distance of

twenty-feet and a new shot (10 feet from the first geophone) was fired and recorded. This process was continued until the end of the seismic line was reached. SDII acquired SR data on a series of seismic lines as also shown on Figure 1, **Appendix 10.11** with a total seismic coverage of 7,500 linear ft over the property.

Results of the Geophysical Investigation

The results of the GPR investigation indicated that the maximum effective depth of investigation ranged from approximately 15 to 25 ft bls. The depth of investigation was limited by attenuation of the GPR signal due to existing soil conditions at the Site.

Figure 2, **Appendix 10.11** is an example segment of one GPR transect line. It shows a fairly strong horizontal reflection sequence at about 6-10-ft depth which is likely an interface within the sediments. The significant feature indicated on Figure 3, **Appendix 10.11** indicates a potential downwarping of sediments or loose soils.

The results of the GPR investigation indicate the presence of rather broad subsurface anomalies (generally in the northern portion of the Site) that were interpreted by SDII as being associated with karst activity or loose soils (Figure 3, **Appendix 10.11**). The southern half of the Site exhibited undisturbed or minimally disturbed soil horizons.

The seismic reflection data were good to very good quality. The highest quality data were in the southern half of the Site where the GPR data indicated the soils were more continuous and undisturbed. The seismic reflection data generally indicated bedrock reflections at an estimated depth of 75 to 85 feet bls. In general, the average depth to bedrock across the Site was approximately 80 feet bls, with shallower elevations in the southern half of the Site. Based upon the results of the geophysical investigation, SDII selected several sites for follow-up subsurface borings to determine whether karstic features were present beneath the Site (Figure 3, **Appendix 10.11**).

Geotechnical Borings and Results

As discussed in **Section 2.3.1.2,** a geotechnical investigation was conducted to characterize subsurface conditions at the Osprey Energy Center Site. The geotechnical investigation

consisted of advancing 14 standard penetration test (SPT) borings. Five borings (B-1 through B-5, **Figure 2.3.1-2**) were constructed in the sites selected by SDII for follow-up subsurface assessment. Borings B-1, B-2, B-4, and B-5 were located in areas identified by SDII as having potential karstic features (Figure 3, **Appendix 10.11**).

The geotechnical boring logs recorded by Golder indicate that a fine clayey sand layer underlies surficial fine sands in B-1, B-2, B-4, and B-5 (**Appendix 10.10**). In the remaining 10 borings that were drilled at the Site, fine-grained sand with little clay underlies the surficial fine sands.

The thickness of surficial sediments and the thickness of the confining clay unit encountered in the borings were examined for any abrupt increases in relative depths between adjacent borings, which may be indicative of a collapse of materials into underlying karstic limestone. The boring logs were reviewed for conditions indicative of relict sinkholes, such as the presence of voids within a borehole or a loss of drilling fluid circulation while advancing a boring, the presence of lenses of surficial sands and confining clays within the sequences of weathered limestone, and the linear continuity of identified indications of potential sinkholes. None of these sinkhole indicators were encountered in the borings.

The boring logs were also reviewed to compare the top of the fractured limestone with the top of bedrock interpreted from geophysical data. Fractured limestone was encountered in borings B-2, B-4, B-5, B-9, B-11, and B-13. In boring B-11 top of limestone was encountered at 65 feet bls during drilling compared to about 77 feet bls interpreted from geophysical data. In the remaining borings the difference between the depths at which top of limestone was encountered during drilling and interpreted from geophysical data was less than 10 feet. In general, the top of limestone encountered during drilling compared well with the geophysical interpretations. The relatively slight differences were probably due to the fact that the geophysical methods would detect slightly deeper and fresher rock than the top of limestone encountered during drilling.

Based on boring logs and laboratory testing, the fines content of the surficial sands generally increase with depth and fines were generally comprised of clays. Based on the SPT N-values, the surficial sands are loose to dense near the ground surface and generally increase in density

with depth. No loss of circulation of drilling fluid, voids or other conditions indicative of a sinkhole were encountered while drilling the SPT borings.

Based upon a review of the results of the geotechnical and geophysical investigation conducted at the Site, no subsurface conditions indicative of past sinkhole activity were encountered. The geologic, hydrologic, geotechnical, and geophysical data available to date suggest that it is unlikely that conditions favorable for the development of sinkholes are present at the Site.

2.3.3 SITE WATER BUDGET AND AREA USERS

2.3.3.1 Site Water Budget

The Site is located in Auburndale, Polk County, Florida. The climate in this area is classified as subtropical with distinctive wet and dry periods. Components of the Site water budget include precipitation, evaporation and evapotranspiration (ET), runoff, and infiltration to the subsurface (i.e., groundwater recharge).

The Southwest Florida Water Management District (SWFWMD) database includes climatological data for data collection stations near the Site. Long-term monthly precipitation data at Winter Haven for the period 1948 through 1999 were obtained from the SWFWMD and the National Oceanic and Atmospheric Administration (NOAA). Rainfall data on long-term monthly averages, maximums, and minimums are summarized in **Table 2.3.3-1**. The annual precipitation averages 49.25 inches per year with the highest precipitation in the summer months (June, July, August, and September) and the lowest in late fall/winter (November and December); however, the entire period from October to May is subject to periods of extended and potentially significant drought.

Monthly temperature values were available at Lake Alfred station for the period 1988 - 1997, and are presented in **Table 2.3.3-2**. The annual average temperature is approximately 74 degrees Fahrenheit (°F) with the highest temperature in June and July and the lowest in December and January.

The average maximum and minimum relative humidity for the warm season in Orlando are approximately 90 and 60-percent, respectively (Source: Water Resources Atlas of Florida). The

Table 2.3.3-1: Rainfall Data (inches per year) for Winter Haven (1948-1999)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
1948	7.46	0.76	3.14	2.93	2.83	5.10	13.73	11.25	13.46	1.48	0.69	2.07	64.90
1949	0.14	0.58	4.17	0.00	0.84	10.84	9.55	14.59	9.30	0.00	1.32	3.08	54.41
1950	0.02	0.44	0.00	2.85	1.94	5.94	7.04	0.00	10.51	7.60	0.00	3.87	40.21
1951	0.20	2.42	2.17	7.36	0.80	4.58	8.95	6.66	8.41	1.57	4.94	1.52	49.58
1952	0.48	3.92	5.74	0.46	1.59	3.58	7.15	13.28	1.96	9.43	1.82	1.16	50.57
1953	2.16	2.95	3.68	3.80	2.18	10.07	7.37	8.01	9.34	6.25	6.76	6.28	68.85
1954	1.38	1.25	1.48	1.98	5.08	5.74	5.72	3.09	7.73	1.43	2.64	1.16	38.68
1955	2.15	1.35	2.90	2.38	2.64	4.97	7.52	4.06	6.04	1.45	1.86	1.46	38.78
1956	0.95	0.91	0.30	2.52	6.37	5.19	6.80	7.05	5.96	8.00	0.29	0.21	44.55
1957	2.15	5.62	4.15	6.34	12.72	2.72	8.35	11.39	7.76	1.72	0.39	2.76	66.07
1958	5.30	4.11	5.69	2.83	4.92	4.52	6.26	6.89	3.96	3.69	1.41	3.15	52.73
1959	3.41	2.78	10.97	5.01	5.83	11.02	8.88	4.22	8.80	9.42	0.60	2.34	73.28
1960	1.62	6.57	12.18	5.30	2.84	6.47	11.37	1.78	17.26	3.09	0.00	1.13	69.61
1961	1.62	3.21	2.54	2.12	6.06	9.40	3.44	7.31	1.22	0.85	0.65	1.39	39.81
1962	1.71	1.55	3.84	1.74	4.60	4.31	6.80	8.74	6.58	0.92	2.46	0.23	43.48
1963	2.83	6.03	2.18	0.18	4.22	3.41	5.73	5.23	5.23	0.46	6.27	2.00	43.77
1964	5.62	4.73	3.31	1.12	2.97	5.46	5.32	5.24	6.06	0.85	1.47	2.12	44.27
1965	1.53	3.98	2.22	1.59	0.58	9.00	11.34	8.35	6.32	1.63	0.87	2.64	50.05
1966	5.91	4.23	1.23	1.66	6.19	9.23	5.99	6.81	4.48	3.76	0.13	1.34	50.96
1967	1.21	4.66	0.91	0.00	2.87	5.83	9.52	10.06	3.29	0.78	0.20	2.37	41.70
1968	0.40	2.64	1.05	0.62	6.28	15.04	5.75	5.57	5.62	2.64	3.97	0.40	49.98
1969	3.62	1.69	6.55	2.66	0.88	6.72	8.29	8.01	4.95	5.66	2.99	3.63	55.65
1970	2.55	2.27	7.16	1.77	4.66	3.70	10.54	3.65	4.50	1.42	0.62	1.01	43.85
1971	0.24	4.64	1.24	0.67	3.54	4.52	11.03	10.02	3.25	5.28	2.96	0.84	48.23
1972	1.28	5.05	2.41	0.91	5.59	5.10	1.95	7.83	1.10	2.91	3.48	1.90	39.51
1973	5.39	2.56	5.52	2.79	1.66	2.62	12.07	7.26	9.69	0.74	1.09	2.44	53.83
1974	0.61	0.88	2.66	1.32	5.09	13.07	10.48	6.22	7.51	0.43	0.46	1.68	50.41
1975	1.40	1.99	0.98	1.75	6.75	5.01	4.06	10.48	9.39	4.29	0.00	0.88	46.98
1976	0.76	0.64	1.81	2.88	8.11	6.33	8.12	7.39	8.33	1.08	2.31	1.72	49.48
1977	1.29	1.67	1.17	0.72	3.49	6.77	6.02	12.76	6.64	2.48	3.36	0.00	46.37
1978	0.00	4.06	0.00	0.61	0.00	0.00	10.16	4.90	2.90	2.14	0.40	3.48	28.65
1979	6.57	1.67	2.10	0.00	12.99	3.52	6.29	0.00	12.47	0.63	2.27	1.95	50.46
1980	3.00	1.67	2.09	3.41	4.41	4.26	5.77	2.04	3.09	1.37	5.21	0.57	36.89
1981	0.42	2.73	1.84	0.00	1.10	7.22	12.05	11.39	5.66	2.09	1.11	1.36	46.97
1982	1.19	1.95	6.34	0.00	10.36	10.21	9.81	7.24	7.14	1.86	1.46	0.75	58.31
1983	1.94	7.82	6.93	0.86	2.72	8.55	7.51	9.89	3.90	2.59	3.79	6.44	62.94
1984	1.62	3.69	1.73	2.52	3.59	6.02	8.59	10.83	0.00	0.75	0.00	0.04	39.38
1985	0.86	0.86	3.14	1.17	0.81	5.22	7.62	8.39	3.14	1.58	0.19	2.28	35.26
1986	2.68	3.47	3.52	0.64	1.00	9.14	2.72	7.66	3.14	4.98	2.49	2.94	44.38
1987	1.59	1.39	9.61	1.29	2.26	6.02	6.51	6.76	11.32	3.41	7.13	0.03	57.32
1988	3.07	1.96	4.74	1.36	3.64	5.45	3.69	0.00	0.00	1.27	7.81	0.91	33.90
1989	2.62	0.32	2.20	3.80	1.44	4.68	8.41	4.56	7.28	0.55	1.49	5.35	42.70
1990	0.97	2.65	3.00	1.60	3.37	9.47	10.93	5.00	2.16	2.89	0.73	0.07	42.84
1991	2.89	0.73	5.61	4.42	5.13	6.01	12.73	4.41	3.35	3.01	0.20	0.40	48.89
1992	1.54	0.00	0.00	0.00	1.36	16.44	4.57	11.94	3.35	2.42	1.86	0.84	44.32
1993	5.62	1.98	3.57	4.02	3.37	2.49	10.44	5.77	5.57	5.21	0.30	1.07	49.41
1994	4.67	1.98	2.53	3.53	1.96	11.87	8.57	7.75	8.23	1.57	5.32	4.93	62.91
1995	2.33	2.89	1.87	3.20	1.19	9.17	11.82	11.78	3.73	6.77	4.07	0.65	59.47
1996	5.78	2.69	6.40	2.14	2.69	6.76	3.36	6.15	6.72	4.17	0.64	2.52	50.02
1997	0.95	1.40	2.08	5.11	1.92	4.57	5.08	4.97	5.55	5.07	2.95	0.00	39.65
1998	3.82	10.61	7.19	1.00	1.24	0.66	13.76	3.31	19.34	0.81	2.27	1.98	65.99
1999	2.91	0.52	0.55	4.96	3.45	9.46	0.00	0.00	0.00	0.00	0.00	0.00	
Maximum	7.46	10.61	12.18	7.36	12.99	16.44	13.76	14.59	19.34	9.43	7.81	6.44	73.28
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	1.95	0.00	0.00	0.00	0.00	0.00	28.65
Monthly Average	2.35	2.75	3.47	2.19	3.73	6.60	7.95	7.02	6.33	2.87	2.11	1.87	49.25

Annual Average: 49.25

Note: Units are in inches per year.

Source: SWFWMD and NOAA, 1999.

Table 2.3.3-2: Average Temperature Values for Lake Alfred Station (1988-1997)

Month of Year	High	Low	Average of Low and High Temperature	Average[1] (1988-1997)
January	72.17	53.15	62.66	61.54
February	74.84	52.69	63.77	63.38
March	82.18	57.81	70.00	66.28
April	84.69	61.62	73.16	70.22
May	93.03	67.57	80.30	73.05
June	96.36	73.25	84.80	79.74
July	95.93	76.13	86.03	79.09
August	97.94	69.60	83.77	76.04
September	95.97	63.91	79.94	66.80
October	86.88	65.86	76.37	81.71
November	78.42	60.94	69.68	61.49
December	71.02	52.84	61.93	60.36
Average	85.79	62.95	74.37	69.98

Notes:

[1] Average of the monthly average temperatures for the period of data.
In calculating averages, months with missing data were not included.

Units are in degrees °F

average lake evaporation for the project area is approximately 49 inches per year. Evaporation estimates were prepared using measured evaporation rates for Lake Alfred, Florida.

2.3.3.2 Area Users

There are several major water users within the area where Osprey Energy Center is proposed to be located. Review of current water use permits issued by SWFWMD (1999) for the area within close proximity of the Osprey Energy Center identified industrial, agricultural and municipal water users. The main source of water for these entities is the Upper Floridan aquifer. **Figure 2.3.3-1** shows the location of major water users near the Site. The Auburndale Power Plant is the closest major water user to the Site. The volume of withdrawal from this plant is less than 1.8 mgd.

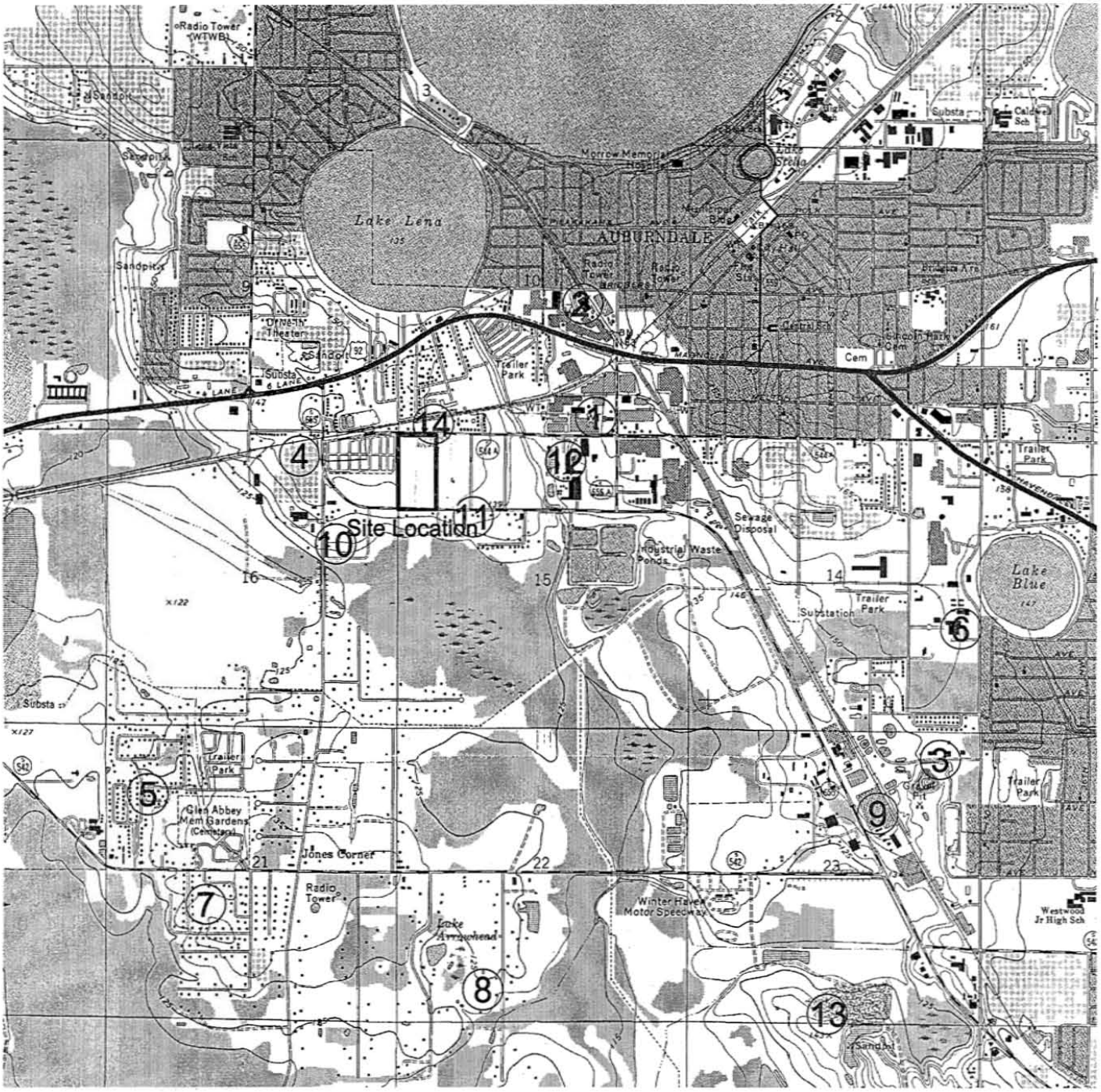
2.3.4 SURFICIAL HYDROLOGY

This section is based primarily on the data collection and analyses performed by Golder during 1999, and the information provided by state and federal agencies for the project area.

2.3.4.1 Hydrologic Characterization

Physical Characteristics

The Site is located in the Polk Upland physiographic region with land surface elevations ranging from 141 to 148 ft (USC & GS, 1929), see site-survey map, **Figure 2.3.4-1**). There no surface water features at the Site. The Site is near the headwaters of the Peace River. Stormwater runoff from the Site drains both north (approximately ¼ of the Site drainage) and south (approximately ¾ of the Site drainage) into ditches along the adjacent roads. After entering the unpaved ditches, runoff from the Site either percolates into subsurface soils or discharges into Lake Lena Run via ditches on the south side of the Site. Lake Lena Run originates from Lake Lena (see **Figure 2.3.4-2**) and eventually discharges into Lake Hancock. Lake Hancock overflows into Saddle Creek, which in turn discharges into the Peace River. Water quality data for nearby lakes, including Lake Ariana, Lake Hancock, and Lake Lena are presented in **Tables 2.3.4-1 through 2.3.4-3.**



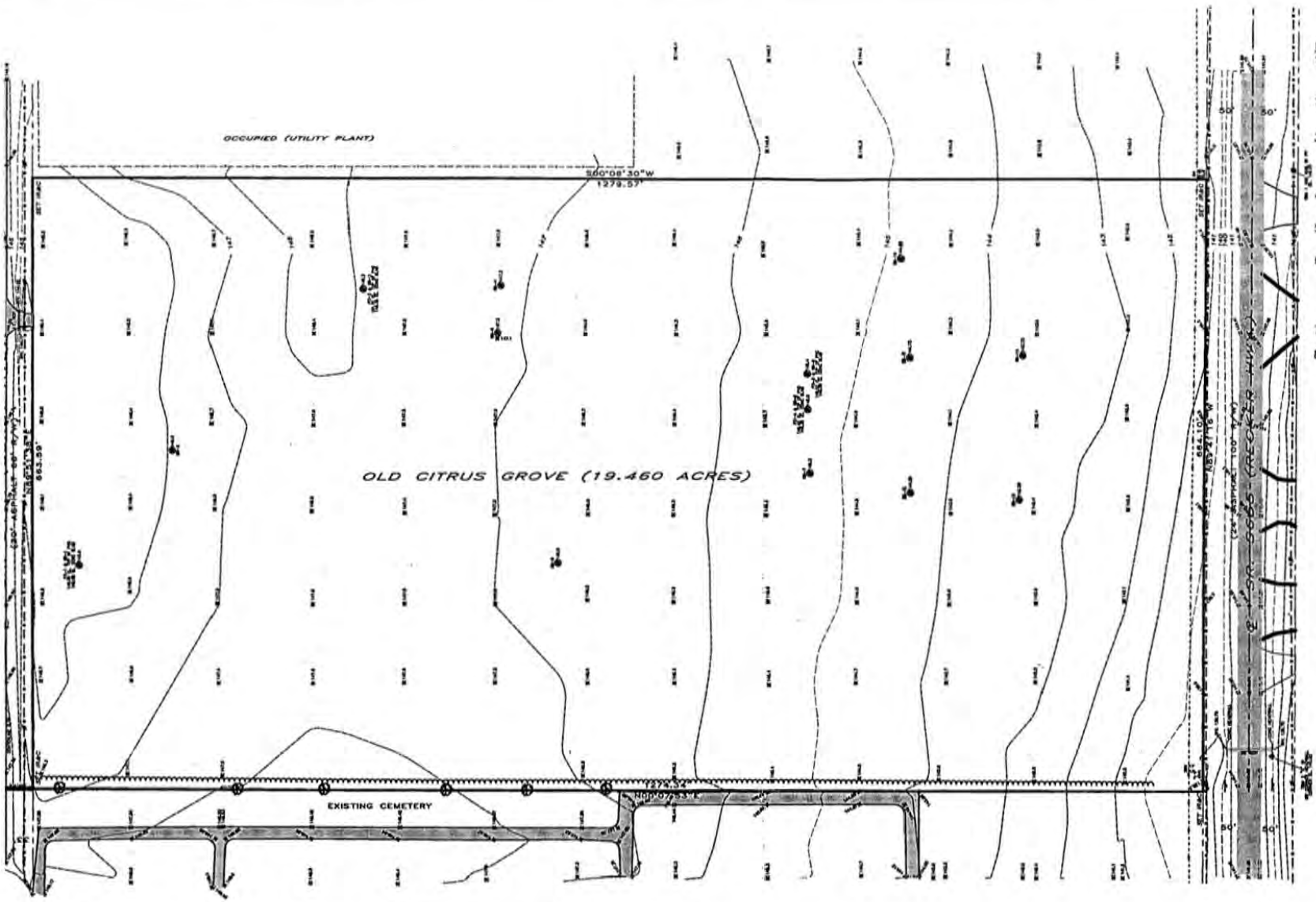
Site	Water Use (gallons per day)	
	Average	Peak
1. Cutrale Citrus Juices USA, Inc.	3,500,000	4,500,000
2. SFE Citrus Processors, Ltd.	404,000	2,528,600
3. MacAsphalt, Div. of APAC	141,000	211,500
4. Talquin Development Co.	26,500	105,900
5. Keen Sales, Rentals, Utilities	81,000	162,000
6. Mitco Water Laboratories, Inc.	11,000	27,700
7. J.C. Helms	900	3,400
8. Fox Hollow Nursery	19,700	42,800
9. Griswold Industries	9,100	30,400
10. Dolores A. Barton	19,100	44,150
11. E.E. Sawyer & Don C. Smith	1,000	4,000
12. FLA Distillers Co. & Tod Hunter	1,000,000	1,300,000
13. Polk Co. Dept. of Parks and Rec.	25,700	71,700
14. Auburndale Power Partners	1,326,300	1,894,700

Legend

(1) Permitted Water User

0 500' 1000' 2000'
SCALE: 1" = 2000'

N



REPORT:

1. THIS SURVEY PERFORMED WITHOUT THE BENEFI OR TITLE OPINION SEARCH, THEREFORE, EASE ENCUMBRANCES MAY EXIST THAT ARE NOT SH
2. THIS SURVEY IS NOT VALID UNLESS ORIGINAL S EMBOSSED SEAL IS AFFIXED.
3. THIS PROPERTY IS LOCATED IN FLOOD ZONE "(FLOOD INSURANCE RATE MAP (per Community 0345 B) PREPARED BY THE EMERGENCY MAN EFFECTIVE DATE:
4. UNDERGROUND IMPROVEMENTS, IF ANY, HAVE NOT BEEN LOCATED.
5. BEARINGS BASED ON CL RECKER HWY. AS BEI N89°41'16"W.
6. PRIMARY BENCHMARK ELEV. 148.9 BENCHMARK #85161101 RAIL ROAD SPIKE IN WEST OF THE NORTHEAST ENTRANCE TO THE BY POLK COUNTY ENGINEERING).
7. ELEVATIONS SHOWN ON PIEZOMETERS WERE TA
8. MCIWORLDCOM DOES HAVE FACILITIES IN THIS A AS-BUILTS IN HOUSE. CONTACT FIELD ENGINEE AT 813-221-0034. REFER TO MCIW ID: 65-

Soil Boring(SB) ELEVATION

Buried C
Benchmar
Clean Out
Oak Tree
(PZ) Piez



LEGAL DESCRIPTION: (PROVIDED)
THE WEST½ OF THE NW¼, OF THE NW ¼
OF SECTION 15, TOWNSHIP 28 SOUTH, RANGE 25 EAST,
POLK COUNTY, FLORIDA LESS ROAD RIGHT-OF-WAYS.

N

120' 0

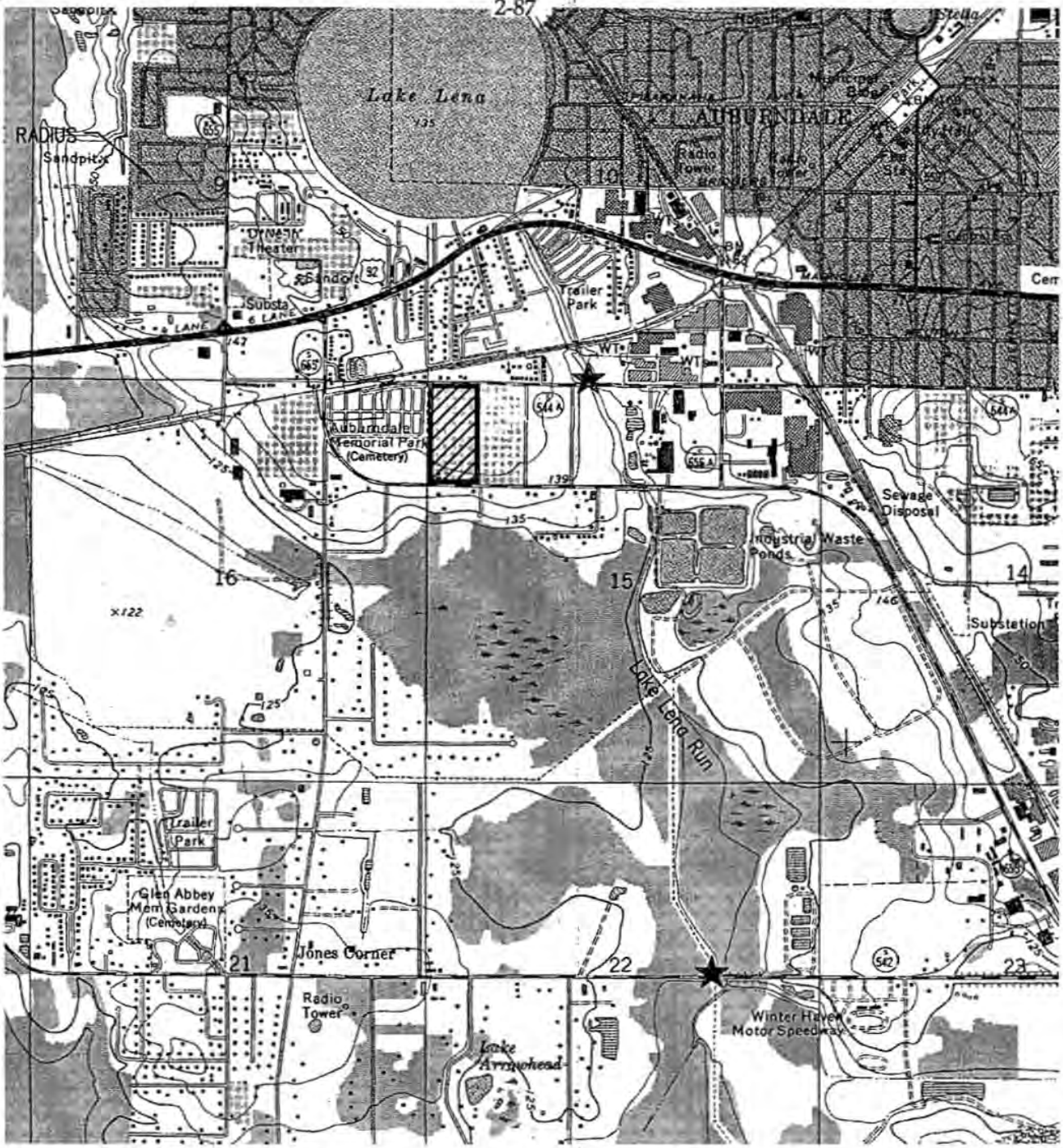
scale

Golder Associates Tampa, Florida

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

Site Survey Map

CAD BY:	CDT	SCALE: 1"=120'	Job
CHK BY:	RAZ	DATE: 03/04/00	FIGUI
REV BY:	--	FILE No.: fig2_3_4-1.dwg	



★ Surface Water Sample Location

N

0 1000' 2000'
SCALE: 1" = 2000'

REFERENCE

USGS 7.5 Minute Topographical Quadrangle, Auburndale, Florida

Golder Associates
Tampa, Florida

Surface Water Sample Locations
(Sampled 11/18/99)

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	1"=2000'	Job No.	993-9570
CHK BY:	HGB	DATE:	02/07/00	FIGURE	2.3.4-2
REV BY:	–	FILE No.:	fig2_3_4-2.dwg		

Table 2.3.4-1 Water Quality Data for Lake Ariana

Year	1995	1996	1997	1998
Sampling Event	APR - NOV	MAY - NOV	MAY - OCT	MAY – NOV
Parameter/Lake Classification	Mean Value	Mean Value	Mean Value	Mean Value
Chlorophyll a (mg/m^3)	24.10	17.26	9.14	20.46
Secchi Disc (m)	1.4	1.6	1.5	1.9
Temperature (°C)	23.2	25.1	24.0	23.2
pH (SU)	7.67	8.14	6.85	5.66
Conductance @ 25 C (∝HMOS)	266	299	214	198
Dissolved Oxygen (mg/l)	7.6	8.2	8.3	7.6
Color (CPU)	10	8	13	13
Turbidity (NTU)	3.7	2.5	1.6	2.1
NH_3 - N (mg/l as N)*	0.000	0.006	0.000	0.000
TKN (mg/l as N)	0.857	0.908	0.592	0.763
(NO_3-N + NO_2-N (mg/l as N)*	0.003	0.001	0.006	0.008
Total Nitrogen (mg/l as N)	0.86	0.91	0.60	0.77
Total Phosphorus (mg/l as P)	0.064	0.048	0.014	0.038
Nitrogen/Phosphorus Ratio	13.44	18.96	42.86	20.26
Limiting Nutrient	NBL	NBL	PLL	NBL
Florida TSI Average	56.17	52.53	44.99	50.35

* Some of these values are below laboratory detection limits but numbers were calculated so a Trophic State Index
could be determined.

Water Quality Index	4.03	3.34	1.95	3.19

Lake Ariana is classified as an oligotrophic lake with good water quality.

Information Sources: Polk County NRD, USGS, SWFWMD, FEMA

mg/m^3	=	milligrams per cubic meter
m	=	meter
°C	=	degree Celsius
SU	=	Standard Unit
∝MOS	=	micro mho
mg/l	=	milligrams per liter
NTU	=	Nephelometric Turbidity Unit
CPU	=	Chloroplatinate Units, color unit
TSI	=	Trophic State Index

Table 2.3.4-2 Water Quality Data for Lake Hancock

Year	1995	1996	1997	1998
Sampling Event	APR - NOV	MAY - NOV	MAY - OCT	MAY - NOV
Parameter/Lake Classification	Mean Value	Mean Value	Mean Value	Mean Value
Chlorophyll a (mg/m^3)	160.37	158.34	111.74	162.21
Secchi Disc (m)	0.2	0.1	0.2	0.3
Temperature (°C)	22.7	22.5	24.4	23.6
pH (SU)	9.57	9.20	9.44	9.02
Conductance @ 25 C (∝HMOS)	203	283	233	204
Dissolved Oxygen (mg/l)	9.4	9.6	13.3	11.7
Color (CPU)	88	75	45	80
Turbidity (NTU)	33.0	21.1	23.2	34.0
NH3 - N (mg/l as N)*	0.000	0.101	0.010	0.001
TKN (mg/l as N)	2.841	4.700	3.306	3.522
(NO_3-N + NO_2-N (mg/l as N)*	0.005	0.001	0.002	0.001
Total Nitrogen (mg/l as N)	2.85	4.71	3.30	3.52
Total Phosphorus (mg/l as P)	0.453	0.462	0.265	0.511
Nitrogen/Phosphorus Ratio	6.29	10.19	12.45	6.89
Limiting Nutrient	NLL	NBL	NBL	NLL
Florida TSI Average	93.44	103.34	91.84	90.95

* Some of these values are below laboratory detection limits but numbers were calculated so a Trophic State Index could be determined.

Water Quality Index	21.27	22.74	14.77	22.90

Lake Hancock is described as a hypereutrophic lake with very poor water quality and excessive algal Blooms. The lake supports a large population of an exotic fish, the Blue Tilapia, and no sports fishery.

Information Sources: Polk County NRD, USGS, SWFWMD, FEMA

mg/m^3	=	milligrams per cubic meter
m	=	meter
°C	=	degree Celsius
SU	=	Standard Unit
∝MOS	=	micro mho
mg/l	=	milligrams per liter
NTU	=	Nephelometric Turbidity Unit
CPU	=	Chloroplatinate Units, color unit
TSI	=	Trophic State Index

Table 2.3.4-3 Water Quality Data for Lake Lena

Year	1995	1996	1997	1998
Sampling Event	APR - NOV	MAY - NOV	MAY - OCT	MAY - NOV
Parameter/Lake Classification	Mean Value	Mean Value	Mean Value	Mean Value
Chlorophyll a (mg/m^3)	39.98	37.80	39.83	34.47
Secchi Disc (m)	0.5	0.5	0.4	0.7
Temperature (°C)	23.3	2.5.5	24.1	23.9
pH (SU)	7.79	8.61	7.64	8.12
Conductance @ 25 C (∝HMOS)	245	282	218	194
Dissolved Oxygen (mg/l)	7.9	9.1	8.1	9.3
Color (CPU)	15	10	13	18
Turbidity (NTU)	9.9	9.6	11.2	11.1
NH3 - N (mg/l as N)*	0.000	0.006	0.015	0.000
TKN (mg/l as N)	1.684	1.566	1.785	1.470
(NO_3-N + NO_2-N (mg/l as N)*	0.005	0.003	0.006	0.009
Total Nitrogen (mg/l as N)	1.69	1.57	1.79	1.48
Total Phosphorus (mg/l as P)	0.063	0.043	0.050	0.059
Nitrogen/Phosphoris Ratio	26.83	36.51	35.80	25.08
Limiting Nutrient	NBL	PLL	PLL	NBL
Florida TSI Average	71.08	71.62	75.29	66.36

* Some of these values are below laboratory detection limits but numbers were calculated so a Trophic State Index could be determined.

Water Quality Index	5.64	4.98	5.60	5.09
Lake Lena is a mesotrophic lake with fair to poor water quality.				

Information Sources: Polk County NRD, USGS, SWFWMD, FEMA

mg/m^3	=	milligrams per cubic meter
m	=	meter
°C	=	degree Celsius
SU	=	Standard Unit
∝MOS	=	micro mho
mg/l	=	milligrams per liter
NTU	=	Nephelometric Turbidity Unit
CPU	=	Chloroplatinate Units, color unit
TSI	=	Trophic State Index

Lake Lena Run

Lake Lena Run is located within the Peace River watershed. It runs south between Lake Lena (207 acres) and Lake Hancock (4,519 acres). Sources of water for the Run include overflow from Lake Lena, groundwater seepage and surface runoff.

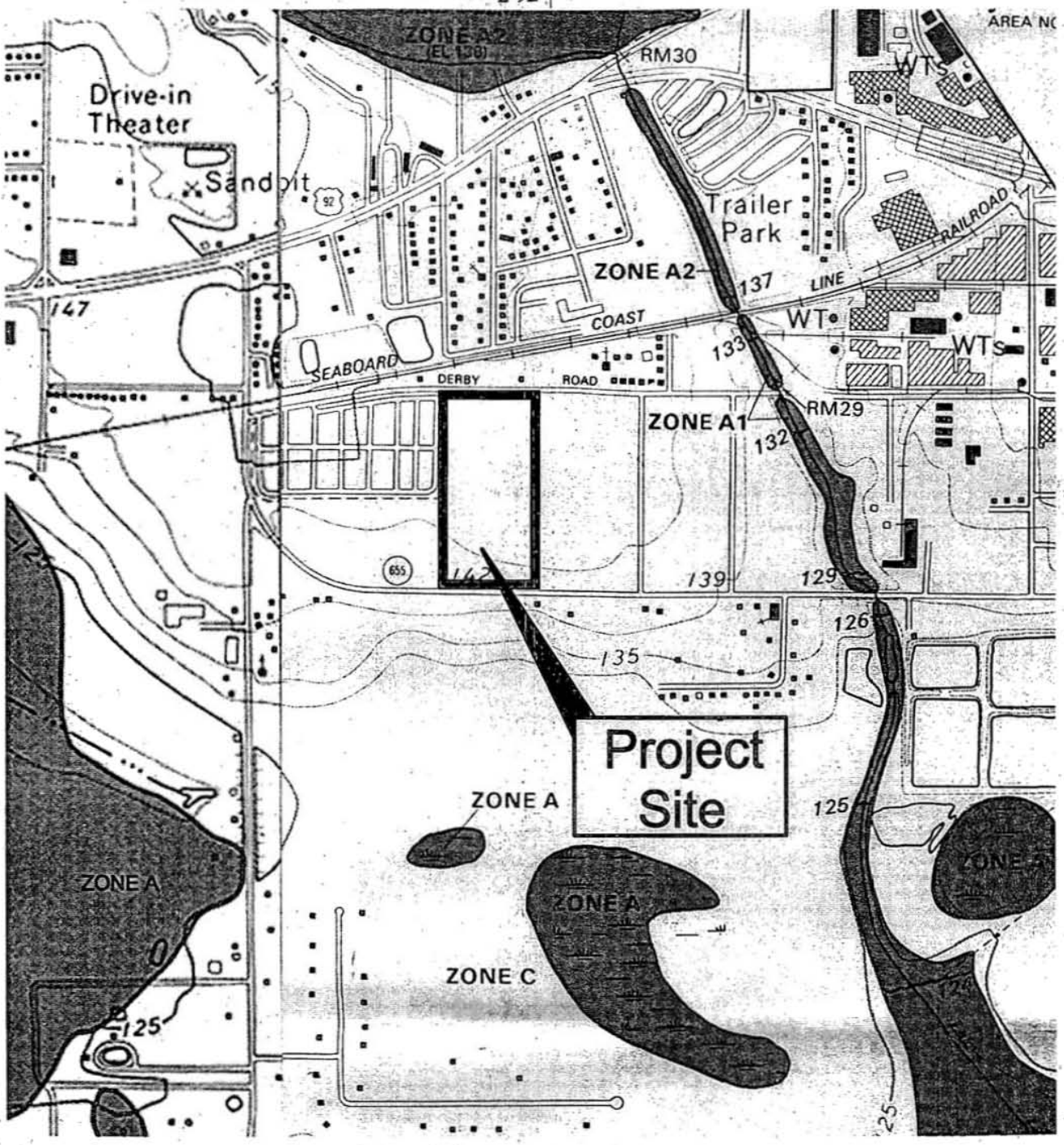
There are two monitoring stations along the Run for sample collection and long-term water quality measurements by Polk County. Water samples from these monitoring stations are analyzed for a limited number of parameters. **Table 2.3.4-4** presents a summary of available water quality parameters for these two stations.

Hydrologic Characteristics

The Osprey Energy Center Site consists of 19.5 acres of non-producing citrus grove land used for agricultural purposes and is considered an undeveloped property. Based on the Flood Insurance Rate Map (FIRM), Panel Number 1202610345 B, the Site is located in Flood Zone C and is outside the 100-year floodplain (see **Figure 2.3.4-3**).

The Project Site is located on top of a local ridge with land at a highest elevation of approximately 148± feet. The existing Site drainage pattern is mainly to the south, except approximately 4.8 acres of the northern portion of the Site, which drain to the north into a drainage swale along Derby Avenue. A drainage swale along Recker Highway intercepts the runoff from the southern portion of the Site that does not percolate into soils and conveys the runoff through a drainage system to nearby wetland areas and ultimately to the connected creeks and lake system that comprise the Peace River Watershed.

The soil map of the Site vicinity indicates that the Site is approximately 80-percent Tavares soil and the remaining is Adamsville soil type which is located at the northern portion of the Site. The soil map and selected characteristics are presented as **Figure 2.3.1-5**. According to the USDA Soil Survey of Polk County, the Seasonal High Water Table (SHWT) for Tavares soil occurs at approximately 3.5 to 6 feet below land surface (bls). As part of the geotechnical investigations conducted at the Site, multiple piezometers and borings were installed at the Site to investigate soil profiles and characteristics. The water table was observed to be approximately 14 to 15 ft bls.



Legend

100–Year Floodplain

Zone Description

Zone A: Area of 100–year flood; base flood elevations and flood hazard factors not determined.

Zone A1–2: Areas of 100–year flood; base flood elevations and flood hazard factors determined.

Zone C: Areas of minimal flooding (no shading)

N

0 500' 1000' 2000'

1"=2000'

REFERENCE

Flood Insurance Rate Map, Polk County, Florida, Panels 345 and 350 of 1025, January 19, 1983

Golder Associates

Tampa, Florida

FEMA Flood Insurance Rate Map
100–Year Flood Zones

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	1"=2000'	Job No.	993-9570
CHK BY:	CA	DATE:	01/13/00	FIGURE	2.3.4–3
REV BY:	–	FILE No.:	fig2_3_4-3.dwg		

Table 2.3.4-4 Water Quality Data for Lake Lena Run

Year	1995	1996	1997	1998
Sampling Event	APR – NOV	MAY - NOV	MAY - OCT	MAY - NOV
Parameter/Lake Classification	Mean Value	Mean Value	Mean Value	Mean Value
Chlorophyll a (mg/m^3)	9.28	3.72	27.73	28.65
Temperature (°C)	28.2	29.3	25.3	27.0
pH (SU)	7.29	6.58	6.68	6.95
Conductance @ 25 C (∝HMOS)	320	358	301	271
Dissolved Oxygen (mg/l)	5.0	4.1	5.3	6.1
Color (CPU)	38	38	45	50
Turbidity (NTU)	2.7	4.9	3.9	5.2
NH3 - N (mg/l as N)*	0.286	0.471	0.392	0.182
TKN (mg/l as N)	1.342	1.495	1.209	1.344
(NO_3-N + NO_2-N (mg/l as N)*	0.897	0.504	0.428	0.339
Total Nitrogen (mg/l as N)	2.24	2.00	1.64	1.68
Total Phosphorus (mg/l as p)	0.223	0.156	0.255	0.156
Total Coliform (#/100 ml)	2550	18315	1345	855
Nitrogen/Phosphorus Ratio	10.05	12.82	6.44	10.77
Limiting Nutrient	NBL	NBL	NLL	NBL
Water Quality Index	9.90	9.88	11.85	8.28

* Some of these values are below laboratory detection limits but numbers were calculated so a Trophic State Index could be determined.

Water quality is poor with high concentrations of nutrients.

Information Sources: Polk County NRD, USGS, SWFWMD, FEMA

mg/m^3	=	milligrams per cubic meter
m	=	meter
°C	=	degree Celsius
SU	=	Standard Unit
∝MOS	=	micro mho
mg/l	=	milligrams per liter
NTU	=	Nephelometric Turbidity Unit
CPU	=	Chloroplatinate Units, color unit
TSI	=	Trophic State Index

Source: Polk County 1998 Annual Lakes and Stream Report, 1998.

2.3.4.2 Measurement Programs

The following surface water quality field studies were conducted to supply the information needed for impact assessments.

Water Quality Sampling

To establish baseline information, two water samples from Lake Lena Run were collected in October, 1999. One sample was collected from a location just north of Derby Avenue. The second sample was collected from a location approximately 1.2 miles south of Recker Highway. The location of the water sampling stations are shown in **Figure 2.3.4-2**. These water samples were analyzed for organic and non-organic parameters. The analytical results for these two water samples are presented in **Table 2.3.4-5.**

2.3.5 VEGETATION/LAND USE

A vegetation/land use survey of the proposed Osprey Energy Center Site and surrounding areas was completed utilizing the Florida Land Use, Cover and Forms Classification System (FLUCFCS) Level III code (FDOT, 1999). Based on this survey, the predominant vegetative communities and land use of the Site is determined to be a non-producing citrus grove and undeveloped urban land, FLUCFCS code 224 and 191 respectively. The location of these areas is illustrated on **Figure 2.3.5-1**, and their composition are described as follows.

The non-producing citrus grove occupies the majority of the Site, approximately 14.59 acres. This grove is comprised of orange trees (*Citrus* sp.) averaging about 10 feet tall. It is overgrown with weedy species common to fallow agricultural areas including dog fennel (*Eupatorium capillifolium*), Mexican tea (*Chenopodium ambrosioides*), ragweed (*Ambrosia artemisifolia*), passionflower (*Passiflora incarnata*), hyssop spurge (*Chamaesyce hyssopifolia*), southern crabgrass (*Digitaria ciliaris*), and Bahia grass (*Paspalum notatum*). The habitat value of this vegetative community is fairly low. Animals observed during the survey include mourning dove (*Zenaida macroura*), mockingbird (*Mimus polyglottos*), loggerhead shrike (*Lanius ludovicianus*), American bird grasshopper (*Schistocerca americana*), two-striped grasshopper (*Mermiria bivittata*), cloudless sulfur (*Phoebis sennae*), and gulf fritillary (*Agraulis vanillae*).

The undeveloped urban land occupies approximately 4.87 acres of the Site, and is located in the

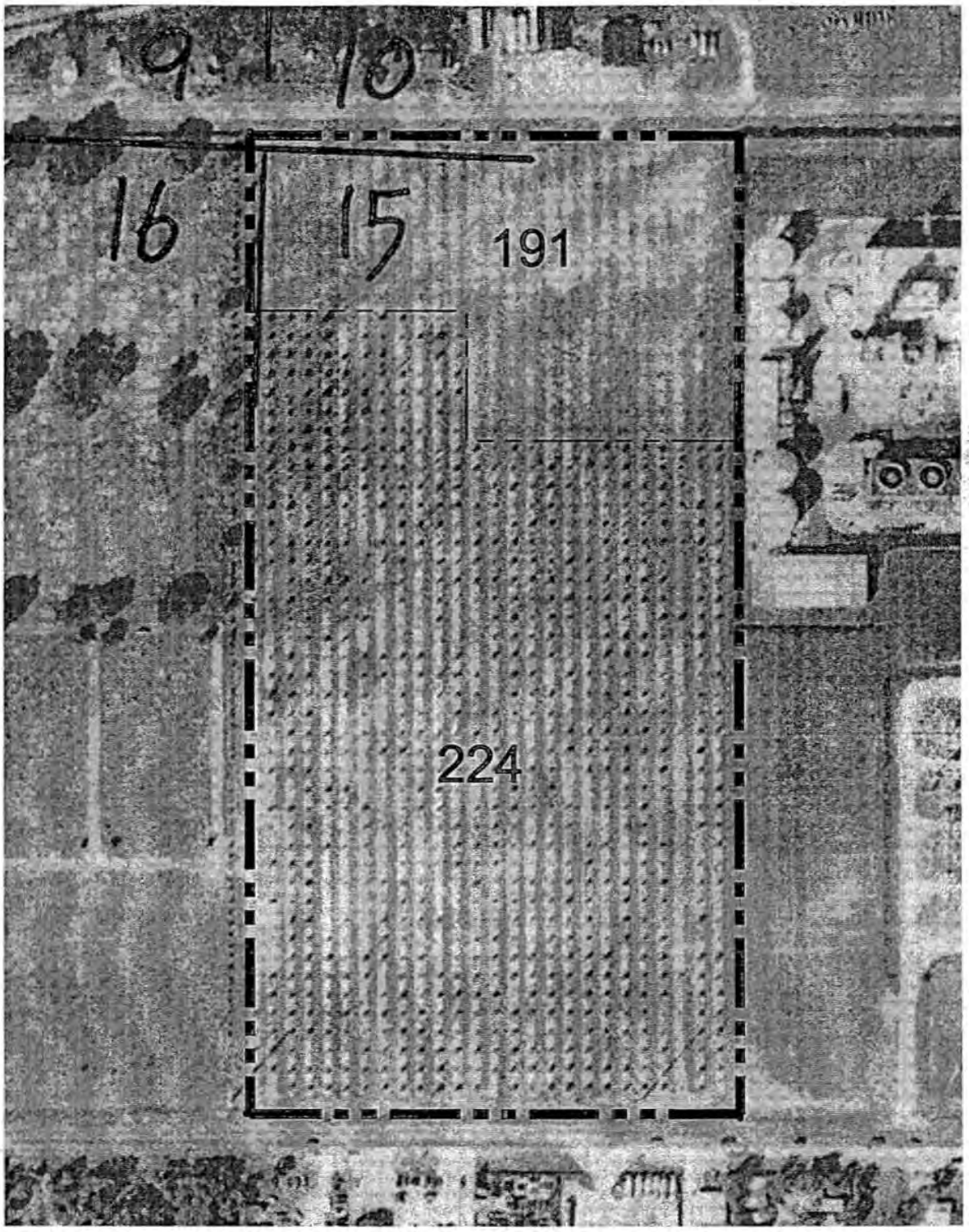
Table 2.3.4-5 Surface Water Sample Analysis (Page 1 of 2)

Constituent, mg/l except as noted	Lake Lena Run SW-1	Lake Lena Run SW-2
TESTING COMPANY	Savannah	Savannah
Alkalinity (Bicarbonate), mg $CaCO_3$/L	170	200
Alkalinity (Carbonate), mg $CaCO_3$/L	<1.0	<1.0
Cyanide, mg/L	<0.010	<0.010
Fluoride, mg/L	0.27	0.31
Hardness, mg/L as $CaCO_3$	100	89
Surfactants, mg/L	<0.10	<0.10
Total Kjeldahl Nitrogen, mg/L	0.76	0.74
Ammonia Nitrogen, mg/L	0.051	<0.030
Organic Nitrogen, mg/L	0.71	0.74
Unionized Ammonia, mg/L	<0.010	<0.010
Nitrate + Nitrite - Nitrogen, mg/L	0.31	1.1
Total Nitrogen, mg/L	1.1	1.8
Oil and Grease, mg/L	6.0	
Carbonaceous Biochemical Oxygen Demand, mg/L	<2.0	<2.0
Chemical Oxygen Demand, mg/L	20	20
Orthophosphorus, mg/L	0.29	0.30
Total Phosphorus, mg/L	0.39	0.35
Sulfate as SO_4, mg/L	<5.0	<5.0
Turbidity, NTU	2.6	2.6
Aluminum, mg/L	<2.0	<2.0
Antimony, mg/L	<0.020	<0.020
Arsenic, mg/L	<0.010	<0.010
Beryllium, mg/L	<0.0040	<0.0040
Cadmium, mg/L	<0.0050	<0.0050
Calcium, mg/L	31	27
Chromium, mg/L	<0.010	<0.010
Hexavalent Chromium, mg/L	<0.010	<0.010
Copper, mg/L	<0.020	<0.020
Iron, mg/L	0.21	0.17
Lead, mg/L	<0.0050	<0.0050
Magnesium, mg/L	5.2	4.8
Manganese, mg/L	<0.010	<0.010
Mercury, mg/L	<0.00020	<0.00020
Nickel, mg/L	<0.040	<0.040
Potassium, mg/L	6.5	6.5
Selenium, mg/L	<0.010	<0.010
Silver, mg/L	<0.010	<0.010
Sodium, mg/L	57	55
Thallium, mg/L	<0.010	<0.010
Zinc, mg/L	0.038	<0.020
Total Coliform, colonies/100 mL	300*F8	100*F8

Table 2.3.4-5 Surface Water Sample Analysis (Page 2 of 2)

Constituent, mg/l except as noted	Lake Lena Run SW-1	Lake Lena Run SW-2
TESTING COMPANY	Savannah	Savannah
Fecal Coliform, colonies/100 mL	>6000	>6000
Alpha, Gross (pCi/L)	*F71	*F71
Beta, Gross (pCi/L)	*F71	*F71
Radium 226 (pCi/L)	*F71	*F71
Radium 228 (pCi/L)	*F71	*F71
Strontium (pCi/L)	*F71	*F71
Chlorophyll-a, mg/m^3	*F71	*F71
Chloride, mg/L	34	33
Total Dissolved Solids, mg/L	320	300
Silica as $SiSO_2$, mg/L	6.3	6.6

Source: Savannah Labs, 1999; Golder, 2000.



Legend

191 Undeveloped Urban Land
224 Abandoned Citrus Grove

Golder Associates
Tampa, Florida

Land Use and Vegetation of Project Site

Client / Project
Calpine Construction Finance Copany, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	1"=200'	Job No.	993-9570
CHK BY:	RAZ	DATE:	02/04/00	FIGURE	2.3.5-1
REV BY:	–	FILE No.:	fig2_3_5-1.dwg		

northern portion of the Site. This area was formerly citrus grove and is presently mixed herbaceous area that is infrequently mowed, and vegetated with Bahia grass, southern crabgrass, and dog fennel. The habitat value of this vegetative community is low. Animals observed during the survey include two-striped grasshopper, and fire ants (*Solenopsis* sp.).

In addition to the two predominant vegetation/land use categories, there are two shallow drainage swales on the north and south sides of the property. These swales are likely part of the public roads rights-of-way, are of low habitat value, and occupy less than 0.5 acres total.

The areas surrounding the proposed Project Site are occupied primarily by mixed commercial and industrial use and a few small residential areas. Additionally, there is a cemetery located immediately west of the Site. A discussion of important natural communities, flora, and fauna within five miles of the Site is provided in Section 2.3.6.

2.3.6 ECOLOGY

An assessment of the ecological setting on Site and within five miles of the proposed Osprey Energy Center was conducted to ascertain the presence and abundance of important natural communities, flora, and fauna. In addition to field surveys, a literature search and a review of remote imagery was undertaken to determine the important elements that could potentially be present in the habitats found on the Site and within five miles.

Based on the on site survey, the predominant vegetative communities and land use of the Site is determined to be a non-producing citrus grove and undeveloped urban land, as discussed in Section 2.3.5. No important natural communities, flora or fauna were encountered onsite, nor are any expected to occur.

Important natural communities, flora, and fauna do occur in Polk County, Florida. Some of these may occur, or have been reported to occur within five miles of the proposed Osprey Energy Center. While important natural communities do not currently receive federal or state legal protective status (apart from wetland protection) their potential for hosting protected flora and fauna warrants their consideration, and are discussed in **Section 2.3.6.1**. Specific flora and fauna that are protected by federal and state legislations, are reported to occur within five miles

of the Site as well. These species are listed in **Tables 2.3.6-1 and 2.3.6-2,** respectively, and are discussed in detail in Section 2.3.6.1.

2.3.6.1 Species-Environmental Relationships

The following section includes descriptions of important natural communities, flora, and fauna within five miles of the proposed Osprey Energy Center. This discussion includes information related to the abundance and distribution of all important communities and species likely to occur in this area, and methodology for determining the likeliness of their presence.

Important Natural Communities

To determine the presence of important natural communities within five miles of the Osprey Energy Center, a field survey was conducted in October 1999. Additional sources of information include 1) an element occurrence report obtained from the Florida Natural Areas Inventory (FNAI, 1999), 2) EcoSearch Element Occurrence Report (EcoSearch, 1999), 3) digital remote imagery obtained from the United States Geologic Survey (USGS, 1998), 4) Notes on Florida's Endangered and Threatened Plants (FDACS, 1998), and 26 Ecological Communities of Florida (SWCS, 1989). The important natural communities reported within five miles are discussed in this section. While this may not include every ecological community present in the area, it details the more sensitive areas where important species may occur.

Phosphate Rock Quarries (FLUCFCS code 163)

There are thousands of acres of abandoned phosphate rock quarries within five miles of the proposed Osprey Energy Center Site. Although these are highly disturbed lands, many of them have progressively recovered to a semi-natural state. These communities now provide cover, forage, and nesting habitat for a variety of upland, wetland, and aquatic fauna species. The nearest of these abandoned phosphate mines is located approximately 1.5 miles west of the Project Site. Others are scattered throughout the area particularly to the northwest, west, and southwest. Many of these have been taken under public ownership for wildlife preservation and management. Examples include Saddle Creek Strip Mines, Tenoroc State Recreation and Fish Management Area, and Lake Hancock Mines.

Vegetation in these areas varies greatly depending upon the depth of water and topography. The more ecologically important areas are wetlands, often vegetated with a mix of Carolina willow (*Salix caroliniana*), primrose willow (*Ludwigia peruviana*), and red maple (*Acer rubrum*). Other more mature areas are vegetated with larger red maple, sweet gum (*Liquidambar styriciflua*), and bald cypress (*Taxodium distichum*).

Important fauna likely to occur in the abandoned phosphate rock quarries are predominantly wading bird species. These include roseate spoonbill, limpkin, little blue heron, snowy egret, tricolored heron, and wood stork. Other important bird species such as Florida sandhill crane and white ibis are likely to occur here as well. The Latin binomial and a detailed description for each of these important species is provided in Section 2.3.6.1.

Pine Flatwoods (FLUCFCS code 411)

The nearest pine flatwoods community in the vicinity of the proposed Osprey Energy Center Site is located approximately 400 feet to the south. This is a mature ecosystem, which surrounds a mixed hardwood swamp. Additional areas of pine flatwoods are common and scattered throughout the area.

The pine flatwoods are a valuable ecological community, providing cover and forage for a large variety of wildlife. These habitats often serve as buffers around wetlands, as is the case with the pine flatwoods south of the Site. Key vegetation of this community is southern slash pine (*Pinus elliottii var dens*), live oak (*Quercus virginiana*), and laurel oak (*Q. laurifolia*), with an understory of gallberry (*Ilex glabra*), saw palmetto, shining sumac (*Rhus copallina*), and wax myrtle (*Myrica cerifera*). Ground cover is made up of blackberry (*Rubus* sp.), greenbrier (*Smilax* sp.), pineland three-awn (*Aristida stricta*), and scattered grasses.

Important flora known to occur in Polk County pine flatwoods includes Curtiss' milkweed, Ashe's Savory, scrub buckwheat, Britton's beargrass, clasping warea, and Carter's Warea. Important fauna species known to occur in some Polk County pine flatwoods include the Florida grasshopper sparrow, southeastern kestrel, red-cockaded woodpecker, bald eagle, and eastern indigo snake. The Latin binomial and a detailed description for each of these important species is provided in Sections 2.3.6.1.2 and 2.3.6.1.3.

Upland Hardwood Forest (FLUCFCS code 420)

The nearest upland hardwood forest community in the vicinity of the proposed Osprey Energy Center is located approximately 300 feet to the north. This is a mature ecosystem disturbed by residential growth. Additional areas of upland hardwood forests were observed scattered throughout the area, particularly in areas of increased topography and surrounding wetlands.

Upland hardwood forests can be a valuable ecological community providing cover and forage for a large variety of wildlife, and as a buffer to wetland habitats. Key vegetation of this community is live oak, laurel oak, Spanish moss (*Tillandsia usneoides*), laurel cherry (*Prunus caroliniana*), southern magnolia (*Magnolia grandiflora*), and scattered pine. Understory vegetation consists of flowering dogwood (*Cornus florida*), American beautybush (*Callicarpa americana*), sparkleberry (*Vaccinium arboreum*), and wax myrtle. Ground cover is composed of greenbrier (*Smilax* sp.), crossvine (*Bignonia capreolata*), and wild grape (*Vitis* sp.).

Important fauna species known to occur in some Polk County upland hardwood forests includes eastern indigo snake, Sherman's fox squirrel, and Florida black bear. The Latin binomial and a detailed description for each of these important species is provided in Section 2.3.6.1.

Upland Scrub (FLUCFCS code 436)

The nearest upland scrub communities in the vicinity of the proposed Osprey Energy Center are located approximately 1.3 miles to the east-southeast. These are two on parcels of state owned land, but they are separated for a short distance by a paved road. Additional areas of sand pine scrub exist in the area, particularly to the northeast, east, and southeast.

The upland scrub is a valuable ecological community. The coarse textured, excessively well drained soils result in a unique ecosystem with important scientific value. Key vegetation of this community is sand pine (*Pinus clausa*) with a dense scrubby understory of Chapman oak (*Quercus chamannii*), sand live oak (*Quercus geminata*), bluejack oak (*Quercus incana*), myrtle oak (*Quercus myrtifolia*), and saw palmetto (*Serenoa repens*). Ground cover under the trees and shrubs is scattered and includes deermoss (*Cladonia* sp.), greenbriar (*Smilax* sp.), and bare sand.

Important flora species known to occur in Polk County sand pine scrub includes pigeon-wing, scrub lupine, pygmy fringe tree, Curtiss' milkweed, Florida bonamia, nodding pinweed, paper-like nailwort, Small's jointweed, Florida blazing star, Britton's beargrass, hairy jointweed, and Carter's area. Important fauna species known to occur in Polk County sand pine scrub includes gopher frog, blue-tailed mole skink, gopher tortoise, sand skink, short-tailed snake, and Florida scrub jay. The Latin binomial and a detailed description for each of these important species is provided Sections 2.3.6.1.2 and 2.3.6.1.3.

Streams/Stream Swamps (FLUCFCS code 510/615)

The nearest stream community in the vicinity of the proposed Osprey Energy Center is Lake Lena Run, which is located approximately 1000 feet to the east at its nearest point. This is a channelized stream that originates at Lake Lena, approximately 2000 feet to the north-northeast, and flows to the south-southeast through a wooded stream swamp southeast of the Site. The nearest significant stream, Saddle Creek, occurs approximately 4.5 miles west of the site at its nearest point. Saddle Creek flows to the south-southeast from mine lands in the northwest to Lake Hancock to the southwest. A number of unnamed smaller streams occur throughout the area as well.

With respect to the Site, the nearest portion of Lake Lena Run is a disturbed, steep banked stream of low habitat value vegetated primarily with Brazilian pepper (*Schinus terebinthifolius*). As it enters wetland areas to the southeast a more valuable ecosystem exists. Vegetation here is predominantly that of a mixed hardwood swamp including red maple, black gum (*Nyssa sylvatica*), American elm (*Ulmus americana*), red bay (*Persea borbonia*), sweetbay (*Magnolia virginiana*), sweetgum, laurel oak, and water oak (*Quercus nigra*). Saddle Creek meanders through a diverse set of valuable ecosystems including stream swamps, as well as improved pasture. Vegetation is diverse as well, ranging from those of the hardwood swamp described above to that of upland ecosystems, including live oak, southern slash pine, laurel oak, saw palmetto, and pasture grass.

Important fauna species likely to occur along streams and stream swamps within 5 miles of the Site include American alligator, protected wading bird species, Florida sandhill crane, and the

Florida black bear. The Latin binomial and a detailed description for each of these important species is provided in Section 2.3.6.1.

Lakes (FLUCFCS code 520)

Over 20 named lakes occur within five miles of the proposed Osprey Energy Center. The nearest of these lakes is Lake Lena, located approximately 2000 feet to the north-northeast. These lakes range in size from less than 10 acres to greater than 500 acres. The largest of the lakes within five miles of the Site include Lakes Ariana, Arietta, Juliana, Van, and Hancock.

These lakes and associated littoral zones provide valuable habitat for all classes of animals in this area. The littoral zones around the edges of these lakes are particularly attractive to amphibians, aquatic invertebrates, fishes, and wading birds. Vegetation is typically cattail (*Typha* sp.), pickeralweed (*Pontederia cordata*), and water-lettuce (*Pistia stratiotes*).

Important fauna known to occur around lakes in Polk County includes American alligator, wading birds, white ibis, and black skimmer. The Latin binomial and a detailed description for each of these important species is provided in Section 2.3.6.1.

Wetland Hardwood Forests (FLUCFCS code 610)

The nearest wetland hardwood forest is located along Lake Lena Run and associated stream swamp to the south-southeast. Additional areas of wetland hardwood forests were observed scattered throughout the area, particularly in areas adjacent to lakes and streams.

Wetland hardwood forest is a valuable ecological community, providing cover and forage for a large variety of wildlife. Key vegetation of this community is blackgum, red maple, sweetbay, water ash, and American elm. Understory vegetation includes buttonbush (*Cephalanthus occidentalis*), Carolina willow, and water ash (*Fraxinus carolinensis*). Ground cover includes cinnamon fern (*Osmunda cinnamomea*), royal fern (*O. regalis*), and lizard's tail (*Saururus cernuus*).

Important flora known to occur in Polk County wetland hardwood forests includes hand fern, spoon-leaved sundew, star anise, and fall-flowering ixia. Important fauna known to occur in Polk County wetland hardwood forests includes American alligator, and wading birds. The

Latin binomial and a detailed description for each of these important species is provided in Sections 2.3.6.1.2 and 2.3.6.1.3.

Cutthroat Seep (not enumerated per FLUCFCS)

No cutthroat seep communities were reported or observed within five miles of the proposed Osprey Energy Center Site. However, since the range of occurrence of cutthroat seeps is limited to Polk and Highlands Counties, the potential exists, and therefore, this community is discussed.

Cutthroat seeps are a valuable ecological community. Water from better drained areas "seeps" out to the ground surface to establish these communities. They then serve as natural drainways and help to improve water quality by the filtering action and nutrient uptake of plants. The predominant vegetation is cutthroat grass (*Panicum abscissium*), with scattered chalky bluestem (*Andropogon capillipes*), maidencane (*Panicum hemitomon*), toothache grass (*Ctenium aromaticum*), and low panicums (*Panicum* sp.).

Important flora known to occur in Polk County cutthroat seeps includes cutthroat grass, hartwrightia, and fall-flowering ixia. Important fauna species known to occur in Polk County cutthroat seeps includes southeastern kestrel, Florida sandhill crane, and bald eagle. The Latin binomial and a detailed description for each of these important species is provided in Sections 2.3.6.1.2 and 2.3.6.1.3.

Wading Bird Rookeries (not enumerated per FLUCFCS)

The Florida Atlas of Breeding Sites for Herons and Their Allies (FGFWFC, 1991) indicates one recorded wading bird breeding colony (rookery) within five miles of the proposed Osprey Energy Center. This rookery was reported to exist approximately 4.5 miles east-northeast of the Site and was nested by double-crested cormorant (*Phalacrocorax auritus*), and great blue heron (Ardea herodias). Due to the prevalence of wetland communities in the area, it may be assumed that other wading bird rookeries that have not been recorded may exist as well. Thus, they are discussed as follows.

Wading bird rookeries are a significant ecological community due to their contribution to our wading bird population. These rookeries are wetland systems containing the feeding and

nesting habitats required to support populations of wading birds, as well as biologically productive ecosystems supporting an array of fish and wildlife species.

Important fauna species likely to occur in wading bird rookeries include American alligator, roseate spoonbill, limpkin, little blue heron, snowy egret, tricolored heron, white ibis, and wood stork. The Latin binomial and a detailed description for each of these species is provided in Section 2.3.6.1.

Important Flora Species

Important flora species, for the purpose of a Site Certification Application, are those plant species listed as endangered or threatened by the US. Fish and Wildlife Service (USFWS) or the Florida Department of Agriculture (FDA). No listed plant species were observed on the proposed Osprey Energy Center during the field survey conducted in October , 1999. Prior to this survey, literature and agency surveys were undertaken to determine the species that could potentially be present in the habitats found on the Site and within five miles. Primary sources of information are the Florida Natural Areas Inventory (FNAI) database; Florida Committee on Rare and Endangered Plants and Animals (FCREPA) reports; Preservation of Native Flora of Florida Law, and Rule Chapter 5B-40, Florida Administrative Code (F.A.C.), and the Regulated Plant Index (5B- 40.0055); (Coile., 1998), and notes on Florida's Endangered and Threatened Plants, Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Bureau of Entomology, Nematology and Plant Pathology.

No important plant species were observed onsite, nor are any expected to occur due to the disturbed nature of the Site and low ecological value. There are a number of important plants species, however, that are likely to occur within five miles of the Site. This is expected due to the diverse and numerous natural communities in the five-mile vicinity. Thirty-eight important plant species are reported to occur in Polk County, Florida as indicated on **Table 2.3.6-1**. The table also identifies their protective status and potential for occurrence. A discussion of 31 important plant species confirmed or with a high probability of occurrence within five miles of the Site is provided in this section. The remaining seven species of important plants are not discussed due to unlikeness of occurrence.

Curtiss' Milkweed (*Asclepias curtissii*)

This species is currently listed as endangered by the FDA. This plant occurs in dry hammocks, scrub, and flatwoods. The potential for occurrence on Site is low, due to lack of suitable habitat. The occurrence of this species within five miles of the Site has been confirmed.

Florida Bonamia (*Bonamia grandiflora*)

This species is currently listed as threatened by the USFWS and endangered by the FDA. This vine occurs in sandy soil and scrub habitats. The potential for occurrence on Site is low, due to lack of suitable habitat. The occurrence of this species within five miles of the Site has been confirmed.

Ashe's Savory (*Calamintha ashei*)

This species is currently listed as threatened by the FDA. This shrub occurs in dry pinelands, sand pine scrub, and disturbed areas. The potential for occurrence on Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Hand Fern (*Cheiroglossa palmata*)

This species is currently listed as endangered by the FDA. This plant grows in the bases of cabbage palm leaves in hydric hammocks and strand swamps. The potential for occurrence on Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Pygmy Fringe Tree (*Chionanthus pygmaeus*)

This species is currently listed as endangered by both the USFWS and the FDA. This shrub occurs in sandy, dry soil and scrub habitats. The potential for occurrence on Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Perforate Reindeer Lichen (*Cladonia perforata*)

This species is currently listed as endangered by both the USFWS and the FDA. This dense lichen occurs in rosemary sandhills. The potential for occurrence on Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Pigeon-wing (*Clitoria fragrans*)

This species is currently listed as threatened by the USFWS and endangered by the FDA. This perennial herb occurs in sandhill, scrub, and scrubby flatwoods, and along roadsides. The potential for occurrence on Site is low, due to lack of suitable habitat. The occurrence of this species within five miles of the Site has been confirmed.

Short-leaved Rosemary (*Conradina brevifolia*)

This species is currently listed as endangered by both the USFWS and the FDA. This plant occurs in sand pine scrub habitats. The potential for occurrence on Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Scrub Mint (*Dicerandra frutescens*)

This species is currently listed as endangered by both the USFWS and the FDA. This shrub occurs on yellow sand in sand pine scrub habitats, generally along openings and paths. The potential for occurrence on Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Spoon-leaved Sundew (*Drosera intermedia*)

This species is currently as listed as threatened by the FDA. This herb occurs along seepage slopes in wet flatwoods, depression marshes, sinkhole lakes, and drainage ditches. The potential for occurrence on Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Scrub Buckwheat (*Eriogonum longifolium*)

This species is currently listed as threatened by the USFWS and endangered by the FDA. This herbaceous perennial occurs in sandhill, scrub, and longleaf pine habitats. The potential for occurrence on Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Hartwrightia (*Hartwrightia floridana*)

This species is currently listed as threatened by FDA. This plant occurs in natural, wet, open, boggy areas and seems to favor acidic conditions. The potential for occurrence on Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Highlands Scrub Hypericum (*Hypericum cumulicola*)

This species is currently listed as endangered by both the USFWS and the FDA. This perennial herb occurs on white sand in sand pine scrub, and appears more abundantly after fires. The potential for occurrence on Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Star Anise (*Illicium parviflorum*)

This species is currently listed as endangered by the FDA. This shrub or small tree occurs in bottomland forest and wet hammocks. The potential for occurrence on Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Nodding Pinweed (*Lechea cernua*)

This species is currently listed as threatened by the FDA. This perennial herb occurs in openings in sand scrub habitats. The potential for occurrence on Site is low, due to lack of suitable habitat. The occurrence of this species within five miles of the Site has been confirmed.

Florida Blazing Star (*Liatris ohlingerae*)

This species is currently listed as endangered by both the USFWS and the FDA. This perennial plant occurs in sand pine scrub habitats. The potential for occurrence on Site is low, due to lack of suitable habitat. The occurrence of this species within five miles of the Site has been confirmed.

Scrub Lupine (*Lupinus westianus* var *aridorum*)

This species is currently listed as endangered by the FDA. This herb occurs on the yellow sands of sand pine scrub. The potential for occurrence on Site is low, due to lack of suitable habitat. The occurrence of this species within five miles of the Site has been confirmed.

Fall-flowering Ixia (*Nemastylis floridana*)

This species is currently listed as endangered by the FDA. This herb occurs in clearings in swamps, marshes, and wet pine flatwoods. The potential for occurrence on Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Britton's Beargrass (*Nolina brittoniana*)

This species is currently listed as endangered by both the USFWS and by the FDA. This perennial grass occurs in dry pinelands and sand pine scrub habitats. The potential for occurrence on Site is low, due to lack of suitable habitat. The occurrence of this species within five miles of the Site has been confirmed.

Cutthroat Grass (*Panicum abscissum*)

This species is currently listed as endangered by the FDA. This perennial grass occurs in wet pinelands and seepage areas. The potential for occurrence on Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Paper-like Nailwort (*Paronychia chartacea* sp. *chartacea*)

This species is currently listed as threatened by the USFWS and endangered by the FDA. This annual or short-lived perennial plant occurs along shores of karst lakes in scrub vegetation. The potential for occurrence on Site is low, due to lack of suitable habitat. The occurrence of this species within five miles of the Site has been confirmed.

Lewton's Polygala (*Polygala lewtonii*)

This species is currently listed as endangered by both the USFWS and by the FDA. This perennial plant occurs on white sands in scrub vegetation. The potential for occurrence on Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Hairy Jointweed (*Polygonella basiramia*)

This species is currently listed as endangered by both the USFWS and by the FDA. This annual or short-lived perennial plant occurs on white sands in sand pine and rosemary scrub habitats. The potential for occurrence on Site is low, due to lack of suitable habitat. The occurrence of this species within five miles of the Site has been confirmed.

Small's Jointweed (*Polygonella myriophylla*)

This species is currently listed as endangered by both the USFWS and by the FDA. This shrub occurs in various scrub habitats. The potential for occurrence on Site is low, due to lack of suitable habitat. The occurrence of this species within five miles of the Site has been confirmed.

Scrub Plum (*Prunus geniculata*)

This species is currently listed as endangered by both the USFWS and by the FDA. This shrub occurs in sand pine scrub habitats. The potential for occurrence on Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Wild Coco (*Pteroglossaspis ecristata*)

This species is currently listed as threatened by FDA. It is a tall, fall-blooming plant, found in sandy habitats. The potential for occurrence on Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Scrub Stylisma (*Stylisma abdita*)

This species is currently listed as endangered by the FDA. This herbaceous vine occurs in dry pinelands and scrub habitats. The potential for occurrence on Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Clasping Warea (*Warea amplexifolia*)

This species is currently listed as endangered by both the USFWS and by the FDA. This herb occurs in dry pinelands and sandhills. The potential for occurrence on Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Carter's Warea (*Warea carteri*)

This species is currently listed as endangered by both the USFWS and by the FDA. This annual herb occurs in pineland, scrub, and sandhill habitats. The potential for occurrence on Site is low, due to lack of suitable habitat. The occurrence of this species within five miles of the Site has been confirmed.

Rain Lily (*Zephyranthes simpsonii*)

This species is currently listed as threatened by the FDA. This plant occurs in wet pinelands and pastures. The potential for occurrence on Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Scrub Ziziphus (*Ziziphus celata*)

This species is currently listed as endangered by both the USFWS and by the FDA. This shrub occurs between the sand pine scrub and longleaf pine habitats characteristic to the Lake Wales Ridge. The potential for occurrence on Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Important Fauna Species

Important fauna species, for the purpose of a Site Certification Application, are those animal species listed as endangered, threatened, or of special concern by the USFWS, or the Florida Fish and Wildlife Conservation Commission (previously known as the Florida Game and Freshwater Fish Commission ((FGFWFC)). No listed animal species were observed on the proposed Osprey Energy Center during the field survey conducted in October, 1999. Prior to this survey, literature and agency surveys were undertaken to determine the species that could potentially be present in the habitats found on the Project Site or within five miles. Primary sources of information are the Florida Natural Areas Inventory (FNAI) database; and the Summary Report on the Vascular Plants, Animals and Plant Communities Endemic to Florida (FGFWFC, 1989).

No important animal species were observed on the Site, nor are any expected to occur due to the disturbed nature of the Site and low ecological value. There are a number of important animal species however, that are likely to occur within five miles of the Site. This is expected due to the diverse and numerous natural communities in the five-mile vicinity. Thirty important animal

species are reported to occur in Polk County, Florida as indicated on **Table 2.3.6-2.** The table also identifies their protective status, and potential for occurrence. A discussion of 24 important animal species confirmed or with a high probability of occurrence within five miles of the Site is provided in this section. The remaining six species of important animals are not discussed due to unlikeness of occurrence.

Gopher Frog (*Rana capito*)

This species is currently listed as a species of special concern by the FFWCC. This amphibian occurs in upland habitats throughout all of peninsular Florida except the southern-most counties. The potential for occurrence on the Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

American Alligator (*Alligator mississippiensis*)

The alligator is listed as threatened due to similarity of appearance with the American Crocodile by USFWS and listed as a species of special concern by FFWCC. This reptile occurs throughout the state, and is commonly associated with wetland and freshwater areas, therefore the likelihood for occurrence on the Site is low. The potential for occurrence in the rivers and wetlands within five miles in the vicinity of the Site is high.

Eastern Indigo Snake (*Drymarchon corais couperi*)

The eastern indigo snake is listed as threatened by both USFWS and FFWCC. This reptile prefers flatwoods and other similar habitats, but may be found in moist communities including wetland hammocks. The likelihood of occurrence on the Site is moderate because of lack of suitable habitat. The occurrence of this species within five miles of the Site has been confirmed.

Blue-tailed Mole Skink (*Eumeces egregius lividus*)

This species is currently listed as threatened by the both the USFWS and the FFWCC. This reptile occurs in scrub communities of the Lake Wales Ridge in Polk and Highlands Counties, Florida. The potential for occurrence on the Site is low, due to lack of suitable habitat. The occurrence of this species within five miles of the Site has been confirmed.

Gopher Tortoise (*Gopherus polyphemus*)

This species is currently listed as a species of special concern by the FFWCC. This reptile occurs in upland communities in the southeastern-most coastal states. The potential for occurrence on the Site is low, due to lack of suitable habitat. The occurrence of this species within five miles of the Site has been confirmed.

Sand Skink (*Neoseps reynoldsi*)

This species is currently listed as threatened by the both the USFWS and the FFWCC. The sand skink occurs in rosemary scrub and sandhill communities in Marion, Polk, and Lake Counties, Florida. The potential for occurrence on the Site is low, due to lack of suitable habitat. The occurrence of this species within five miles of the Site has been confirmed.

Florida Pine Snake (*Pituophis melanoleucus mugitus*)

This species is currently listed as a species of special concern by the FFWCC. This reptile occurs in areas of sandy soil dominated by scrub pines and shrubs, and sandhills in the southeastern-most coastal states south to Charlotte, Palm Beach, and Dade Counties. The potential for occurrence on the Site is moderate, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Short-tailed Snake (*Stilosoma extenuatum*)

This species is currently listed as threatened by the FFWCC. This retile occurs in sandhills and adjacent scrub throughout peninsular Florida, west of the St. John's River. The potential for occurrence on the Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Roseate Spoonbill (*Ajaia ajaja*)

This species is currently listed as a species of special concern by the FFWCC. This bird occurs in freshwater and saltwater marshes throughout Florida. The potential for occurrence on the Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Florida Grasshopper Sparrow (*Ammodramus savannarum floridanus*)

This species is currently listed as endangered by both the USFWS and the FFWCC. This bird occurs in open country and grasslands. The potential for occurrence on the Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Florida Scrub-jay (*Aphelocoma coerulescens*)

This species is currently listed as threatened by both the USFWS and the FFWCC. This bird occurs in scattered and small isolated patches of scrub habitat in peninsular Florida from Clay and Levy Counties south to Hendry, Lee and Collins Counties. The potential for occurrence on the Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Limpkin (*Aramus guarauna*)

This species is currently listed as a species of special concern by the FFWCC. This bird occurs in freshwater marshes and wooded swamps throughout most of Florida. The potential for occurrence on the Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Little Blue Heron (*Egretta caerulea*)

This species is currently listed as a species of special concern by the FFWCC. This bird occurs in most wetland habitats throughout Florida. The potential for occurrence on the Site is low, due to lack of suitable habitat. The occurrence of this species within five miles of the Site has been confirmed.

Snowy Egret (*Egretta thula*)

This species is currently listed as a species of special concern by the FFWCC. This bird occurs in most wetland habitats throughout Florida. The potential for occurrence on the Site is low, due to lack of suitable habitat. The occurrence of this species within five miles of the Site has been confirmed.

Tricolored Heron (*Egretta tricolor*)

This species is currently listed as a species of special concern by the FFWCC. This bird occurs in most wetland habitats throughout Florida. The potential for occurrence on the Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

White Ibis (*Eudocimus albus*)

This species is currently listed as a species of special concern by the FFWCC. This bird occurs in wetland habitats as well as open upland communities throughout Florida. The potential for occurrence on the Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Peregrine Falcon (*Falco peregrinus*)

This species is currently listed as endangered by both the USFWS and the FFWCC. This bird is a migrant species found in upland and wetland habitats. As an occasional winter migrant it does not breed in the area. The potential for occurrence on the Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Southeastern American Kestrel (*Falco sparverius paulus*)

This species is currently listed as threatened by the FFWCC. The southeastern American kestrel is the smallest member of the falcon family in the United States. This bird occurs in mature, open pine woodlands, and adjacent pastures and fields. The potential for occurrence on the Site is moderate, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Florida Sandhill Crane (*Grus canadensis pratensis*)

This species is currently listed as threatened by the FFWCC. This bird occurs in wet and dry prairies and other wetlands throughout peninsular Florida. The potential for occurrence on the Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Bald Eagle (*Haliaeetus leucocephalus*)

This species is currently listed as threatened by the USFWS and the FFWCC. The bald eagle is the only eagle unique to North America, and ranges over most of the continent. Preferred nesting and foraging habitat includes areas with large trees near rivers, lakes, marshes, or other wetland areas. The potential for occurrence on the Site is low, due to lack of suitable habitat. The occurrence of this species within five miles of the Site has been confirmed.

Wood Stork (*Mycteria americana*)

This species is currently listed as endangered by both the USFWS and the FFWCC. This bird occurs in fresh, brackish, and salt wetlands throughout Florida. The potential for occurrence on the Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Black Skimmer (*Rynchops niger*)

This species is currently listed as a species of special concern by the FFWCC. This bird occurs in inshore waters, beaches, coastal dunes, mudflats, tidal shallows, and salt marshes throughout Florida. The potential for occurrence on the Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Florida Mouse (*Podomys floridanus*)

This species is currently listed as a species of special concern by the FFWCC. This mammal occurs primarily in early stages of sand pine scrub and sandhills of peninsular Florida. The potential for occurrence on the Site is low, due to lack of suitable habitat. The potential for occurrence within five miles of the Site is high.

Sherman's Fox Squirrel (*Sciurus niger shermani*)

This species is currently listed as a species of special concern by the FFWCC. This mammal occurs in vegetative communities adjacent to pine and oak forests, including bottomland and upland hardwoods and cypress domes and strands throughout northern and central peninsular Florida. The potential for occurrence on the Site is low, due to lack of suitable habitat. The occurrence of this species within five miles of the Site has been confirmed.

2.3.6.2 Pre-Existing Stresses

The most significant pre-existing stresses to the ecology of the proposed Osprey Energy Center Site is its historic use as an orange grove and its isolation from other vegetative communities and wildlife habitat due to adjacent industrial, commercial, and residential development. Regionally, urban and suburban development, phosphate mining and agricultural activities have impacted the natural flora and fauna to a significant extent. Agricultural activities in the area include citrus production, vegetable farming, and cattle ranching.

2.3.6.3 Measurement Programs

An assessment of the ecological setting on Site and within five miles of the proposed Osprey Energy Center Site was conducted in October, 1999 in order to ascertain the presence and abundance of important natural communities, flora, and fauna. In addition to field surveys, a literature search and a review of remote imagery was undertaken to determine the important elements that could potentially be present in the habitats found on the Project Site and within five miles.

Table 2.3.6-1. Listed Plant Species Occurring In Polk County, Florida (FNAI, 1999 ; FDACS, 1998)

Scientific Name	Common Name	Federal Status[1]	State Status[2]	Occurrence Potential[3]
Asclepias curtissii	Curtiss' milkweed		E	C/L
Bonamia grandiflora	Florida bonamia	T	E	C/L
Calamintha ashei	Ashe's savory		T	H/L
Cheiroglossa palmata	hand fern		E	H/L
Chionanthus pygmaeus	pygmy fringe tree	E	E	H/L
Cladonia perforata	perforate reindeer lichen	E	E	H/L
Clitoria fragrans	pigeon-wing	T	E	C/L
Conradina brevifolia	short-leaved rosemary	E	E	H/L
Crotalaria avonensis	Avon Park rabbit-bells	E	E	M/L
Dicerandra frutescens	scrub mint	E	E	H/L
Drosera intermedia	spoon-leaved sundew		T	H/L
Eriogonum longifolium	scrub buckwheat	T	E	H/L
Eryngium cuneifolium	wedge-leaved button-snakeroot	E	E	M/L
Hartwrightia floridana	hartwrightia		T	H/L
Hypericum cumulicola	Highlands scrub hypericum	E	E	H/L
Hypericum edisonianum	Edison's ascyrum		E	M/L
Illicium parviflorum	star anise		E	H/L
Lechea cernua	nodding pinweed		T	C/L
Lechea divaricata	pine pinweed		E	M/L
Liatris ohlingerae	Florida blazing star	E	E	C/L
Lupinus westianus var *aridorum*	scrub lupine	E	E	C/L
Matelea floridana	Florida spiny-pod		E	L/L
Nemastylis floridana	fall-flowering ixia		E	H/L
Nolina brittoniana	Britton's beargrass	E	E	C/L
Panicum abscissum	cutthroat grass		E	H/L
Paronychia chartacea sp *chartacea*	paper-like nailwort	T	E	C/L
Platanthera integra	yellow fringeless orchid		E	L/L
Polygala lewtonii	Lewton's polygala	E	E	H/L
Polygonella basiramia	hairy jointweed	E	E	C/L
Polygonella myriophylla	Small's jointweed	E	E	C/L
Prunus geniculata	scrub plum	E	E	H/L
Pteroglossaspis ecristata	wild coco		T	H/L
Salix floridana	Florida willow		E	L/L
Stylisma abdita	scrub stylisma		E	H/L
Warea amplexifolia	clasping warea	E	E	H/L
Warea carteri	Carter's warea	E	E	C/L
Zephyranthes simpsonii	rain lily		T	H/L
Ziziphus celata	scrub ziziphus	E	E	H/L

[1] Federal Legal Status (US Fish and WildlifeService)
- E = Listed as an Endangered Species in the List of Endangered and Threatened Wildlife and Plants under the provisions of the Endangered Species Act. Defined as any species which is in danger of extinction throughout all or a significant portion of its range.
- T = Listed as a Threatened Species. Defined as any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

[2] State Legal Status (Florida Dept. of Agricultureand Consumer Services)
- E = Listed as an Endangered Plant in the Preservation of Native Floraof Florida Act. Defined as species of plants native to the state that are in imminent danger of extinction within the state, the survival of which is unlikely if the causes of a decline in the number of plants continue, and includes all species determined to be endangered or threatened pursuant to the Federal Endangered Species Act of 1973, as amended.
- T = Listed as a Threatened plant in the Preservation of the Native Flora of Florida Act. Defined as species native to the state that are in rapid decline in the number of plants within the state, but which have not so decreased in such number as to cause them to be endangered.
- C = Listed as a Commercially Exploited Plant in the Preservation of Native Flora of Florida Act. Defined as species native to state which are subject to being removed in significant numbers from native habitats in the state and sold or transported for sale.

[3] Occurrence Potential
- H = High probability of occurrence in the vicinity of this Site, based on distribution and habitat preferences of this species.
- M = Moderate probability of occurrence in the vicinity of this Site, based on distribution and habitat preferences of this species.
- L = Low probability of occurrence in the vicinity of this Site, based on distribution and habitat preferences of this species.
- C = Confirmed as reported or Observed within five miles of the Site.

Note: The initial characterization potential describes regional occurrence. The latter characterization describes onsite potential for occurrence.

Table 2.3.6-2 Listed Animal Species Occurring In Polk County, Florida (FNAI, 1999)

Scientific Name	Common Name	Federal Status[1]	State Status[2]	Occurrence Potential[3]
	AMPHIBIANS			
Rana capito	gopher frog		S	H/L
	REPTILES			
Alligator mississippiensis	American alligator	T(S/A)	S	H/L
Drymarchon corais couperi	eastern indigo snake	T	T	C/M
Eumeces egregius lividus	blue-tailed mole skink	T	T	C/L
Gopherus polyphemus	gopher tortoise		S	C/L
Neoseps reynoldsi	Sand skink	T	T	C/L
Pituophis melanoleucus mugitus	Florida pine snake		S	H/M
Pseudemys concinna suwanniensis	Suwannee cooter		S	L/L
Stilosoma extenuatum	short-tailed snake		T	H/L
	BIRDS			
Ajaia ajaja	roseate spoonbill		S	H/L
Ammodramus savannarum floridanus	Florida grasshopper sparrow	E	E	H/L
Aphelocoma coerulescens	Florida scrub-jay	T	T	H/L
Aramus guarauna	limpkin		S	H/L
Caracara plancus	crested caracara	T	T	L/L
Egretta caerulea	little blue heron		S	C/L
Egretta thula	snowy egret		S	C/L
Egretta tricolor	tricolored heron		S	H/L
Eudocimus albus	white ibis		S	H/L
Falco peregrinus	peregrine falcon	E	E	H/L
Falco sparverius paulus	southeastern American kestrel		T	H/M
Grus canadensis pratensis	Florida sandhill crane		T	H/L
Haliaeetus leucocephalus	bald eagle	T	T	C/L
Mycteria americana	wood stork	E	E	H/L
Picoides borealis	red-cockaded woodpecker	E	T	M/L
Rostrhamus sociabilis plumbeus	snail kite	E	E	L/L
Rynchops niger	black skimmer		S	H/L
Speotyto cunicularia floridana	Florida burrowing owl		S	M/L
	MAMMALS			
Podomys floridanus	Florida mouse		S	H/L
Sciurus niger shermani	Sherman's fox squirrel		S	C/L
Ursus americanus floridanus	Florida black bear	E	T	M/L

[1] Federal Legal Status (US Fish and WildlifeService)

E = Listed as an Endangered Species in the List of Endangered and Threatened Wildlife and Plants under the provisions of the Endangered Species Act. Defined as any species which is in danger of extinction throughout all or a significant portion of its range.

T = Listed as a Threatened Species. Defined as any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

T (S/A) = Listed as a Threatened Species, due to similarity of appearance [to the American crocodile (*Crocodylus acutus*)]

[2] State Legal Status (Florida Fish and Wildlife Conservation Commission)

E = Listed as an Endangered Species. Defined as a species, subspecies, or isolated population which is so rare or depleted in number or so restricted in range of habitat due to any man-made or natural factors that it is in immediate danger of extinction or extirpation from the state, or which may attain such a status within the immediate future.

T = Listed as a Threatened Species. Defined as a species, subspecies, or isolated population which is acutely vulnerable to environmental alteration, declining in number at a rapid rate, or whose range or habitat is decreasing in area at a rapid rate and as a consequence is destined or very likely to become an endangered species within the foreseeable future.

S = Listed as a Species of Special Concern. Defined as a population which warrants special protection, recognition, or consideration because it has an inherent significant vulnerability to habitat modification, environmental alteration, human disturbance, or substantial human exploitation which, in the foreseeable future, may result in its becoming a threatened species.

[3] Occurrence Potential

H = High probability of occurrence in the vicinity of this Site, based on distribution and habitat preferences of this species.

M = Moderate probability of occurrence in the vicinity of this Site, based on distribution and habitat preferences of this species.

L = Low probability of occurrence in the vicinity of this Site, based on distribution and habitat preferences of this species.

C = Confirmed as reported or Observed within five miles of the Site.

Note: The initial characterization potential describes regional occurrence. The latter characterization describes onsite potential for occurrence.

2.3.7 METEOROLOGY AND AMBIENT AIR QUALITY

2.3.7.1 Meteorology

Meteorological data collected at existing monitoring stations were used to describe the local and regional climatology near the proposed Osprey Energy Center. The closest existing meteorological station to the Site with complete surface meteorological data is the primary National Weather Service (NWS) station located at Tampa International Airport situated approximately 70 km (42 miles) to the west of the proposed Project. NWS has recorded weather observations for more than 50 years at this site. Regular surface observations are taken just before each hour, 7 days per week. The closest meteorological station to the Site with upper air data is the NWS station at Ruskin, located approximately 75 km (45 miles) southwest of the Site. Upper air data are collected twice per day. These data are the most complete for and representative of the region surrounding the Osprey Energy Center.

FDEP has approved the use of these meteorological data in previous air permit applications for this area and recommended that these data be used for this Project.

Temperature

The climate in the Tampa area, including the Site, is subtropical with a marine influence from the Gulf of Mexico. Temperature means and extremes for Tampa are presented in **Table 2.3.7-1**. The mean annual temperature is approximately 72°F with monthly temperatures varying from a maximum of 90°F to a minimum of 50°F. Record extreme temperatures range from a low of 18°F to a record high of 99°F. Although the sun's elevation is nearly zenith during the summertime, temperatures do not exceed 100°F. The reason can be attributed to the high relative humidities with subsequent cloud cover formation and the resultant abundant convective-type precipitation.

Relative Humidity and Precipitation

Relative humidities, which indicate the amount of moisture in the air at a given temperature, are presented in **Table 2.3.7-2** for the morning hours of 0100 and 0700 and early afternoon and evening hours of 1300 and 1900. The highest humidities are coincident with the coolest ambient temperatures, which generally occur at 0700, or near dawn. The lowest humidities coincide with the highest ambient temperatures.

Table 2.3.7-1. Temperature Means and Extremes Measured at Tampa International Airport

	Daily Average Temperatures (°F)[a]			Daily Extremes (°F)[b]	
Month	Mean	Maximum	Minimum	Maximum	Minimum
January	60.4	70.5	50.3	86	21
February	62.1	72.2	52.0	88	24
March	66.6	76.4	56.6	91	29
April	71.4	81.7	61.3	93	40
May	77.4	87.4	67.6	98	49
June	81.3	89.9	72.7	99	53
July	82.3	90.3	74.3	97	63
August	82.3	90.4	74.3	98	67
September	81.0	89.1	72.9	96	57
October	75.0	84.0	65.8	94	40
November	67.6	77.5	57.5	90	23
December	62.0	72.1	51.9	86	18
Annual	72.4	81.8	63.1	99	18

[a] 51-year period of record, 1948 to 1998.

[b] 52-year period of record, 1947 to 1998.

Source: NOAA, 1998.

Table 2.3.7-2. Precipitation and Diurnal Relative Humidity Measured at Tampa International Airport

Month	Precipitation (inches)			Humidity [a] (%) hour (LT)			
	Mean [a]	Maximum [b]	Minimum [b]	0100	0700	1300	1900
January	1.99	8.02	T	84	86	58	73
February	3.08	10.82	0.21	83	86	56	69
March	3.01	12.64	0.06	82	87	54	67
April	1.15	10.71	T	82	86	50	62
May	3.10	17.64	0.07	82	86	52	62
June	5.48	13.75	1.46	84	87	60	69
July	6.58	20.59	1.65	85	88	63	73
August	7.61	18.59	2.35	87	90	64	75
September	5.98	13.98	1.28	86	91	62	75
October	2.02	7.36	0.09	85	89	56	71
November	1.77	6.12	T	86	88	57	74
December	2.15	15.57	0.07	84	87	58	74
Annual	43.92	67.71[c]	31.47[c]	84	88	58	70

Note: LT = local time.
T = trace amount.

[a] 30-year period of record, 1961 to 1990.
[b] 52-year period of record, 1947 to 1998.
[c] 30-year period of record, 1969 to 1998.

Source: NOAA, 1998.

Precipitation means and extremes are also presented in **Table 2.3.7-2**. Approximately 66-percent of the annual precipitation falls during the six warmest months, May through October. The mean annual precipitation is approximately 44 inches, but this has varied from as little as 31 inches to over 67 inches in the past 30 years. The majority of rain is in the form of short-lived convection showers.

Wind Patterns

The Tampa area lies entirely within the trade wind belt (i.e., below 30 degrees North latitude), resulting in predominant winds from the east. However, because of the location of the Gulf of Mexico, moderate to strong late afternoon sea breezes occur on days with strong land heating producing local onshore winds (i.e., wind with a westerly component). Annual and seasonal wind roses for the 5-year period from 1987 through 1991 are given in **Figures 2.3.7-1** and **2.3.7-2**. A summary of the average wind speeds for each season and throughout the year, including calm conditions, is presented in **Table 2.3.7-3**. Since 1965, the wind sensors have been located 6.7 m (22 ft) above grade.

Atmospheric Stability

Atmospheric stability is a measure of the atmosphere's capability to disperse pollutants. During the daytime with strong insulation, the atmosphere can disperse pollutants very quickly for a relatively short period. This condition is considered very unstable and generally occurs infrequently during the year. During the nighttime under clear skies and light wind speeds, the atmosphere is considered stable with minimal potential to disperse pollutants. Under moderate to high wind speeds, pollutants are dispersed at moderate rates under neutral conditions, which are generally more prevalent throughout the year and can occur any time throughout the day.

The seasonal and annual average occurrences of atmospheric stability classes from 1987 through 1991 are shown in **Table 2.3.7-4**.

During the summer months, unstable stability occurs nearly 40-percent of the time due to strong insulation, whereas unstable stability occurs only 18-percent of the time in the winter months. Neutral stability occurs most frequently during the winter months due to the higher wind speeds and lower temperatures in this season. The occurrence of stable stability is nearly

Table 2.3.7-3. Wind Direction and Wind Speed Measured at Tampa International Airport [a]

			Prevailing Wind	
Season	Average Wind Speed (mph)	Calm (%)	Direction (%)	Average Wind Speed (mph)
Winter	7.9	5.3	East (10.4)	8.1
Spring	8.0	5.2	East (12.2)	8.2
Summer	6.6	8.2	East (9.8)	6.4
Fall	7.6	5.2	East-northeast (16.1)	7.8
Annual	7.5	6.0	East (11.0)	7.6

[a] 5-year period of record, 1987 to 1991.

Source: NOAA, 1991.

Table 2.3.7-4. Occurrences of Atmospheric Stability Classes Determined at Tampa International Airport [a]

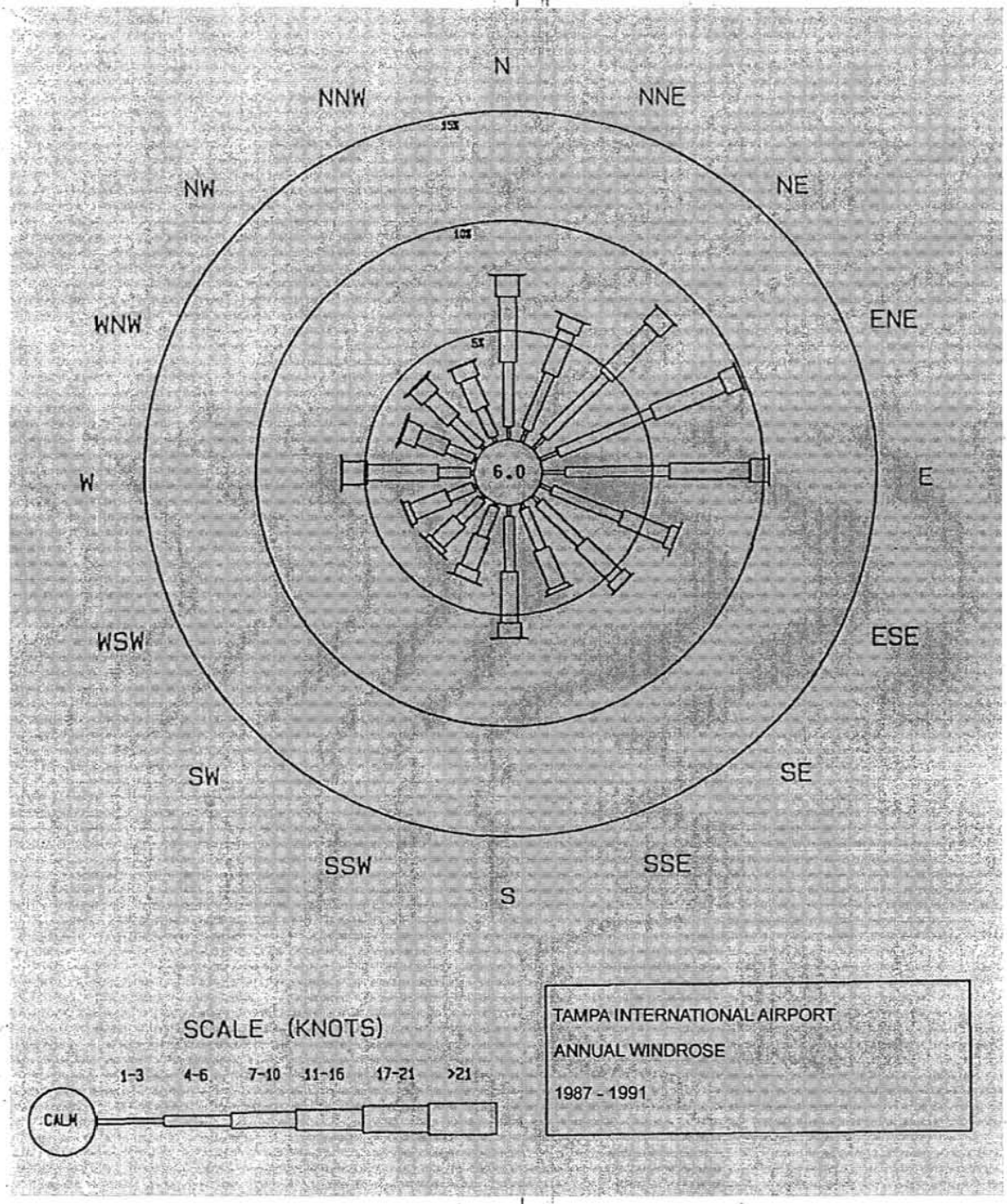
	Occurrence (%) of Stability Class					
Season	Very Unstable	Moderately Unstable	Slightly Unstable	Neutral	Slightly Stable	Moderately Stable
Winter	0.0	3.8	14.2	37.5	17.5	27.1
Spring	0.9	10.8	17.8	29.0	17.1	24.5
Summer	3.3	17.2	18.5	16.7	17.0	27.4
Fall	0.6	8.5	16.7	26.8	18.7	28.6
Annual	1.2	10.1	16.8	27.5	17.5	26.9

[a] 5-year period of record, 1987 to 1991.

Source: NOAA, 1991.

IMAGE QUALITY

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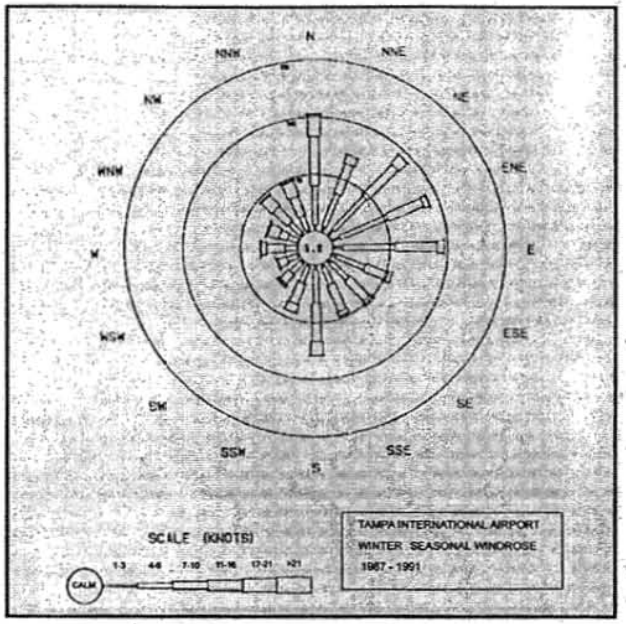
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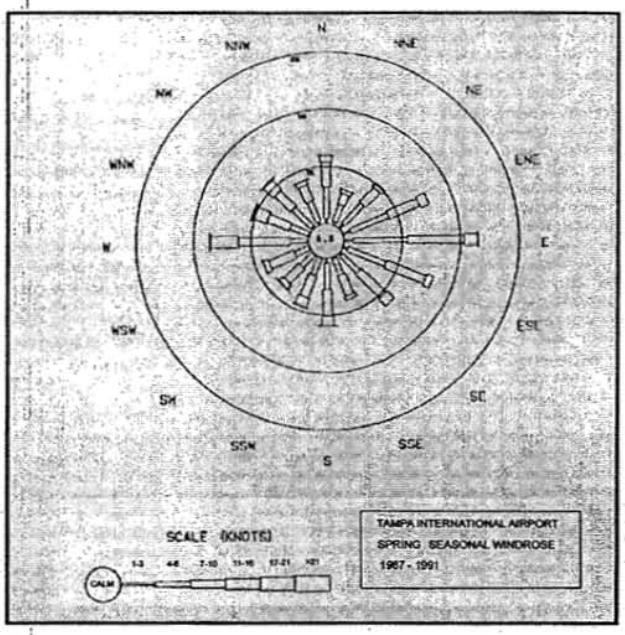
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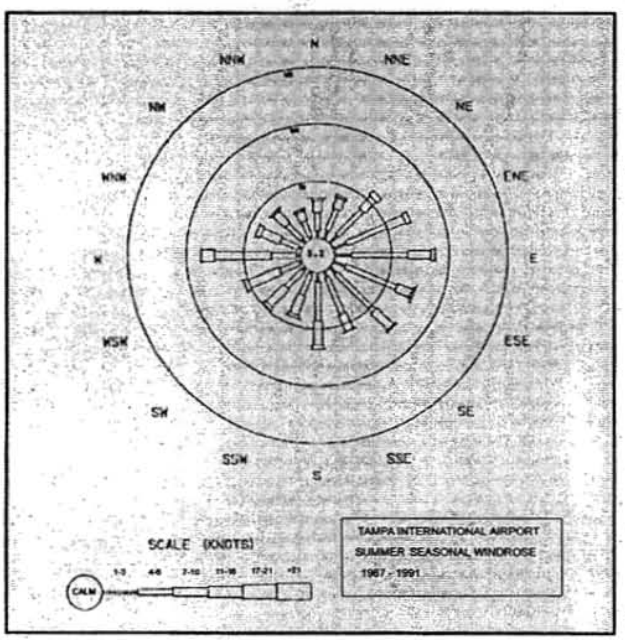
Annual Wind Rose
Tampa International
Airport

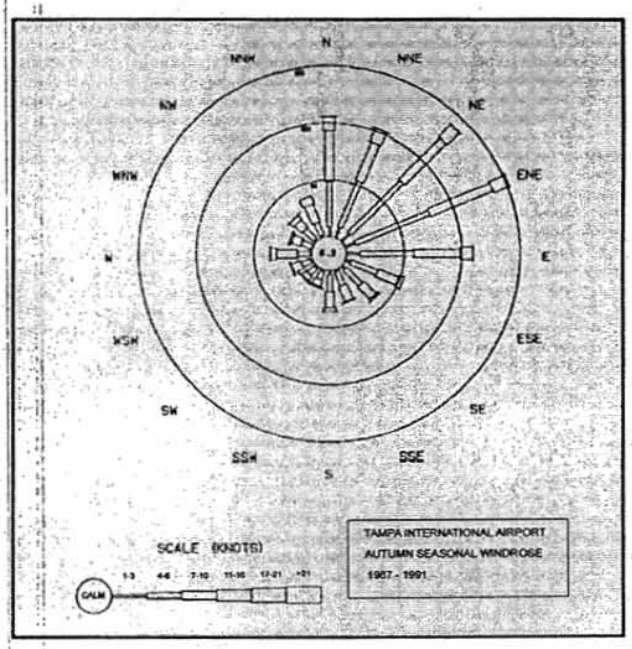
Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: No Scale	Job No. 993-9570
CHK BY: RAZ	DATE: 02/07/00	FIGURE 2.3.7-1
REV BY: -	FILE No.: fig2_3_7-1.dwg	









Golder Associates

Tampa, Florida

Seasonal Wind Rose
Tampa International
Airport

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: No Scale	Job No. 993-9570
CHK BY: RAZ	DATE: 02/07/00	FIGURE 2.3.7-2
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uniform throughout the year, with a maximum occurrence of approximately 47-percent in the fall.

Mixing Height

The mixing height is a parameter used to define the vertical height to which air emissions can disperse. In general, the higher the mixing height, the greater the dispersion. Mixing heights are estimated using upper air data coupled with surface temperature.

The seasonal and annual average morning and afternoon mixing heights for Tampa from 1987 to 1991 determined using the Holzworth method are listed in **Table 2.3.7-5**. These mixing heights were estimated using the upper air data collected in Ruskin with surface meteorology measured in Tampa. The highest afternoon mixing depths occur in the spring and the lowest morning depths occur in mid-winter.

Severe Storms

Thunderstorms are the most frequent of severe storms, occurring an average of 87 days per year. These storms occur throughout the year, but about 88-percent occur from May through October.

In the 80-km (50-mile) coastal strip from above Pinellas County to Tampa Bay, there is less than a 10-percent chance that a tropical storm will pass over the Bay area during any given year. For storms of hurricane strength [i.e., wind speeds exceeding 117 km/hr (73 mph)], the chance decreases to 1 in 16 (i.e., 6.2-percent) with a 1-percent chance that the winds will be greater than 200 km/hr (124 mph) (i.e., wind speeds of a great hurricane).

Statistics compiled by the Severe Local Storms (SELS) branch of the National Severe Storms Forecast Center (Pautz, 1969) show that 42 tornadoes were spotted within the 1 degree latitude by 1 degree longitude square centered just south of the Tampa area from 1955 to 1967. This total averages approximately two tornadoes per year. The tornado recurrence interval for any specific point location within the 1-degree square was estimated by the methodology of Thom (1963) to be 740 years. Therefore, the mean recurrence interval for a tornado striking a point within this square is 740 years. The most common tornado month is June.

Table 2.3.7-5. Morning and Afternoon Mixing Heights Determined at Tampa International Airport [a]

Season	Mixing Height (m)	
	Morning	Afternoon
Winter	404	1,119
Spring	561	1,519
Summer	676	1,490
Fall	464	1,410
Annual	526	1,384

[a] 5-year period of record, 1987 to 1991.

Source: NOAA, 1991.

2.3.7.2 Ambient Air Quality

Ambient Air Quality Standards

The existing applicable national and Florida ambient air quality standards (AAQS) are presented in **Table 2.3.7-6**. The AAQS have been promulgated for sulfur dioxide (SO_2), nitrogen dioxide (NO_2), particulate matter with an aerodynamic diameter of 10 microns (PM_{10}), carbon monoxide (CO), ozone (O_3), and lead. Primary national AAQS were promulgated to protect the public health, and secondary national AAQS were promulgated to protect the public welfare from any known or anticipated adverse effects associated with the presence of pollutants in the ambient air. Areas of the country in violation of AAQS are designated as nonattainment areas, and new sources to be located in or near these areas may be subject to more stringent air permitting requirements.

Polk County is classified as an attainment area for all criteria pollutants. Adjacent counties are also classified as attainment areas for all criteria pollutants. There are no designated nonattainment areas in Florida. However, there are several maintenance areas near Polk County, which were previously designated as nonattainment. These include Hillsborough and Pinellas counties, classified as a maintenance area for ozone; a portion of Hillsborough County, classified as a maintenance area for lead; and a portion of Hillsborough County, classified as a maintenance area for PM.

Prevention of significant deterioration (PSD) review is used to determine whether significant air quality deterioration will result from the new or modified source located in attainment areas. Under federal PSD review requirements, all major new or modified sources of air pollutants regulated under the Clean Air Act (CAA) must be reviewed and approved by EPA or an agency delegated with PSD review authority. In Florida, FDEP has been delegated PSD review authority by EPA.

In promulgating the 1977 CAA Amendments, Congress specified that certain increases above an air quality baseline concentration level of SO_2 and particulate matter (PM) concentrations would constitute significant deterioration. The magnitude of the allowable increment depends on the classification of the area in which a new source (or modification) will be located or have an impact. Three classifications were designated based on criteria established in the CAA

Table 2.3.7-6. National and State AAQS, Allowable PSD Increments, and Significant Impact Levels

Pollutant	Averaging Time	AAQS ($\mu g/m^3$)			PSD Increments ($\mu g/m^3$)		
		Primary Standard	Secondary Standard	Florida	Class I	Class II	Significant Impact Levels ($\mu g/m^3$) [b]
Particulate Matter [c] (PM_{10})	Annual Arithmetic Mean	50	50	50	4	17	1
	24-Hour Maximum	150	150	150	8	30	5
Sulfur Dioxide	Annual Arithmetic Mean	80	NA	60	2	20	1
	24-Hour Maximum [a]	365	NA	260	5	91	5
	3-Hour Maximum [a]	NA	1,300	1,300	25	512	25
Carbon Monoxide	8-Hour Maximum [a]	10,000	10,000	10,000	NA	NA	500
	1-Hour Maximum [a]	40,000	40,000	40,000	NA	NA	2,000
Nitrogen Dioxide	Annual Arithmetic Mean	100	100	100	2.5	25	1
Ozone [c]	8-Hour Maximum [d]	157	157	157	NA	NA	NA
Lead	Calendar Quarter Arithmetic Mean	1.5	1.5	1.5	NA	NA	NA

Note: Particulate matter (PM_{10}) = particulate matter with aerodynamic diameter less than or equal to 10 micrometers.
NA = Not applicable, i.e., no standard exists.

[a] Short-term maximum concentrations are not to be exceeded more than once per year.

[b] Maximum concentrations are not to be exceeded.

[c] On July 18, 1997, EPA promulgated revised AAQS for particulate matter and ozone. For particulate matter, $PM_{2.5}$ standards were introduced with a 24-hour standard of 65 g/m^3 (3-year average of 98th percentile) and an annual standard of 15 g/m^3 (3-year average at community monitors). These standards have been stayed by a court case against EPA; implementation of these standards appears to be years away.

[d] 0.08 parts per million (ppm); achieved when 3-year average of 99th percentile is 0.08 ppm or less. These have been stayed by a court case against EPA. EPA is appealing. The 1-hour standard of 0.12 ppm is still applicable. FDEP has not yet adopted the new standards.

Sources: Federal Register, Vol. 43, No. 118, June 19, 1978.; 40 CFR 50; 40 CFR 52.21.; Chapter 62-204, F.A.C.

Amendments. Initially, Congress promulgated areas as either Class I [international parks, national wilderness areas, and memorial parks larger than 2,024 ha (5,000 acres), and national parks larger than 2,428 ha (6,000 acres)] or as Class II (all areas not designated as Class I). No Class III areas, which would be allowed greater deterioration than Class II areas, were designated. EPA then promulgated as regulations the requirements for classifications and area designations.

The EPA class designations and allowable PSD increments are presented in **Table 2.3.7-6**. Florida has adopted the EPA allowable increments for PM, SO_2, and NO_2. The area surrounding the Project is classified as a PSD Class II area. The nearest PSD Class I area to the Project is the Chassahowitzka National Wilderness Area located approximately 102 km from the Site.

The term "baseline concentration" evolves from federal and state PSD regulations and refers to a concentration level corresponding to a specified baseline date and certain additional baseline sources. By definition, in the PSD regulations as amended August 7, 1980, baseline concentration means the ambient concentration level that exists in the baseline area at the time of the applicable baseline date. A baseline concentration is determined for each pollutant for which a baseline date is established and includes:

1. The actual emissions representative of facilities in existence on the applicable baseline date; and
2. The allowable emissions of major stationary facilities that commenced construction before January 6, 1975, for SO_2 and PM (TSP) concentrations, or February 8, 1988, for NO_2 concentrations, but that were not in operation by the applicable baseline date.

The following emissions are not included in the baseline concentration and therefore affect PSD increment consumption:

1. Actual emissions from any major stationary facility on which construction commenced after January 6, 1975, for SO_2 and PM (TSP) concentrations, and after February 8, 1988, for SO_2 concentrations; and
2. Actual emission increases and decreases at any stationary facility occurring after the baseline date.

In reference to the baseline concentration, the term "baseline date" actually includes three different dates:

1. The major facility baseline date, which is January 6, 1975, in the cases of SO_2 and PM (TSP), and February 8, 1988, in the case of SO_2.
2. The minor facility baseline date, which is the earliest date after the trigger date on which a major stationary facility or major modification subject to PSD regulations submits a complete PSD application.
3. The trigger date, which is August 7, 1977, for SO_2 and PM (TSP), and February 8, 1988, for SO_2.

The minor source baseline date for SO_2 and PM (as Total Suspended Particulates (TSP)) has been set as December 27, 1977, for the entire State of Florida (Rule 62-204.360(1) and (2), F.A.C.). The minor source baseline for SO_2 has been set as March 28, 1988 (Rule 62-204.360(3), F.A.C). It should be noted that references to PM (TSP) are also applicable to PM_{10}.

To address compliance with AAQS and PSD Class II increments, a source impact analysis must be performed for the criteria pollutants. This analysis may be limited to the new source alone if the new source's impacts are less than the EPA significant impact levels presented in **Table 2.3.7-6**. If the new source's impacts are predicted to be less than significant, then they are assumed not to have a significant adverse affect on air quality and additional modeling is not required. However, if the source's impacts are predicted to be greater than the significant impact levels, additional modeling with other sources is required to demonstrate compliance with ambient standards.

Based on the Osprey Energy Center proposed emissions and maximum predicted concentrations, the Project's impacts are less than the significant impact levels. Therefore, the Project will comply with AAQS and PSD increments (see Section 5.6 for a more detailed discussion).

Ambient Air Quality Data

FDEP operates a statewide ambient air-monitoring network including several monitoring stations located in Polk County. The network in Polk County consists of monitoring stations that measure SO_2, PM_{10}, and ozone (O_3) concentrations. Ambient SO_2 and PM_{10} concentrations are measured at two monitoring stations located in Mulberry, approximately 25 km (16 miles) to the southwest of the Site. Ambient O_3 concentrations are measured at two monitoring stations located in Lakeland, approximately 15 km (9 miles) from the Site. The locations of the stations are shown in **Figure 2.3.7-3.**

A summary of data collected at these monitoring stations from 1996 through 1999 is presented in **Table 2.3.7-7.**

These data collected show that the measured concentrations are below applicable standards. It should be noted that elevated ozone concentrations were measured throughout the state, including this region, in the spring and summer of 1998. These elevated concentrations have been attributed to wild fires in Mexico and Florida coupled with adverse meteorological conditions (drought conditions, winds). The FDEP has documented the suspected causes for these elevated concentrations and has submitted a request to the United States Environmental Protection Agency (EPA) to ignore the days of elevated ozone concentrations in determining an area's compliance with AAQS. At present, EPA has recognized that these elevated concentrations were due to anomalous events and has allowed certain days to be excluded for compliance determinations. However, EPA is waiting to make a final determination on the remaining days until more data have been collected in 1999 and analyzed.

Ambient data for NO_2, CO, and lead (Pb) have been measured by FDEP in the Tampa and Orlando metropolitan areas at the monitoring stations nearest the Site. A summary of data collected at these monitoring stations from 1996 through 1999 is presented in **Table 2.3.7-8.** These data show that the measured concentrations are below applicable standards. Since these pollutants are usually associated with an urban environment, the concentrations of these pollutants at the Site are expected to be lower than the measurements in Tampa and Orlando, thus, well below applicable standards.

Table 2.3.7-7. Summary of Maximum Sulfur Dioxide, PM_{10}, and Ozone Concentrations Measured in Polk County from 1996 to 1999

County	Site Number and Location		Measurement Period: Year	Months	Number of Observation	Measured Concentration ($\mu g/m^3$) (a)					
Sulfur Dioxide						3-Hour Average			24-Hour Average		Annual
			Florida AAQS			NA 1st	1300 ug/m³ 2nd		NA 1st	260 ug/m³ 2nd	60 ug/m³ Average
Polk	12-105-0010	Mulberry, Anderson and Pinecrest Rd.	1999	Jan-Jun	4,326	183	136		50	47	16
			1998	Jan-Dec	8,710	204	180		76	71	16
	3680-010-F02		1997	Jan-Dec	8,680	176	148		53	48	17
			1996	Jan-Dec	8,610	432	257		86	80	15
	12-105-2006	Mulberry, NW 4th Circle, Mulberry H.S.	1999	Jan-Jun	4,324	149	120		47	34	10
			1998	Jan-Dec	8,595	183	139		44	42	13
	2860-006-F02		1997	Jan-Dec	8,647	168	134		49	38	11
			1996	Jan-Dec	7,272	150	124		57	43	11
PM_{10}						24-Hour Average				Annual	
			Florida AAQS			NA	NA		150 ug/m³ 3-year Average	50 ug/m³	
						1st	2nd	4th	4th (b)	Average	
Polk	12-105-0010	Mulberry, Anderson and Pinecrest Rd.	1999	Jan-Jun	23	42	39	36	39	25	
			1998	Jan-Dec	61	54	48	46	39	24	
	3680-010-F02		1997	Jan-Dec	31	41	36	34	NA	20	
			1996	Jan-Dec	61	75	45	38	NA	22	
	12-105-2006	Mulberry, NW 4th Circle, Mulberry H.S.	1999	Jan-Jun	165	47	47	46	NA	24	
			1998	Jan-Dec	333	108	91	65	NA	26	
			1997	Jan-Dec	NA	NA	NA	NA	NA	NA	
			1996	Jan-May	21	36	28	NA	NA	21	
Ozone						8-Hour Average				1-Hour Average	
			Florida AAQS			NA	NA		85 ppb 3-year Average	NA	120 ppb
						1st	2nd	4th	4th (b)	1st	2nd
Polk	12-105-6005	Lakeland, 2727 Shepherd Road, Sikes E.S.	1999	Jan-Sep	273	80	79	78	81	99	92
			1998	Jan-Dec	365	105	89	87	78	125	110
	2160-005-F01		1997	Jan-Dec	363	91	80	79	72	104	102
			1996	Jan-Dec	366	70	70	68	70	95	85
	12-105-6006	Lakeland, 1015 Sikes Blvd.	1999	Jan-Sep	273	85	84	78	80	103	94
			1998	Jan-Dec	365	100	90	85	77	123	119
	2160-005-F01		1997	Jan-Dec	365	87	86	77	74	100	99
			1996	Jan-Dec	366	81	77	71	72	99	92

Note: NA= not applicable; AAQS= ambient air quality standard.

(a) For ozone, concentrations reported in parts per billion (ppb).
(b) Concentration value is the 3-year average of the 4th highest concentration.

Table 2.3.7-8. Summary of Maximum Nitrogen Dioxide, Carbon Monoxide, and Lead Measured in the Region Near Polk County from 1996 to 1999 (Page 1 of 2)

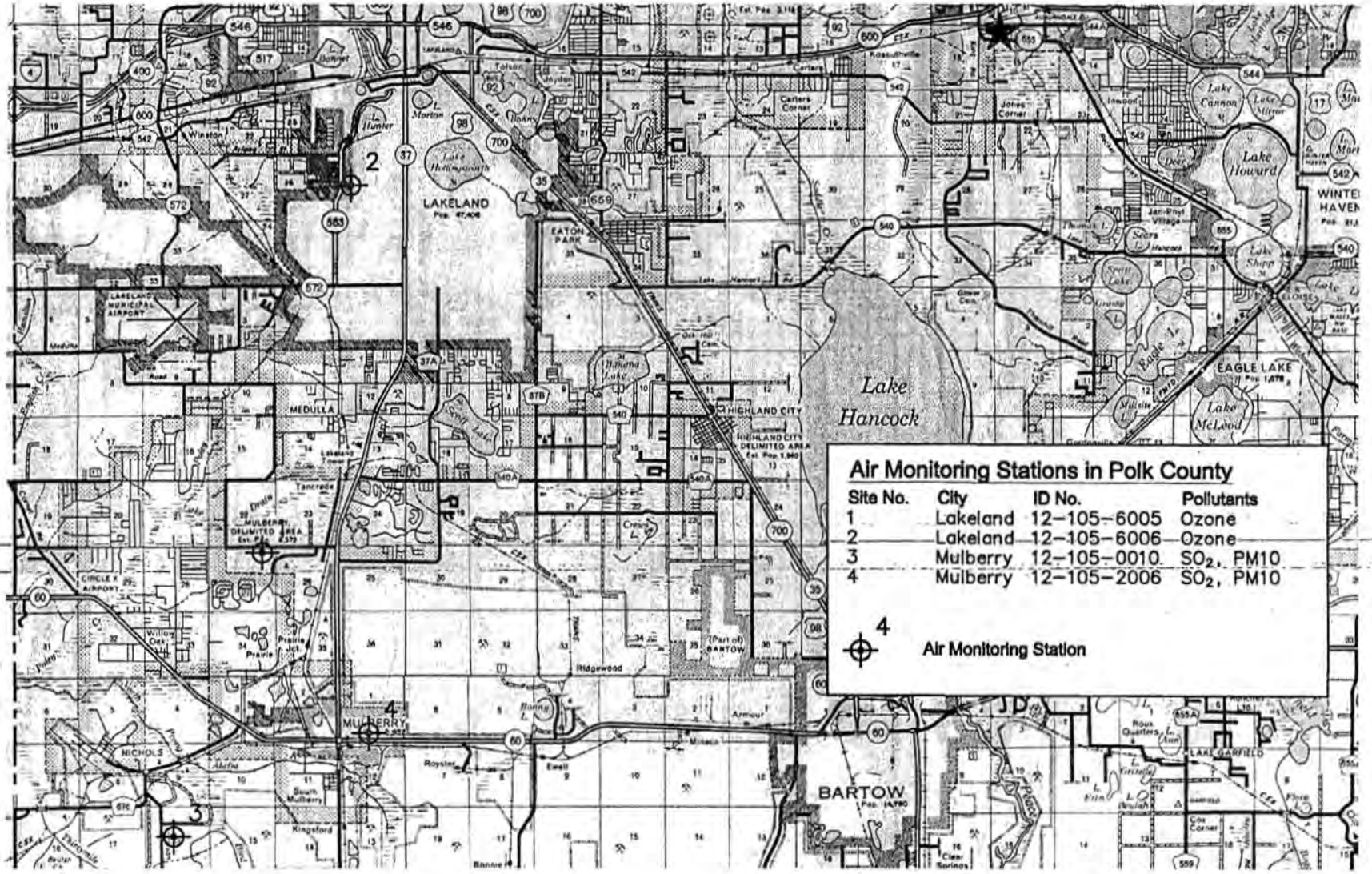
County	Site Number and Location		Measurement Period: Year	Measurement Period: Months	Number of Observation	Measured Concentration (µg/m³) (a)	
Nitrogen Dioxide							
			Florida AAQS			**Annual 100 ug/m³ Average**	
Hillsborough	12-057-0081	Tampa, E.G. Simmons County Park	1999	Jan-Jun	3,497	18	
			1998	Jan-Dec	NA	NA	
	1800-081-G03		1997	Jan-Dec	8,573	12	
			1998	Jan-Dec	8,574	13	
	12-057-0081	Tampa, 5121 Gandy Blvd	1999	Jan-Jun	4,304	26	
			1998	Jan-Dec	8,634	29	
	4360-065-G01		1997	Jan-Dec	8,087	18	
			1996	Jan-Dec	8,637	18	
Orange	12-095-2002	Winter Park, Morris Blvd.	1999	Jan-Jun	4,249	34	
			1998	Jan-Dec	8,408	29	
	4900-002-G01		1997	Jan-Dec	8,306	24	
			1996	Jan-Dec	8,343	24	
Carbon Monoxide						**8-Hour Average**	**1-Hour Average**
			Florida AAQS			**NA 1st / 9 ppm 2nd**	**NA 1st / 9 ppm 2nd**
Hillsborough	12-057-0063	Tampa, 220 Madison Ave.	1999	Jan-Jun	4,336	5.3 / 4.7	9.0 / 8.5
			1998	Jan-Dec	8,719	2.8 / 2.8	6.7 / 6.2
	4360-063-G01		1997	Jan-Dec	8,682	3 / 3	6 / 6
			1996	Jan-Dec	8,725	3 / 2	4 / 3
	12-057-1035	Tampa, Coast Guard Station.	1999	Jan-Jun	4,334	1.6 / 1.4	2.8 / 2.7
			1998	Jan-Dec	8,691	2.3 / 1.9	3.3 / 2.9
	4360-035-G02		1997	Jan-Dec	8716	2 / 2	4 / 4
			1996	Jan-Dec	8,695	2 / 2	3 / 3
	12-057-1070	Tampa, 4702 Central Ave.	1999	Jan-Jun	4,319	3.9 / 3.1	5.4 / 5.0
			1998	Jan-Dec	8,698	4.1 / 4.1	8.1 / 6.9
	4360-070-G01		1997	Jan-Dec	8,497	4 / 4	7 / 7
			1996	Jan-Dec	8,710	6 / 4	7 / 7
	12-057-4004	Plant City, One Raider Place	1999	Jan-Jun	4,289	1.5 / 1.3	3.6 / 2.4
	4360-045-G01	Tampa, Tampa Stad., Buffalo& Dale Mambr	1997	Jan-Dec	8,527	3 / 3	5 / 5
			1996	Jan-Dec	8,669	4 / 3	8 / 6
	4360-068-G01	Tampa, Northdale, 4013 Ragg Road	1997	Jan-Dec	8,602	2 / 2	3 / 3
			1996	Jan-Dec	8,672	3 / 3	5 / 4
Orange	12-095-1005	Orlando, No. 1 Orange Ave.	1999	Jan-Jun	4,063	3.6 / 3.3	5.2 / 5.0
			1998	Jan-Dec	8,472	4.0 / 3.5	5.9 / 5.5
	3280-005-G01		1997	Jan-Dec	8,436	5 / 4	9 / 9
			1996	Jan-Dec	8,578	7 / 4	23 / 12

Table 2.3.7-8. Summary of Maximum Nitrogen Dioxide, Carbon Monoxide, and Lead Measured in the Region Near Polk County from 1996 to 1999 (Page 2 of 2)

County	Site Number and Location	Measurement Period: Year	Months	Number of Observation	Measured Concentration ($\mu g/m^3$) (a)			
	12-095-2002 Winter Park, Morris Blvd.	1999	Jan-Jun	4,299	2.2	2.0	3.4	3.9
		1998	Jan-Dec	8,591	2.5	2.4	3.9	3.6
	4900-002-G01	1997	Jan-Dec	8,477	3	3	4	4
		1996	Jan-Dec	8,463	2	2	4	4
Lead							**Quarterly Average (ug/m^3)**	
		Florida AAQS					**1.5 ug/m^3 1st**	**NA 2nd**	**NA 3rd**
Hillsborough	12-057-1066 Tampa, 1700 North 66th St.	1999	Jan-Jun	30			0.42	0.41	NA
		1998	Jan-Dec	59			0.51	0.41	0.37
	4360-066-G02	1997	Jan-Dec	60			0.6	0.6	0.4
		1996	Jan-Dec	60			0.7	0.7	0.3
	12-057-1073 Tampa, 6811 East 14th Ave.	1999	Jan-Jun	29			0.27	0.17	NA
		1998	Jan-Dec	57			0.23	0.13	0.12
	4360-073-G01	1997	Nov-Dec	9			0.1	NA	NA
	12-057-1074 Tampa, 3100 North 66th St.	1999	Jan-Jun	28			0.03	0.08	NA
		1998	Jan-Dec	54			0.08	0.07	0.04
	1800-003-G03 Ruskin, Ruskin Fire Station	1997	Jan-Dec	30			0.0	0.0	0.0
		1996	Jan-Dec	31			0.0	0.0	0.0
	1800-103-G02 Tampa, Navajo Ave. and 27th St.	1997	Jan-Dec	59			0.1	0.0	0.0
		1996	Jan-Dec	60			0.0	0.0	0.0
	4360-067-G02 Tampa, Orient Park, 1914 62nd St.	1997	Jan-Dec	59			0.5	0.4	0.4
		1996	Jan-Dec	58			0.5	0.4	0.4
	4360-071-G02 Tampa, 1905 North 66th St. (b)	1997	Jan-Jun	20			3.1	1.3	0.0
		1996	Jan-Dec	58			2.8	1.5	1.0
Orange	3240-007-G01 Orlando, 2401 W. 33rd St., Sheriff's Office	1996	Jan-Dec	61			0.0	0.0	0.0
	4900-002-G01 Winter Park, Lake Isle Estates	1996	Jan-Dec	61			0.0	0.0	0.0

Note: NA= not applicable; AAQS= ambient air quality standard.

(a) For carbon monoxide, concentrations reported in parts per million (ppm).
(b) Located near a steel plant which shutdown in 1997.



2-138

Golder Associates

Tampa, Florida

Locations of Air Monitoring Stations

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	NTS	Job No.	993-9570
CHK BY:	RAZ	DATE:	02/07/00	FIGURE	2.3.7-3
REV BY:	–	FILE No.:	fig2_3_7-3.dwg		

A PSD preconstruction ambient air monitoring analysis is typically developed as part of the licensing plan to satisfy PSD requirements. Because the estimated increase in potential emissions due to the Project exceed the significant emission rates for several regulated pollutants, including SO_2, NO_x, PM_{10}, and CO, an ambient air monitoring analysis is required for these pollutants. However, an exemption from monitoring is available under FDEP rules [Section 62-212.400(3)(e)] for impacts that are predicted to be less than the *de minimis* ambient impacts.

Based on the Osprey Energy Center proposed emissions and the existing ambient monitoring data, Calpine is proposing that preconstruction monitoring not be required, because the Project's impacts and/or emissions are predicted to be below the *de minimis* monitoring levels.

Existing Air Pollutant Sources

There are several major sources in Polk County including the Auburndale Power Project (which is a PSD increment-consuming source, located adjacent to the east boundary of the site). This facility is a cogeneration plant consisting of a combined cycle combustion turbine cogeneration system rated at a nominal 150 total megawatts (MW) output. The combined cycle system consists of one combustion turbine (CT) with a nominal electrical generating capability of 104-MW, one unfired heat recovery steam generator (HRSG), and one 52-MW steam turbine-generator. Other major sources located near the Project Site include the City of Lakeland's McIntosh and Larsen Power Plants.

2.3.7.3 Measurement Programs

Since the proposed Osprey Energy Center is exempt by FDEP from ambient air quality monitoring, all information (i.e., meteorology and air quality data) were compiled from offsite monitoring stations maintained and operated by cooperating governmental agencies. Ambient air quality data were obtained from FDEP which operates ambient air monitoring stations in Polk County. No significant changes in these programs are anticipated after the Project goes into commercial operation.

2.3.8 NOISE

2.3.8.1 Background

The proposed Osprey Energy Center is located in a non-productive citrus grove. The property is bordered by the Auburndale Power Plant and Tampa Electric Company's Recker electrical substation to the east, the Auburndale Memorial Park (cemetery) to the west, Recker Highway to the south and Derby Avenue to the north. There are numerous commercial and industrial facilities located in the area of the Osprey Energy Center. A baseline noise survey was performed to determine the ambient noise levels in the area of the proposed plant prior to its construction and operation.

2.3.8.2 Noise Measurement Procedures

A comprehensive ambient noise-monitoring program was performed to assess the existing ambient noise levels in the proposed Osprey Energy Center Project area. The field effort to collect the baseline noise level data was initiated on October 11, 1999 at four different locations. The four monitoring locations were chosen to delineate the noise levels at the Osprey Energy Center property boundaries. Additionally, a 24-hour continuous noise measurement at Site 1 was initiated on November 22, 1999 to assess the temporal variations in noise levels during the measurement period. Site 1 was located at the northwest property corner, Site 2 at the western property line approximately 500 feet north of Recker Highway, Site 3 at the southeast property corner, and Site 4 at the eastern property line approximately 600 feet north of Recker Highway.

The sound pressure levels (SPLs) and octave band data were collected at the locations (**Figure 2.3.8-1**) using measurement techniques set forth by American National Standard Institute (ANSI) S12.9-1993/Part 3. **Table 2.3.8-1** provides, in tabular format, the noise-monitoring sites referenced to the proposed location of the proposed project.

The noise monitoring equipment used during the study included:

1. Continuous Noise Monitoring Equipment
   a. Larson Davis Model 824 Precision Integrating Sound Level Meter with Real Time Frequency Analyzer
   b. Larson Davis Model PRM902 Microphone Preamplifier
   c. Larson Davis Model 2560 Prepolarized 1/2" Condenser Microphone

d. Windscreen, tripod, and various cables

2. Sound Level Meter Calibration Unit

a. Larson Davis Model CAL200 Sound Level Calibrator, 94/114 dB at 1,000 Hz.

The Larson Davis sound level meter complies with Type I--Precision requirements set forth by ANSI S1.4-1983 for sound level meters.

The equipment used to monitor the baseline noise levels operated in the slow response mode to obtain accurate, integrated, A-weighted sound pressure levels. A windscreen was used because all measurements were taken outdoors. The microphone was positioned so that a random incidence response, as specified by the ANSI, was achieved. The sound level meter and octave band analyzer were calibrated immediately prior to and just after the sampling period to provided a quality control check of the sound level meter's operation during monitoring. Integrated sound pressure level (SPL) data consisting of the following noise parameters were collected at each location:

L_{eq} The sound pressure level averaged over the measurement period; this parameter is the continuous steady sound pressure level that would have the same total acoustic energy as the real fluctuating noise over the same time period;

Max The maximum sound pressure level for the sampling period, and;

Min The minimum sound pressure level for the sampling period.

Monitoring was conducted using the sound level meter mounted on a tripod at a height of 1.2 m (4 ft) above grade. Local meteorological conditions (wind speed, wind direction and temperature) were measured during the monitoring periods. Detailed field notes were recorded by the operator during monitoring and including major noise sources in the area.

Ambient SPLs were measured at each of the four sites, for a minimum of 30 consecutive minutes. The L_{eq} (equivalent sound pressure level averaged for the sampling period) as well as the maximum and minimum SPLs during each monitoring episode were recorded. The minimum, maximum, and L_{eq} SPLs for each site were calculated.

The SPL averages were calculated using the following formula:

$$\text{Average SPL} = 10 \text{ Log} \frac{\sum_{i-1}^{N} 10^{(SPLi/10)}}{N}$$

where:

N = number of observations.

SPL_i = individual sound pressure level in data set.

Also included in **Table 2.3.8-1** is the wind speed, wind direction, and microphone orientation, as well as comments on events and observations occurring during the monitoring program. The SPL data were analyzed and reported in A-weighted decibels (dBA). The higher the decibel values, the louder the sound.

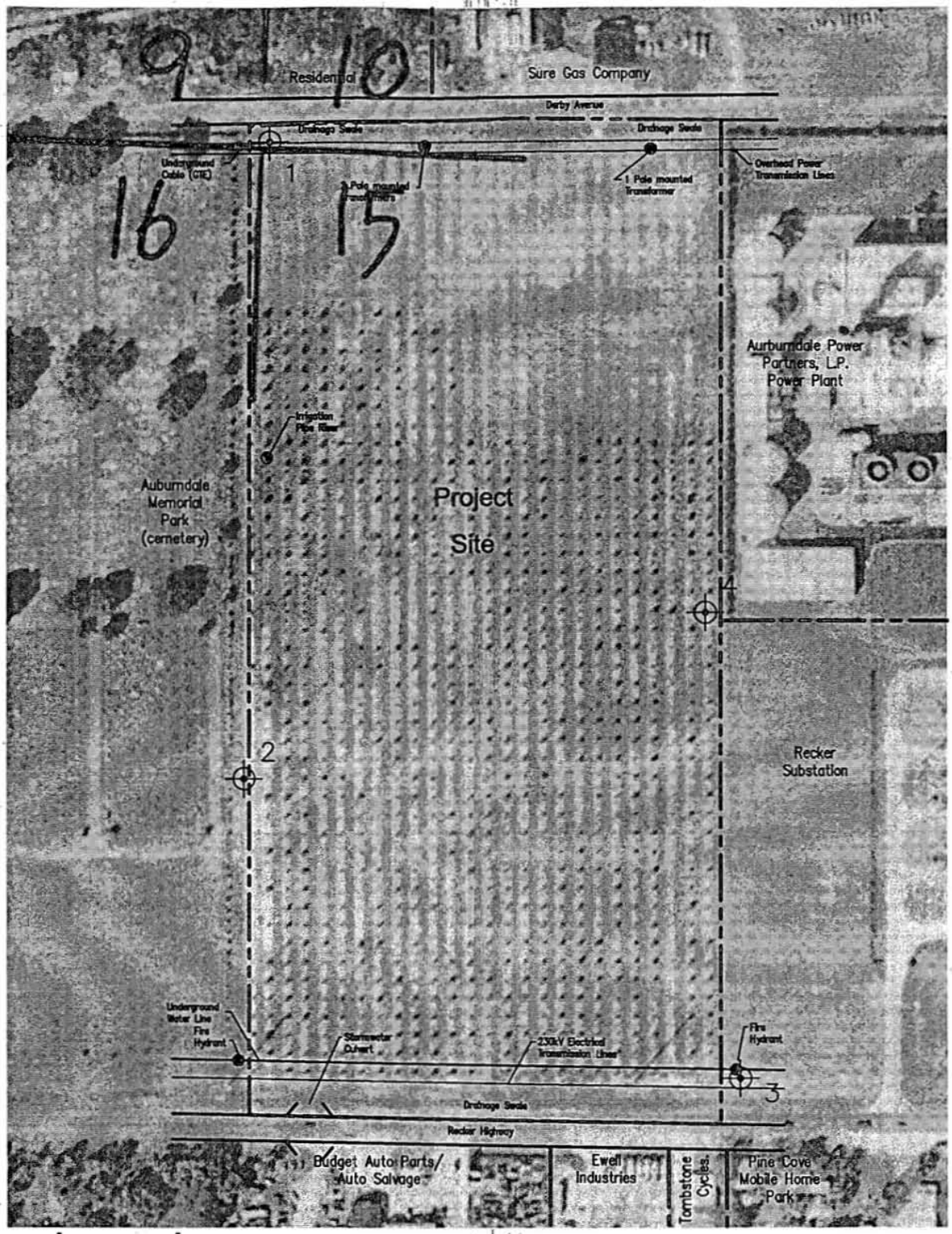
2.3.8.3 Noise Survey Results

The ambient noise levels, measured as an equivalent sound pressure level (L_{eq}), for each of the monitoring sites range from 52.4 dBA at Site 2 to 62.6 dBA at Site 3. The minimum values represent the baseline ambient noise levels in the area. The maximum L_{eq} noise levels measured at the sites during the October, 1999 monitoring event ranged from 60.3 dBA at Site 2 to 73.3 dBA at Site 3, indicating other external and intermittent noise sources, such as insects, traffic, aircraft and railroads influencing the measurements. Indeed, during the 24-hour noise measurement period, the minimum and maximum L_{eq} values ranged from 47.5 dBA to 81.4 dBA, respectively. The average L_{eq} measured for the 24 hours at Site 1 was 60.5 dBA, which is within 1 dBA of the values measured a month earlier at the same location.

Table 2.3.8-1. Baseline Ambient Sound Pressure Level Data for the Osprey Energy Center

Site	Date	Time	Wind Speed	Wind Direction	Microphone Orientation	Sound Pressure Levels (dBA) Min	Max	Leq	Comments
1	10/11/99	1430	<10	090	120	51.0	70.8	59.8	Auburndale Power Plant not operating, high-pitched whine at 1600 Hz
2	10/11/99	1515	5-7	300	000	46.7	60.3	52.4	Auburndale Power Plant not operating; insect noises
3	10/11/99	1610	5-7	300	000	51.6	73.3	62.6	Auburndale Power Plant not operating; >30 cars in 3 minutes both ways on Recker Highway (traffic noise dominates)
4	10/11/99	1640	3-5	Var.	270	50.3	63.7	53.2	Auburndale Power Plant not operating; mockingbird singing
1	11/23/99	24 hour	3-7	Var.	120	47.5	81.4	60.5	Aurburndale Power Plant operating; train @ 2 p.m.; various aircraft; fog in early morning

Source: Golder Associates Inc, 2000.



Legend

3 Noise Monitor Location

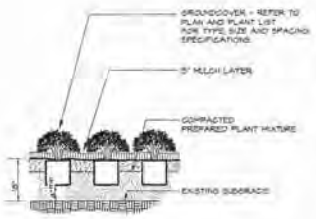
0 50' 100' 200'
SCALE

Golder Associates Tampa, Florida

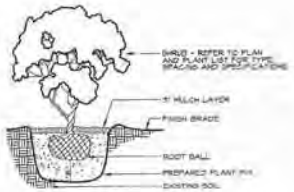
Noise Monitoring Locations

Client / Project: Calpine Construction Finance Copany, L.P. Osprey Energy Center	CAD BY: CDT	SCALE: 1"=200'	Job No. 993-9570
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	REV BY: -	FILE No.: fig2_3_8-1.dwg	

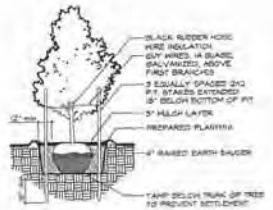
17300 S



GROUNDCOVER PLANTING DETAIL



SHRUB PLANTING DETAIL



TREE PLANTING DETAIL

PLANT LIST

QT.	COMMON NAME	SCIENTIFIC NAME	REMARKS
44	BALD CYPRESS	TAXODIUM DISTICHUM	6' HT, 1.5" CAL.
40	LIVE OAK	QUERCUS VIRGINIANA	6' HT, 1.5" CAL.
112	SHUMARD OAK	QUERCUS SHUMARDII	6' HT, 1.5" CAL.
10	DAHOON HOLLY	ILEX CASSINE	6' HT, 1.5" CAL.
79	LONG LEAF PINE	PINUS PALUSTRIS	6' HT, 1.5" CAL.
8	WAX MYRTLE	MYRICA CERIFERA	25 GAL. 20' OC
9	T.P. LIGUSTRUM	LIGUSTRUM JAPONICUM	25 GAL. 12' OC
570	FLORIDA ANISE	ILLICIUM FLORIDANUM	SPACE 3' OC.
544	VIBURNUM	VIBURNUM OBOVATUM	SPACE 3' OC.
50	OLEANDER	NERIUM OLEANDER	3 GAL. 6' HT MIN SPACE 2.5' OC
138	IND. HAWTHORNE	RAPHIOLEPIS INDICA	5 GAL. 4' HT MIN SPACE 2.5' OC
24	DW. YAUPON HOLLY	ILEX VOMITORIA 'NANA'	3 GAL. 4' HT MIN SPACE 2.5' OC
480	EVERGREEN GIANT LIRIOPE	LIRIOPE EVERGREEN GIANT'	1 GAL. SPACE 15" OC
28,476 SQ		PINE STRAW MULCH	3" THICK
40,000 SY		HYDROSEED	

LANDSCAPE CALCULATIONS

LOT TREE CALCULATION FOR NON-RESIDENTIAL
ONE TREE PER 3,000 SQUARE FEET
LOT SIZE = 19.5 ACRES (849,420 SF)
TOTAL NUMBER OF TREES REQUIRED = 284
TOTAL NUMBER OF NEW TREES = 285

SHADE TREES REQUIRED
60% OF 362 = 171
SHADE TREES PROVIDED = 286

PERIMETER STRIP SEPERATING VEHICULAR USE FROM RIGHT-OF-WAY:
TREE CALCULATION
ONE TREE PER 50 LINEAL FEET
PERIMETER LENGTH ON NORTH SIDE = 140 LF
TOTAL NUMBER OF TREES REQUIRED = 1
TOTAL NUMBER OF TREES PROVIDED = 1

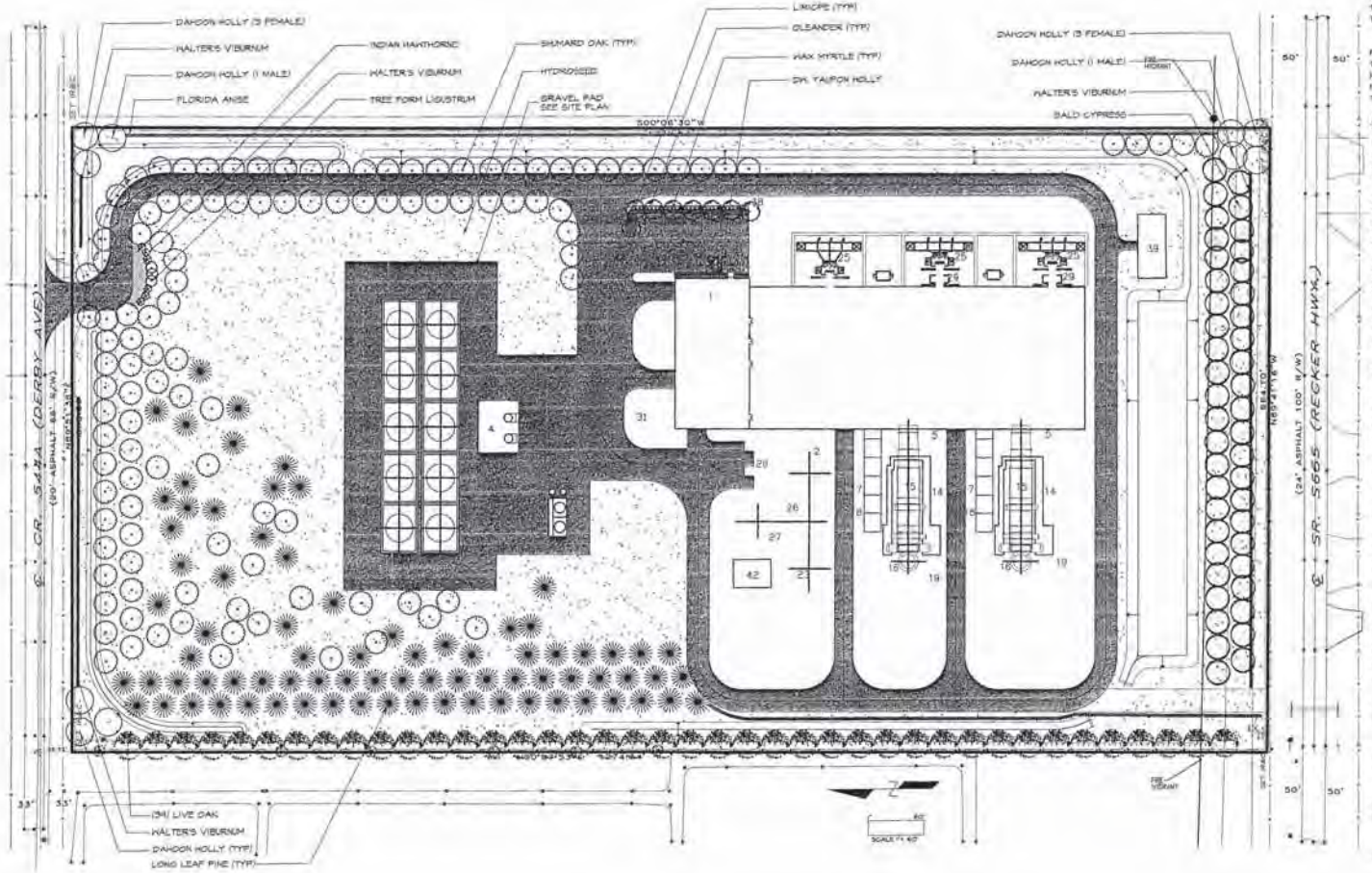
PERIMETER LENGTH ON SOUTH SIDE = 580 LF
TOTAL NUMBER OF TREES REQUIRED = 20
TOTAL NUMBER OF TREES PROVIDED = 24

HEDGE REQUIREMENT
MINIMUM OF 48" HIGH FROM GROUND TO TOP OF PLANT
SPACING 18-36" ON CENTER.
SPACING PROVIDED ON PLAN IS 30" ON CENTER.

PERIMETER STRIP SEPERATING VEHICULAR USE FROM T-E INTERIOR LOT LINE OF AN ABUTTING PROPERTY
TREE CALCULATION
ONE TREE PER 50 LINEAL FEET

PERIMETER LENGTH ON EAST SIDE = 1,070 LF
TOTAL NUMBER OF TREES REQUIRED = 21
TOTAL NUMBER OF TREES PROVIDED = 21

PERIMETER LENGTH ON WEST SIDE = 460 LF
TOTAL NUMBER OF TREES REQUIRED = 16
NUMBER OF NEW TREES = 16
NUMBER OF EXISTING TREES = 0
TOTAL NUMBER OF TREES PROVIDED = 16



LANDSCAPE NOTES

1. PLANT MATERIAL SHALL BE FLORIDA NUMBER 1 GRADE AS OUTLINED IN "GRADES AND STANDARDS FOR NURSERY PLANTS", LATEST EDITION, PUBLISHED BY THE FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES.

2. EXISTING SITE CONDITIONS MAY DICTATE AN ADJUSTMENT OF THE LANDSCAPE PLAN. IF SUCH CONDITIONS OCCUR, PRIOR TO MAKING ANY CHANGES, THE CONTRACTOR SHALL PROMPTLY NOTIFY THE OWNER FOR DIRECTION AND APPROVAL OF PROPOSED MODIFICATIONS.

3. PLANT SUBSTITUTIONS WILL BE PERMITTED ONLY UPON SUBMISSION OF SUFFICIENT PROOF THAT THE SPECIFIED PLANTS ARE NOT ATTAINABLE AND UPON THE CONSENSUS OF THE OWNER.

4. PLANT QUANTITIES IDENTIFIED ON THE PLANT LIST ARE FOR REFERENCE ONLY. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING PLANTS SPACED AS SPECIFIED ON THE PLANT LIST AND IN SUFFICIENT QUANTITIES TO FULFILL THE DESIGN INTENT.

5. WHERE TREE CALIPER, HEIGHT, AND/OR SPREAD IS SPECIFIED, ALL ARE MINIMUM.

6. FERTILIZER TABLETS, SOIL CONDITIONING AGENTS (SUCH AS TERRA SORB) AND MYCORHIZAE BIOSTIMULANTS SHALL BE ADDED TO THE PLANTING AREA ACCORDING TO THE MANUFACTURER'S RECOMMENDATION.

7. ENSURE THE PLANTING AREA DRAINS PROPERLY BEFORE INSTALLING PLANT MATERIAL. IMMEDIATELY NOTIFY THE ENGINEER OF ANY DRAINAGE OR PERCOLATION PROBLEMS BEFORE INSTALLING PLANT MATERIAL.

8. THE CONTRACTOR SHALL FULLY ACQUAINT HIMSELF WITH THE RELATED PAVING, GRADING, AND UTILITY WORK TO PRECLUDE ANY MISUNDERSTANDING AND UNFORSEEN PROBLEMS. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE WATER AND/OR ELECTRICITY REQUIRED TO COMPLETE THE MAINTAIN THE HEALTH AND SURVIVABILITY OF THE PLANT WORK AND MATERIAL.

9. ALL MATERIALS AND EQUIPMENT SHALL BE INSTALLED IN A PROFESSIONAL MANNER IN ACCORDANCE WITH THE BEST RECOGNIZED PRACTICE OF THE TRADE. THE OWNER AND/OR LANDSCAPE ARCHITECT RESERVES THE RIGHT TO DIRECT THE REMOVAL AND REPLACEMENT OF ANY ITEMS DUE TO DEFECTIVE MATERIALS, EQUIPMENT OR WORKMANSHIP PRIOR TO FINAL COMPLETION AND ACCEPTANCE OF THE WORK.

10. THE EXACT LOCATION OF UTILITIES SHALL BE DETERMINED ON SITE. THE APPROPRIATE UTILITY COMPANIES SHALL BE NOTIFIED 48 HOURS IN ADVANCE OF ANY EXCAVATION.

11. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ANY AND ALL PERMITS REQUIRED FOR LANDSCAPE CONSTRUCTION AS REQUIRED BY LOCAL OR STATE GOVERNMENTS.

12. THE CONTRACTOR SHALL GUARANTEE THE HEALTH AND VIGOR OF PLANT MATERIAL FOR A MINIMUM OF 90 DAYS. PLANT MATERIAL THAT DOES NOT MEET REQUIREMENTS AS DESCRIBED IN NOTE 1 SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

13. CONTRACTOR SHALL PROVIDE IRRIGATION PLAN ACCORDING TO LOCAL IRRIGATION DESIGN STANDARDS.

RS&H
Architectural, Engineering, Planning and Environmental Services
Reynolds, Smith and Hills, Inc.
1715 North Westshore Blvd., Suite 500
Tampa, Florida 33607
813-289-5550 FAX 813-289-0262
www.rsandh.com
FL Cert No. AAC001985 - EB0005820 - LCC0002161

Golder Associates

OSPREY ENERGY CENTER

REVISIONS

NO.	DESCRIPTION	DATE

DATE ISSUED: 1/4/00
REVIEWED BY: RS
DRAWN BY: DMZ
DESIGNED BY: DMZ

AEP PROJECT NUMBER
104-0694-001

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SHEET TITLE

LANDSCAPE PLAN

SHEET NUMBER

L1.1

3.0 THE PLANT AND DIRECTLY ASSOCIATED FACILITIES

3.1 BACKGROUND

This chapter provides a description of the Osprey Energy Center, including the overall Site layout, key components of the facility and their operation, and proposed controls for air emissions and water discharges. Fuel specifications are provided for pipeline natural gas. Estimates of the expected character, quality, and quantity of discharges and emissions from the facility are provided, based on the current available engineering and design information.

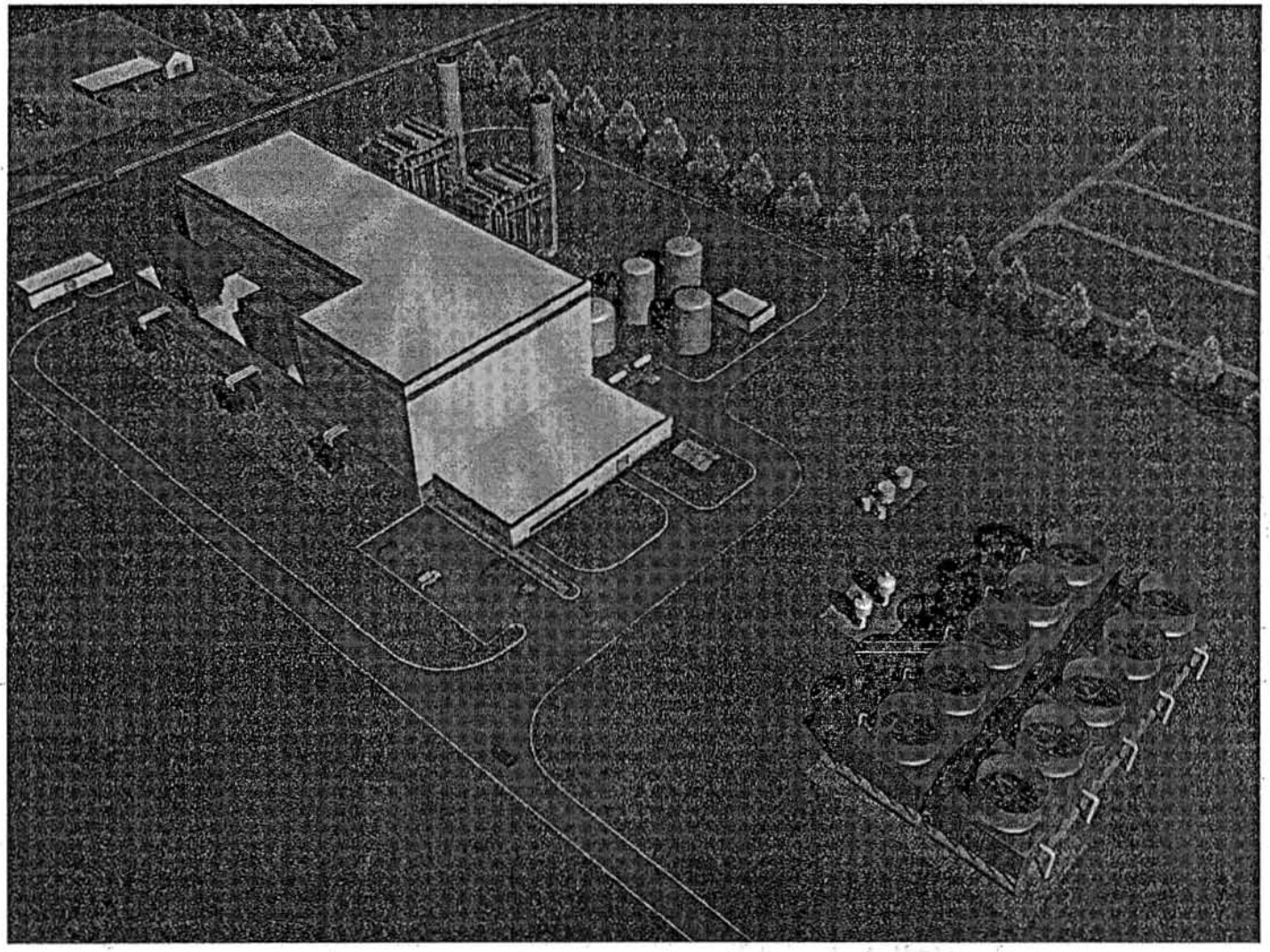
Location of the new facility at the Auburndale Site and selection of the combined-cycle technology will maximize the beneficial use of the Site while minimizing environmental, land use, and cost impacts. The Project will tie into a number of existing facilities, including potable water, reclaimed water and wastewater pipelines, a paved road, and Tampa Electric Company's Recker Substation, which has 230-kV transmission lines adjacent to the Site.

The Osprey Energy Center will consist of a 527-MW combined-cycle power plant and directly associated facilities. The Project will include two 170-MW Westinghouse "F" Class combustion turbines (CTs) and associated triple pressure heat recovery steam generators (HRSGs). The CTs will be equipped with dry low-nitrogen oxides (DLN) combustors to reduce nitrogen oxides (NO_x) emissions from the CTs. The HRSGs will be equipped with Selective Catalytic Reduction (SCR) systems to reduce further NO_x emissions. The CT units will have a combined generating capacity of 340-MW (net), when operating under average ambient conditions (74°F), excluding power augmentation. The HRSGs will supply steam to a steam turbine electric generator, which will have a nominal generating capacity of 200-MW under average ambient conditions, excluding duct-firing. The facility will have a total generating capacity of 527-MW (average ambient). The facility will be fired exclusively with natural gas and will only be operated in a combined-cycle mode.

The facility will use what is commonly referred to as a "2 by 1" combined-cycle configuration (**Figure 3.1.0-1**). A schematic of the facility is shown in **Figure 3.1.0-2.** The facility will use duct burners, located in the HRSGs, to increase the steam supply for the steam cycle and the power output of the unit. By utilizing both the energy produced by the CTs

IMAGE QUALITY

AS YOU REVIEW THE NEXT FEW PAGES, PLEASE NOTE THAT THE ORIGINAL DOCUMENT WAS OF POOR QUALITY.



3-2

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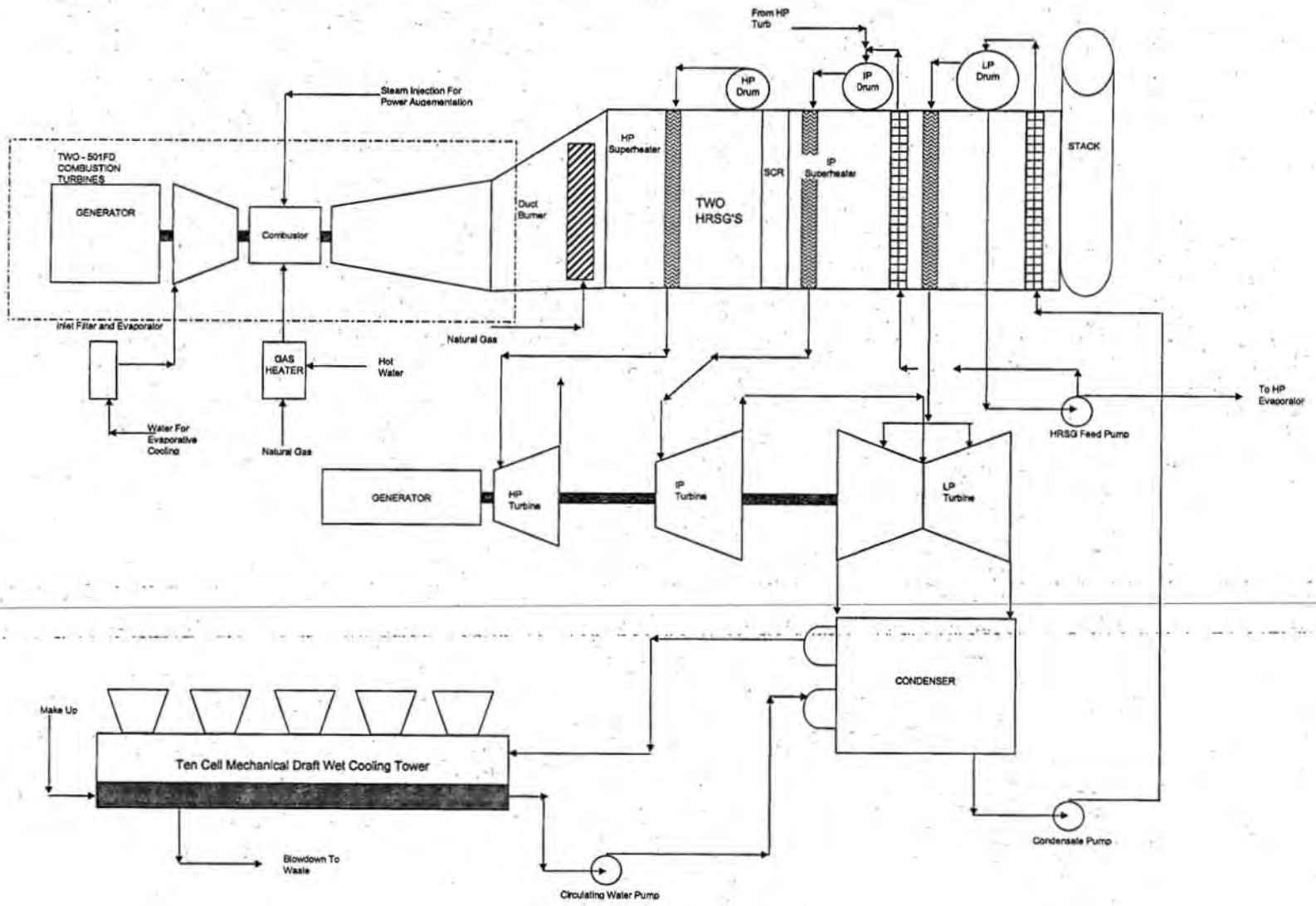
Tampa, Florida

Project Rendering

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	NTS	Job No.	993-9570
CHK BY:	RAZ	DATE:	03/04/00	FIGURE	3.1.0–1
REV BY:	–	FILE No.:	fig3_1_0-1.dwg		



3-3

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Tampa, Florida

Cycle Schematic

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: NTS	Job No. 993-9570
CHK BY: RAZ	DATE: 03/07/00	FIGURE 3.1.0-2
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and the exhaust heat from the CTs, the combined-cycle facility will be more efficient than either simple cycle CTs or existing steam cycle power plants.

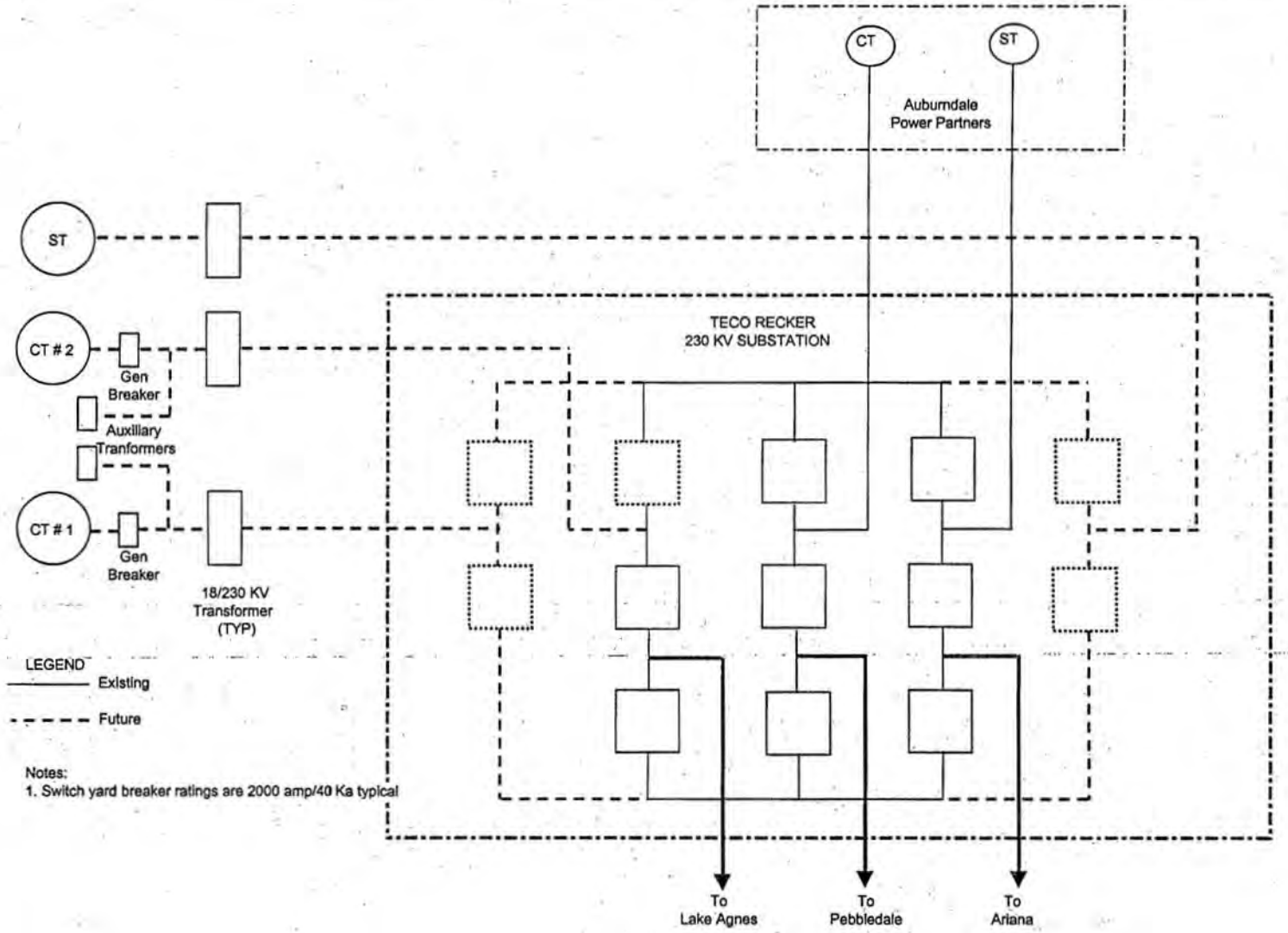
Plant output will vary in response to changes in ambient temperatures. The plant's output also will depend on whether the facility is duct-firing or power augmenting (injecting steam into the CT).

The DLN combustor designed for the "F" CTs consists of premixed fuel zones plus a standard diffusion flame pilot burner for flame stability. Low NO_x levels are achieved by introducing fuel primarily to the premix zones and reducing the amount of fuel being combusted from the pilot nozzle. Power augmentation, in which steam is injected into the CT, will be used to boost electrical output. Steam injection for power augmentation is different than using steam injection in the combustion zone for NO_x control. In addition to power augmentation, the turbine inlet will be equipped with an evaporative cooling system to reduce the inlet air temperature. This cooling of inlet air also increases the power and output of the CTs.

Other on-site facilities to be constructed as part of the Osprey Energy Center include the power block building containing the CTs and the steam turbine, a water treatment and storage system, and administration, storage, and warehouse/service areas. Both the CTs and the steam turbine will be enclosed.

The Osprey Energy Center will be connected to Florida's electric power grid by interconnection with the existing Tampa Electric Company's Recker Substation, which is located immediately to the east of the southern portion of the Project Site. Tampa Electric Company will modify the substation to accommodate the plant, at Calpine's expense. The substation will be owned and operated by Tampa Electric Company. The main electrical one line is shown in **Figure 3.1.0-3.**

Natural gas will be transported to the Site via pipeline. The off-site pipeline will be designed, permitted, constructed, owned and operated by "Gulfstream Natural Gas Transmission System," a joint venture between American Natural Resources (ANR) and Coastal Corporation. The on-site facilities will include a gas metering/regulating station and short fuel supply line to the power block.



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Station One Line

lient / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	NTS	Job No.	993-9570
CHK BY:	RAZ	DATE:	03/07/00	FIGURE	3.1.0-3
REV BY:	–	FILE No.:	fig3_1_0-3.dwg		

Primary water uses for the Osprey Energy Center will be for condenser cooling, evaporative cooling and process water. Process water and make-up water will be obtained from an existing municipal wastewater treatment plant (i.e., highly disinfected reclaimed water) and new on-site wells. The Project will make use of all of the reclaimed water that is available from Auburndale's Allred Wastewater Treatment Plant, which is located on Recker Highway southeast of the Site.

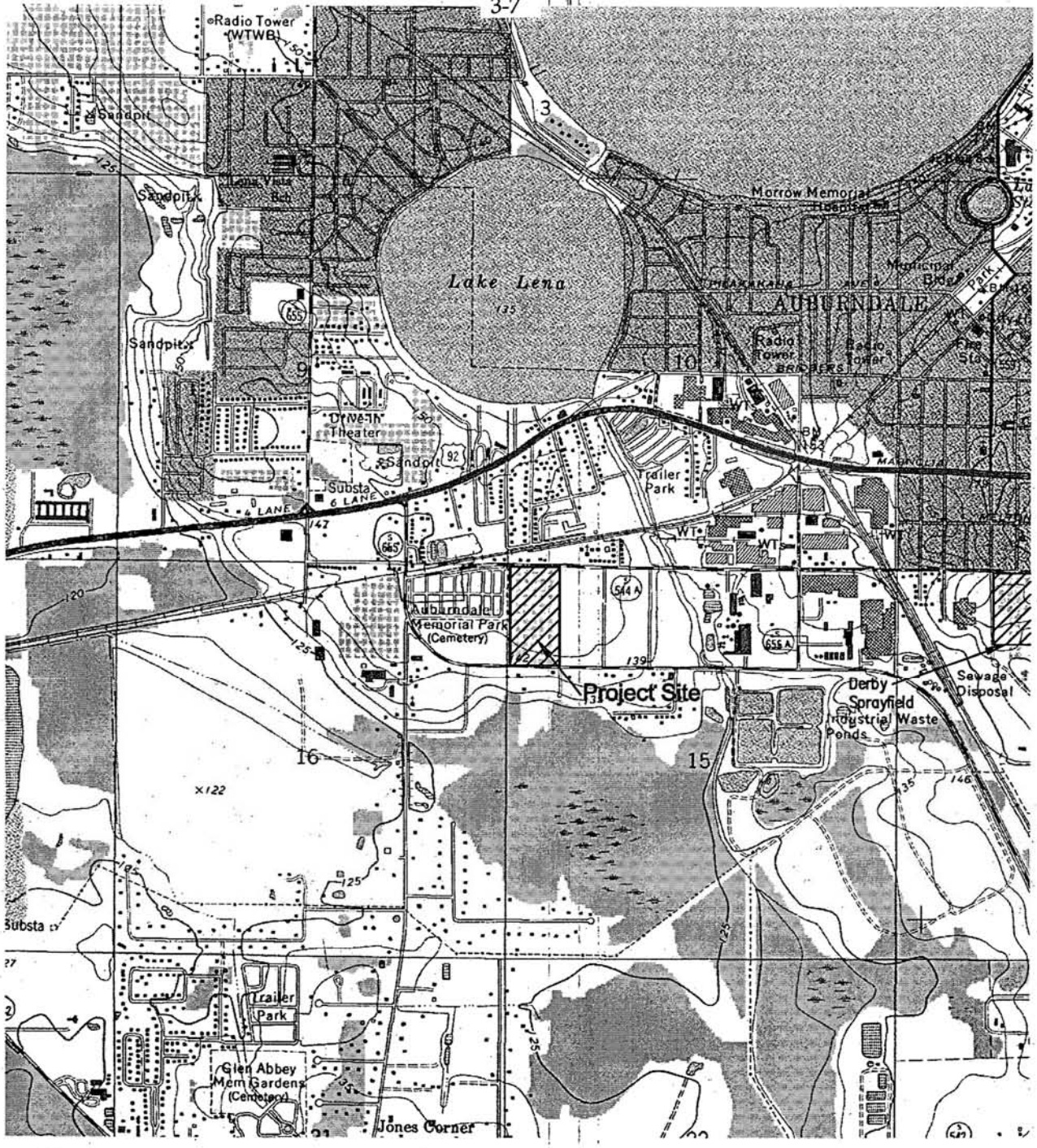
Air emissions controls will consist of state-of-the-art DLN combustors in the CTs and SCR in the HRSG to further control NO_x. This design maximizes the control of air emissions while minimizing economic, environmental, and energy impacts [see Section 3.4 for a description of the control technology and the analysis of Best Available Control Technology (BACT)].

Non-contact stormwater runoff will be collected and routed to two stormwater detention ponds which will be designed to meet Southwest Florida Water Management District (SWFWMD) requirements (see Section 3.8 and **Appendix 10.11.1**). The facility has been designed to eliminate direct discharges to surface waters. Wastewaters, including process water, pretreatment backwash, sanitary treatment system wastewater, plant and equipment drains, and neutralization unit effluent, will be treated as appropriate and discharged to the existing City of Auburndale municipal wastewater treatment system. The Osprey Energy Center will also tie into the municipal water supply system for potable and fire protection needs.

3.2 SITE LAYOUT

The Osprey Energy Center will be located on a 19.5-acre Site (see **Figure 3.2.0-1**). The power block (CTs, HRSGs, steam turbine and associated facilities) will be located on approximately 7-acres of the southern portion of the Site (see **Figure 3.2.0-2**). This area has already been affected by the prior use of the Site as a citrus grove. The facilities and their approximate areas are:

Power Block and Buildings	7-acres
Transformer Area	4-acres
Site Runoff Detention Ponds	2-acres
Buffer	4-acres
Miscellaneous (e.g., new site roads)	2-acres
Total Land Area Requirement:	**19-acres**
Off-site Construction Laydown and Parking	10-acres



LEGEND

PROJECT SITE

N

0 1000' 2000'

1"=2000'

REFERENCE

USGS 7.5 Minute Topographical Quadrangle, Auburndale, Florida

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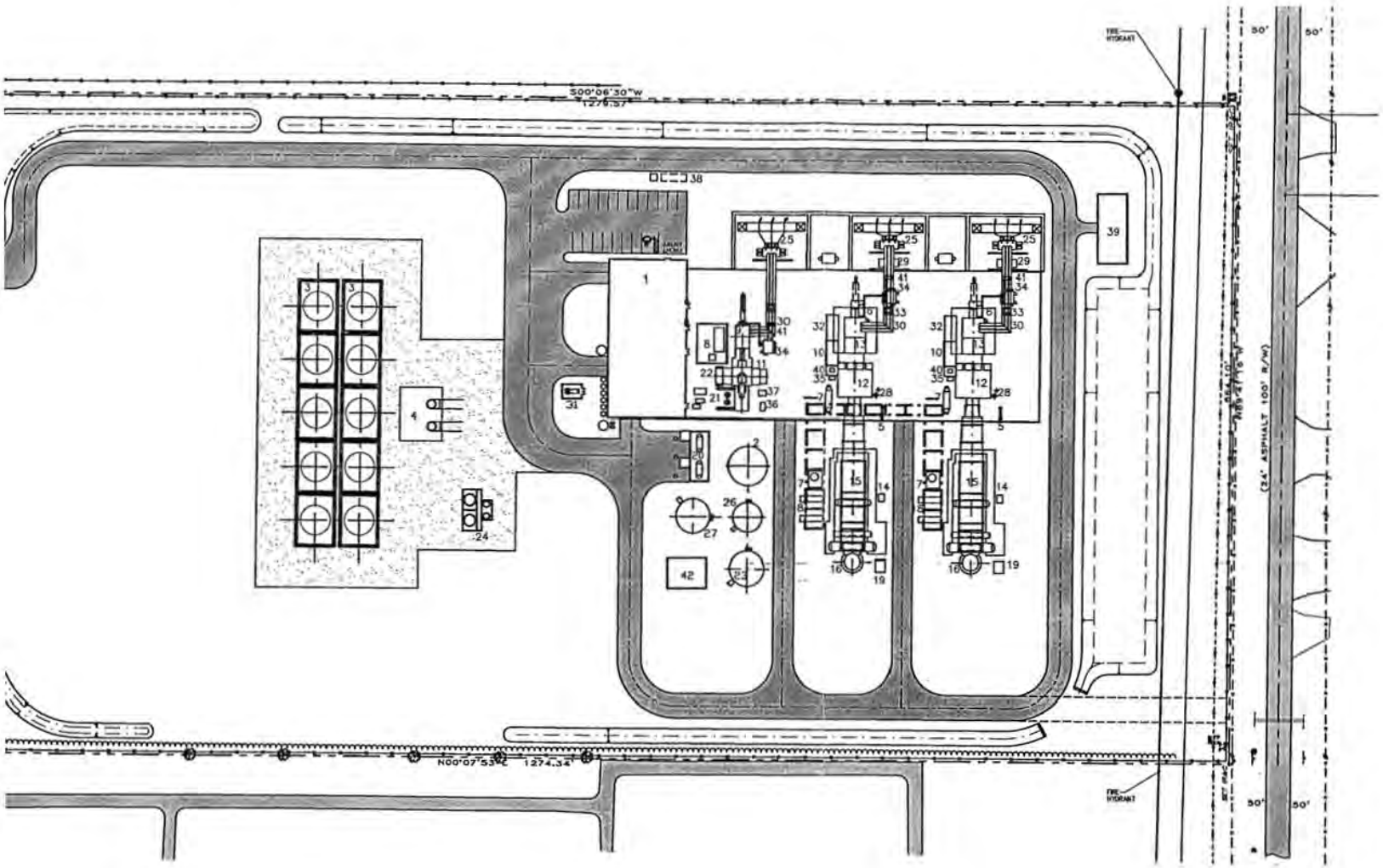
Tampa, Florida

Project Site

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: 1"=2000'	Job No. 993-9570
CHK BY: RAZ	DATE: 02/03/00	FIGURE 3.2.0-1
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Legend

1. ADMINISTRATION AND MAINTEN
2. SERVICE WATER TANK
3. COOLING TOWER
4. CIRCULATING WATER PUMPS
5. FUEL GAS HEATER
6. COMBUSTION TURBINE AIR INLE
7. KETTLE BOILER
8. LUBE OIL SKID
9. ST GENERATOR
10. CT MECHANICAL PACKAGE
11. STEAM TURBINE
12. COMBUSTION TURBINE
13. CT GENERATOR
14. AMMONIA INJECTION SKID
15. HEAT RECOVERY STEAM GENER
16. HRSG STACK
17. HRSG BLOWDOWN TANK
18. BOILER FEED PUMP HOUSE
19. CEMS
20. AMMONIA STORAGE TANKS
21. CONDENSATE PUMPS
22. CONDENSER
23. DEMINERALIZED WATER STORAG
24. WET SURFACE AIR COOLER
25. GENERATOR STEP-UP TRANSF
26. WASTEWATER TANK
27. RAW WATER STORAGE TANK
28. FUEL GAS SCRUBBER
29. UNIT AUX. TRANSFORMER
30. ISO-PHASE BUS DUCT
31. STANDBY GENERATOR
32. ELECTRICAL EQUIPMENT PACKA
33. GENERATOR VT & SURGE CUBI
34. GENERATOR EXCITATION SKID
35. COMPRESSOR WATER WASH SK
36. STEAM JET AIR EJECTORS
37. GLAND STEAM CONDENSER
38. OIL/WATER SEPARATOR
39. GAS METER BUILDING
40. HYDRAULIC SKID
41. EXCITATION TRANSFORMER
42. CENTRAL PUMP HOUSE

N

120' 0 120

scale feet

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Site Plan

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE: 1"=120'	Job
CHK BY:	RAZ	DATE: 03/08/00	FIGUI
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The buffer area will be used for construction laydown and parking initially and then will be used as a buffer when the facility is operational. A parcel of land near the Site will be leased for additional off-site construction laydown and parking, as required. A profile of the facilities is shown in **Figure 3.2.0-3**, with preliminary dimensions presented in **Table 3.2.0-1**. The profile shows the stacks associated with HRSGs.

The site layout was developed in a manner that integrates the Project components with the adjacent infrastructure, including Tampa Electric Company's Recker Substation and 230-kV transmission lines, the natural gas lateral from Gulfstream, and other utility pipelines. The site layout was influenced by planned access to Derby Avenue and adjacent land use considerations. A landscape plan (**Appendix 10.12**) has been developed to establish visual and open space buffers between the Project and Derby Road, Recker Highway, and the cemetery.

Site non-contact stormwater runoff will be collected in two on-site detention ponds. Non-contact stormwater from the two detention ponds will be released off-site to right-of-way drainage swales (**Figure 3.2.0-4**). The southern swale eventually flows to a natural system, which discharges into Lake Lena Run. The northern swale flows directly into Lake Lena Run. Stormwater discharge from the Site will be infrequent (i.e., only during storm events greater than the 10-year, 24-hour storm) and post development runoff will not exceed predevelopment runoff. No other point source water discharges will be located at the Site.

3.3 FUEL

The fuel used by the CTs will be natural gas, delivered to the plant by pipeline. Typical properties of pipeline-grade natural gas are shown in **Table 3.3.0-1**. The heat content is approximately 21,000 British thermal units per pound (Btu/lb) [low heating value (LHV)] with a typical sulfur content of 0.2 grains per 100 standard cubic feet (gr/100 scf) of gas.

The fuel usage and concomitant generating capacity of a combined-cycle plant is affected by ambient temperature, with increased temperature resulting in less electric production. Greater

Table 3.2.0-1. Dimensions of Major Plant Facilities for the Osprey Energy Center

Facility	Elevation[a] (ft)	Length (ft)	Width (ft)
Environmental Enclosure for CT and Steam Turbine	96	358	150
Inlet Air Filter	86	44	N/A
HRSG Stack	135	19[b]	N/A
HRSG	88	90	24
Service/Fire Water Tank	40	40[b]	N/A
Demineralizer Tank	32	35[b]	N/A
Service Building Warehouse Machine Shop	32	160	80
Water Treatment Building Circulating Water Pump Area	15	30	20

[a] Above ground surface
[b] Diameter

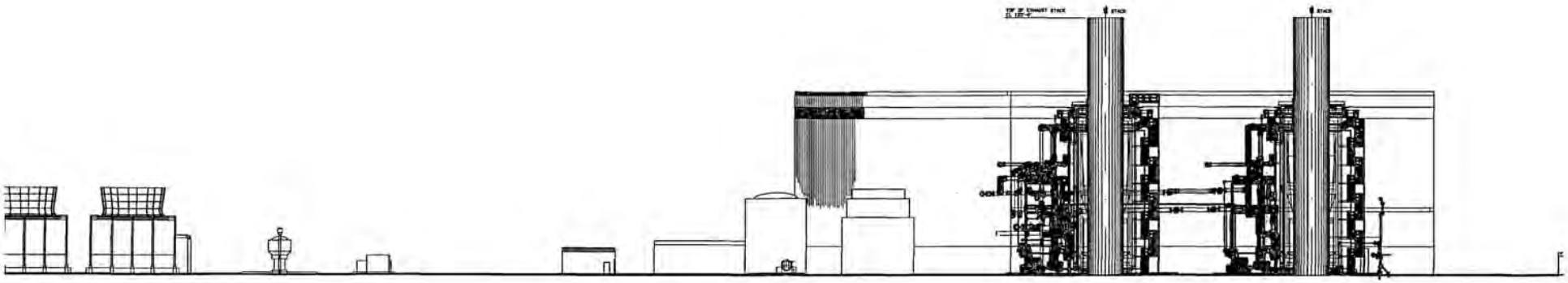
Source: Calpine Corporation, 2000.

Table 3.3.0-1. Natural Gas Specifications for Turbine Performance and Typical Values

Compound	Turbine Specification (Percent by Volume)	Typical Percent by Volume
Methane (CH_4)	98.0	95.873
Ethane (C_2H_6)	0.6	2.579
Propane (C_3H_8)	--	0.161
Butane (C_4H_{10})	--	0.017
Pentane (C_5H_{12})	--	0.007
Hexane (C_6H_{14})	--	0.027
Carbon dioxide (CO_2)	--	0.883
Nitrogen (N_2)	1.4	0.453
Total Sulfur (S)	0.2 [a]	2 gr/100 scf [b]
Water Vapor (H_2O)	--	0.6 lb/MMscf

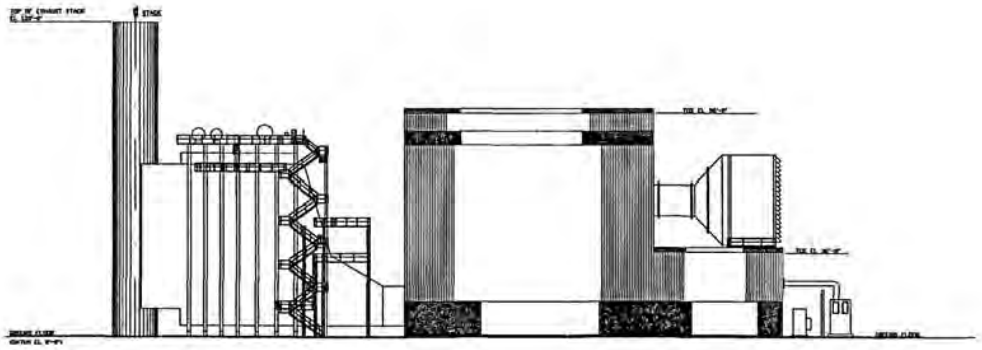
HHV = 23,299 Btu/lb = 1,021 Btu/scf (60°F @ 14.7 psi)
LHV = 20,981 Btu/lb = 920 Btu/scf (60°F @ 14.7 psi)

[a] H_2S only
[b] Typical maximum for total sulfur



Profile of Site Looking East

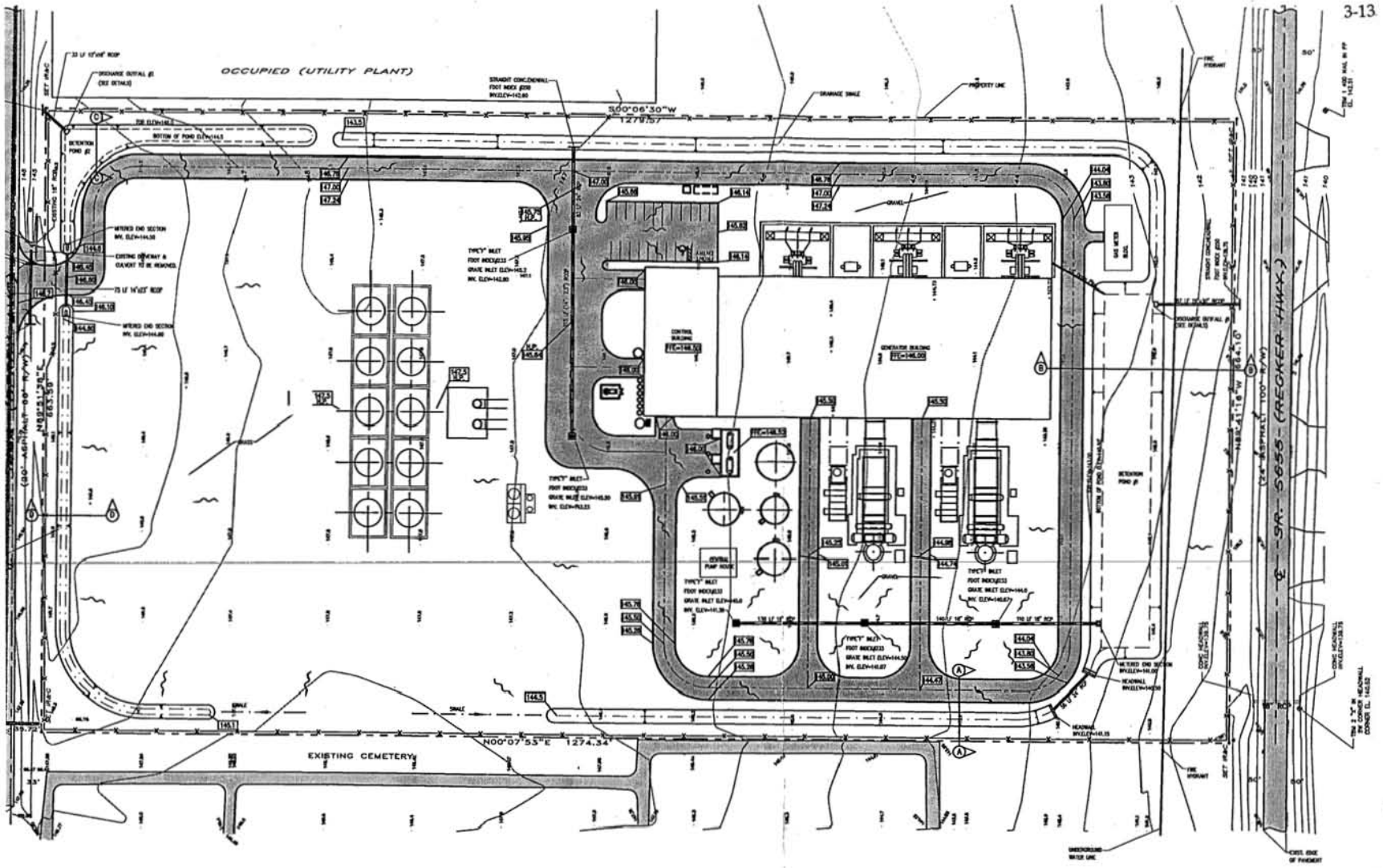
Scale: 1"=60'



Profile of Site Looking North

Scale: 1"=60'

Golder Associates Tampa, Florida		Site Profile	
Client / Project: Calpine Construction Finance Company, L.P. Osprey Energy Center	CAD BY: CDT	SCALE: 1"=60'	Job
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Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

Drainage Plan

CAD BY:	JPE	SCALE:	1"=120'
CHK BY:	RAZ	DATE:	03/08/00
REV BY:	–	FILE No.:	fig3_2_0-4.dwg

overall fuel consumption and power output will occur at lower ambient temperatures. The design temperature range is a maximum of 95°F and a minimum of 32°F, with an annual average of 74°F. For determining conservative estimates of annual fuel consumption and average air emissions, an inlet temperature of 59°F and 60-percent relative humidity has been assumed.

Each combustion turbine will be provided with an inlet air cooling system that uses a "fogging" technique. The cooling system will use atomized water to create a fog in an evaporative system to achieve adiabatic cooling. The water vapor is produced by injection grids placed in the turbine inlet duct and water nozzles distribute the water vapor over the inlet area of the turbine duct. The evaporative cooler extracts the latent heat from the gas stream by mixing the water with the air. The result is a cooler, more dense (higher mass flow), and more moisture-laden air stream that increases both combustion turbine generation (CTG) and combined-cycle power output. The use of this type of fogging system does not produce blowdown wastewater, sometimes associated with other evaporative cooling systems.

The amount of inlet air temperature reduction is highly dependent upon the ambient air conditions. The two most important parameters are the dry bulb temperature and the relative humidity. As moisture is added to the inlet air, the vaporization of the water cools the air toward the wet-bulb temperature. For the proposed Project, the design condition is 95°F and 60-percent relative humidity, with a cooler efficiency of 85-percent. The resultant CT inlet temperature is 85° F. At 92-percent saturation, the inlet cooling system would result in about a 10° F decrease of the turbine inlet air.

For calculating maximum hourly fuel use quantities, the following operating conditions for the CTs were used:

1. 32° F dry-bulb ambient temperature,
2. 60-percent relative humidity,
3. 140 feet above mean sea level (ft-msl) elevation, and
4. 20,981 Btu/lb heating value (LHV) of natural gas.

The duct burners will be operated for an equivalent of 2,880 hours at the maximum heat input, which is equivalent to 782 x 10^{-6} cf/yr of natural gas. The CTs will be connected on site with a new natural gas lateral constructed to the Site from the proposed Gulfstream Natural Gas System.

3.4 AIR EMISSIONS CONTROLS

3.4.1 AIR EMISSIONS TYPES AND SOURCES

The combustion turbine emissions are controlled via the utilization of dry low-NO_x combustors (DLN), selective catalytic reduction (SCR), and clean natural gas as fuel. The DLN combustion system consists of 16 can-annular combustors. Each combustor has four fuel stages to provide fuel-to-air ratio control from initial engine ignition to full load operation. A pilot, which stays lit over the entire operating range, burns in diffusion mode and provides flame stability. The remaining burners are full premix. A compressor discharge bypass valve is also provided to control the fuel-to-air ratio at low loads. Compressor discharge air is bypassed around the combustors via modulation of the valve at low loads to maintain low NO_x levels.

The pilot and premix burner in stage 1, in conjunction with the discharge bypass valve, provide fuel-to-air ratio control from engine ignition to approximately 50-percent load levels. At approximately 50-percent load, premix burner stage 2 fires. Above 90-percent load, premix burner stage 3 is brought on-line. At full load, the pilot fuel flow (fourth fuel stage) is reduced to minimize NO_x production from this diffusion flame.

The fuel staging, with the combination of diffusion pilot and lean premix burners, provides good flame stability at low NO_x levels. The utilization of the compressor discharge bypass valve further enhances fuel-to-air control, promoting flame stability at low loads while maintaining low NO_x emissions. NO_x emission levels out of the combustion turbine can be controlled to 25 ppmvd at 15-percent oxygen (O_2) over the anticipated operating range of 60- to 100-percent CT loads.

In addition, each of the HRSGs will be supplementary fired by a duct burner. Each duct burner will have a maximum heat input rate of 250 mmBtu/hr and be fired exclusively by natural gas. The design of the duct burners is based on low NO_x emission combustor technology. The duct

burners will be used when the Project is operating at or near baseload conditions. For permitting purposes, the duct burners are assumed to operate for 2,880 hours per year.

Stack NO_x levels are further reduced via the SCR system located in the HRSG. SCR is a post-combustion process where NO_x in the gas stream is reacted with ammonia in the presence of a catalyst to form nitrogen and water. The SCR catalyst beds are extruded ceramic moldings composed of inorganic oxides. The reaction occurs typically between 600°F and 750°F, which has limited SCR application to combined-cycle units where such temperatures occur in the HRSG. SCR has been installed and operated on combined-cycle facilities to achieve 9 ppmvd NO_x (corrected to 15-percent O_2) or less while burning natural gas. The SCR systems installed for the Osprey Energy Center will achieve a maximum NO_x emission concentration of 4.0 ppmvd (corrected to 15-percent O_2) under all operating conditions, including duct firing (except startup, shutdown and malfunctions). The ammonia used in the SCR system will be aqueous ammonia with 19-percent ammonia in water. This aqueous ammonia will be stored in receiving tanks located adjacent to the HRSGs. There will be one, approximately 10,000 gallon storage tank for each HRSG. These tanks will be located within containment dikes. The storage capacity of the tanks will require them to be refilled approximately twice a month.

Air emissions resulting from products of incomplete combustion [i.e., particulate matter (PM), carbon monoxide (CO) and volatile organic compounds (VOC)] will also result from the combustion process using the DLN combustors. Natural gas has very low concentrations of impurities such as ash and sulfur that generate particulate air emissions.

Table 3.4.1-1 presents the stack, operating, and emission rates of regulated pollutants for each combustion turbine. The maximum estimated emission rates were determined using the manufacturer's information for the equipment proposed for the Osprey Energy Center. The design parameters were provided for operating loads of 100-percent (base load), 75-percent, and 60-percent capacity and for three turbine inlet temperatures (32°F, 59°F, and 95°F). A mix of load capacity factors and operating temperatures were examined in order to determine the worst case or conservative estimate of yearly emissions. These temperatures represent the range of ambient temperatures that the CTs are most likely to experience. Air dispersion modeling used this range of temperatures for the range of operating loads. Maximum annual emissions were

Table 3.4.1-1. Stack, Operating, and Emission Data for the Combustion Turbines/HRSG and Duct Burners
Osprey Energy Center

		Operating and Emission Data [a] for Ambient Temperarure				
		Combustion Turbine/ HRSG				CT/ HRSG/ Duct Burner
					Power Augmentation	Power Augmentation
Parameter		32 °F	59 °F	95 °F	95 °F	95 °F
Stack Data (ft)						
Height		135	135	135	135	135
Diameter		19	19	19	19	19
100 Percent Load						
Operating Data						
Temperature (°F)		200	200	200	200	200
Velocity (ft/sec)		62.9	60.0	55.2	59.7	60.0
Maximum Hourly Emissions per Unit [b]						
SO_2	lb/hr	11.0	10.4	9.4	10.4	12.0
PM/PM_{10}	lb/hr	22.3	21.1	19.0	19.8	22.8
NO_x	lb/hr	29.5	27.7	25.2	27.9	31.4
CO	lb/hr	45.0	43.0	39.0	106.0	139.3
VOC (as methane)	lb/hr	5.8	5.4	4.9	5.5	12.4
Sulfuric Acid Mist	lb/hr	1.69	1.59	1.44	1.59	1.83
Mercury	lb/hr	1.57E-06	1.48E-06	1.35E-06	1.49E-06	1.71E-06
75 Percent Load						
Operating Data						
Temperature (°F)		200	200	200	-	-
Velocity (ft/sec)		54.8	52.8	50.2	-	-
Maximum Hourly Emissions per Unit [b]						
SO_2	lb/hr	8.6	8.1	7.6	-	-
PM/PM_{10}	lb/hr	19.0	18.2	16.9	-	-
NO_x	lb/hr	22.9	21.7	20.2	-	-
CO	lb/hr	35.0	33.0	31.0	-	-
VOC (as methane)	lb/hr	8.4	7.9	7.4	-	-
Sulfuric Acid Mist	lb/hr	1.31	1.25	1.16	-	-
Mercury	lb/hr	1.23E-06	1.16E-06	1.08E-06	-	-
60 Percent Load						
Operating Data						
Temperature (°F)		200	200	200	-	-
Velocity (ft/sec)		45.9	44.5	42.5	-	-
Maximum Hourly Emissions per Unit [b]						
SO_2	lb/hr	7.4	7.2	6.5	-	-
PM/PM_{10}	lb/hr	16.0	15.4	14.3	-	-
NO_x	lb/hr	19.9	19.1	17.4	-	-
CO	lb/hr	152.0	146.0	133.0	-	-
VOC (as methane)	lb/hr	7.3	7.0	6.3	-	-
Sulfuric Acid Mist	lb/hr	1.14	1.10	1.00	-	-
Mercury	lb/hr	1.07E-06	1.02E-06	9.30E-07	-	-

[a] Refer to Appendix 10.1.5 for detailed information. Data at 100% load and duct firing for 95 °F are based on power augmentation with evaporative cooler on and operating at 95 percent efficiency. With evaporative cooler not operating, emissions are lower. Duct firing is assumed for 100-percent operating load. No duct firing is assumed for loads less than 100-percent

[b] Other regulated pollutants are assumed to have negligible emissions. These pollutants include lead, reduced sulfur compounds, hydrogen sulfide, fluorides, beryllium, arsenic, asbestos, vinyl chloride, and radionuclides.

See Appendix 10.1.5 for basis of pollutant emission rates and operating data.

based on emissions expected for base load, 100-percent capacity factor and a turbine inlet temperatures of 59°F, which provides a conservative estimate of annual emissions for most pollutants. A mixture of loads and operating conditions were assumed for emissions of CO and VOC during low load (60-percent) operation. The prevention of significant deterioration (PSD) application (see ***Appendix 10.1.5***) presents the basis for the emission rates and maximum annual emissions of regulated and non-regulated pollutants.

During combustion, two primary types of NO_x are formed: fuel NO_x and thermal NO_x. Fuel NO_x emissions are formed through the oxidation of a portion of the nitrogen contained in the fuel. Thermal NO_x emissions are generated through the oxidation of a portion of the nitrogen contained in the combustion air. NO_x formation is typically limited by lowering combustion temperatures (through water or steam injection) and/or staging combustion (a reducing atmosphere followed by an oxidizing atmosphere, known as dry NO_x control). Emission rates for CO were established by the level of NO_x control, since DLN combustors will be used. Maximum CO emission rates for the Osprey Energy Center would be 10 parts per million by volume dry (ppmvd) corrected for 15-percent O_2 at base load operation, 25 ppmvd corrected for 15-percent O_2 under power augmentation, and 50 ppmvd corrected for 15-percent O_2 at low load operation (i.e., at 60-percent load).

Carbon monoxide is formed by incomplete combustion of fuel. High combustion temperatures, adequate excess air, and good fuel/air mixing during combustion will minimize CO formation. Carbon monoxide formation is limited by ensuring complete efficient combustion of the fuel in the turbines. Recent improvements in CT combustor technology allow for both reduced NO_x emissions and low CO emissions.

Maximum CO emission rates for the Osprey Energy center will vary based on operating conditions. At 100- to 70-percent loads, CO emissions will be 10 ppmvd corrected for 15-percent O_2. Under duct firing, the CO emissions will be 16 ppmvd corrected for 15-percent O_2. For power augmentation without duct firing, CO emissions will be 25 ppmvd corrected for 15-percent O_2. During power augmentation with duct firing, CO emissions will be no greater than 30 ppmvd corrected to 15-percent O_2. The CO emissions will be 50 ppmvd corrected for 15-percent O_2 at low load operation (i.e., at 70- to 60-percent loads).

Maximum SO_2 emission rates are dictated by the amount of sulfur in the fuel, which for natural gas is typically less than 0.2 grains of sulfur (from hydrogen sulfide) per 100 standard cubic feet (scf) or less than 0.001-percent by weight. To account for odorants put in natural gas (i.e., mercaptans), a sulfur concentration of 2 grains sulfur per 100 scf was assumed (typical gas analysis normally identifies sulfur at 1 grain per 100 scf). This sulfur concentration is conservative since in Florida, typical gas analyses have demonstrated sulfur content to be approximately 1 grain per 100 scf.

The Osprey Energy Center will also include the installation of a wet cooling tower for the condenser cooling system used for the electric steam generator. The cooling tower will be of a mechanical counterflow design. Particulate matter in the form of drift will result from the operation of the tower. The tower will be equipped with high-efficiency drift eliminators that will reduce drift to 0.002-percent of the circulating water flow rate. Since the drift may contain dissolved solids, particulate matter will be formed when the drift aerosols evaporate in the atmosphere. **Table 3.4.1-2** presents the physical, performance, and emissions data for the cooling tower proposed for the Project. For the purposes of regulatory applicability and impact analysis, it is assumed that all drift was PM and that 50-percent of the drift was PM_{10}. The latter assumption is conservative, since representative data of cooling tower particle size indicate that 50-percent of the drift is 0 to 50 micrometers (um) in diameter.

The Project will also include a 600 kW gas-fired emergency generator and a diesel fire pump. These emissions sources will normally be operated a few hours per month to ensure their reliability and during emergency conditions.

3.4.2 AIR EMISSION CONTROLS

The use of clean fuel (i.e., natural gas), combustion controls and SCR will minimize air emissions and enable compliance with applicable emission-limiting standards. Using clean fuels will minimize emissions of sulfur dioxide (SO_2), particulate matter (PM)/particulate matter with an aerodynamic diameter of 10 micrometers or less (PM_{10}), and other fuel-bound contaminants. Combustion controls and design will minimize the formation of NO_x and the formation of CO and volatile organic compounds (VOCs). An SCR system will be used to further reduce NO_x

Table 3.4.1-2. Physical, Performance, and Emissions Data for the Mechanical Draft Cooling Tower

Parameter	Values Typical[a]
Physical Data	
Number of Cells	10
Deck Dimensions, ft	
Length	270
Width	84
Height	45
Stack Dimensions	
Height, ft	55
Stack Top Effective Inner Diameter, per cell, ft	28
Effective Diameter, all cells, ft	88.5
Performance Data	
Discharge Velocity, ft/min	1,944
Circulating Water Flow Rate (CWFR), gal/min	140,000
Design hot water temperature, °F	99
Design cold water temperature, °F	80
Heat Rejected, million Btu/hr[f]	1350
Design Air Flow Rate per cell, acfm	1,197,017
Liquid/ Gas (Air Flow) (L/G) Ratio	1.349
Hours of operation	8,760
Emission Data	
Drift Rate[b] (DR), percent	0.002
Total Dissolved Solids (TDS) Concentration[c] ,maximum ppm	1,400
Solution Drift[d] (SD), lb/hr	1,401
PM Drift[e] , lb/hr	1.96
tons/year	8.6
PM_{10} Drift	
PM_{10} Portion (percent) of PM Drift	50
PM_{10} Emissions, lb/hr	0.98
tons/year	4.3

[a] Data used in the impact analyses
[b] Drift rate is the percent of circulating water
[c] TDS assumed for modeling
[d] Includes water and based on circulating water flow rate and drift rate (CWFR x DR x 8.34 lb/gal x 60 min/hr)
[e] PM calculated based on total dissolved solids and solution drift (TDS x SD)
[f] Heat rejected for duct fired case

emissions. These techniques are proposed for this Project, and have been determined to be BACT for this project and previous projects in Florida, based on an evaluation of economic, energy, and environmental impacts. The following subsection presents a summary of the Air Pollution Control Technology and BACT analysis, which is presented in full in the Air/PSD permit application in **Appendix 10.1.5**.

3.4.3 CONTROL TECHNOLOGY DESCRIPTION AND BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

BACT review is required under the State of Florida and U.S. Environmental Protection Agency (EPA) regulations pertaining to PSD. Federal regulations are codified in 40 CFR Part 52.21 and the State of Florida has adopted PSD regulations essentially the same as the federal rules (Rule 62-212.400 F.A.C.). PSD review is required under these regulations for combined cycle facilities emitting more than 100 TPY of any regulated air pollutant. The BACT review (Rule 62-212.410, F.A.C.) is part of the evaluation of control technology under PSD rules. BACT is applicable to all pollutants for which PSD review is required and is pollutant-specific for each pollutant emitted in amounts greater than the significant impact levels. **Table 3.4.3-1** presents the maximum potential emissions for the Osprey Energy Center Project. PSD review, including BACT review, is required for emissions of NO_x, CO, VOC, SO_2, sulfuric acid mist, and PM/PM_{10}.

BACT is an emission limitation that is based on the maximum degree of reduction for each regulated pollutant which is determined to be appropriate after taking into account energy, environmental, and economic impacts and other costs. BACT cannot be any less stringent than the federal New Source Performance Standards (NSPS) applicable to the source under evaluation.

The applicable NSPS for the Osprey Energy Center is that promulgated by EPA for stationary gas turbines. These NSPS (40 CFR Part 60, Subpart GG) establish emission-limiting standards for NO_x and SO_2. The applicable NSPS are:

- ***NO_x*** 75 ppmvd corrected to 15-percent O_2, heat rate adjustment and allowance for fuel-bound nitrogen
- ***SO_2*** no more than 0.8-percent sulfur (by weight) in the fuel

The State of Florida and EPA have established a policy for BACT review in which the most stringent control alternatives are evaluated first. The alternatives either are rejected, based on technological, environmental, energy, or economic reasons, or are proposed as BACT. This procedure is referred to as the "top-down" approach.

Appendix 10.1.5 of this SCA contains a complete PSD application. Section 4.0 of that application contains the BACT evaluation for this Project and addresses those pollutants for which BACT is applicable. It includes a discussion of the environmental, economic, and energy aspects of alternative control techniques and methods. The remainder of this section briefly describes those control technologies that are proposed for the Osprey Energy Center. For further details, refer to Section 4.0 and Attachment B in the PSD application, **Appendix 10.1.5**.

3.4.3.1 Nitrogen Oxides

DLN combustor technology has been offered and installed by CT manufacturers to reduce NO_x emissions by inhibiting thermal NO_x formation through premixing fuel and air prior to combustion and providing staged combustion to reduce flame temperatures. NO_x emissions of 25 ppmvd (corrected to 15-percent O_2) and less have been offered by manufacturers for advanced CTs. Advanced in this context is the larger (over 150 MW) and more efficient (higher initial firing temperatures and lower heat rate) CTs. This technology truly represents pollution prevention because NO_x emissions are inhibited from forming.

Selective catalytic reduction (SCR) is a post-combustion process where NO_x in the gas stream is reacted with ammonia in the presence of a catalyst to form nitrogen and water. The reaction occurs typically between 600°F and 750°F, which limits SCR application to combined-cycle units where such temperatures occur in the HRSG. SCR has been typically installed and operated on combined-cycle facilities to achieve 9 ppmvd (corrected to 15-percent O_2) or less while burning natural gas. Guarantees for NO_x emissions less than 9 ppmvd (corrected to 15-percent O_2) are available from HRSG and SCR manufactures. Obtaining a guarantee for an emission level of 4 ppmvd is available from SCR manufacturers. Ammonia injected in the SCR system that does not react with NO_x is emitted directly and referred to as ammonia slip. In general, SCR manufacturers guarantee ammonia slip to be no more than 9 ppmvd at 15-percent O_2. SCR is

technically capable of reducing NO_x emissions to 4 ppmvd at 15-percent O_2 when firing natural gas.

Based on the ability to control NO_x to low emission levels, an emission level of 4.0 ppmvd corrected to 15-percent O_2 is proposed for the Osprey Energy Center using DLN technology and SCR. This proposed BACT emissions limit is for all operating conditions including duct firing and power augmentation. A guarantee will be obtained for the emission level during all operating loads and conditions (i.e., loads from 100- to 60-percent including duct firing and power augmentation). This represents a reduction of over 84-percent from DLN technology alone and is consistent with BACT determinations made by the FDEP.

3.4.3.2 Carbon Monoxide

The BACT emission rates proposed for the Project for CO are 10 ppmvd corrected for 15-percent O_2 at 100- to 70-percent loads, 25 ppmvd corrected to 15-percent O_2 for power augmentation, 16 ppmvd corrected to 15-percent O_2 during duct firing, 30 ppmvd corrected to 15-percent O_2 during duct firing and power augmentation, and 50 ppmvd corrected to 15-percent O_2, at 70 to 60-percent load. The CTs would use advanced combustion technology. The proposed CO emission rates are consistent with those established as BACT by FDEP.

The duct burner emissions have been estimated to add a maximum of 0.12 lb/mmBtu (HHV) while operating, which is equivalent to 16 ppmvd (corrected to 15-percent O_2) when combined with the turbine exhaust at 95°F base load operation. This emission level is consistent with BACT determinations for other projects with duct burners.

The only other feasible control measure available to reduce CO emissions from the combined-cycle units, other than good combustion practice, is an oxidation catalyst where exhaust gases from the CTs are passed over a catalyst bed and excess air oxidizes the CO. The temperature range for this process is approximately 600°F to 1,200°F, with the highest removal efficiencies occurring in the upper temperature range. This technology is not considered BACT based on the project-specific economic, environmental and energy impacts (see **Appendix 10.1.5**).

3.4.3.3 Volatile Organic Compounds

The proposed BACT emission rate for VOC is 2.3 ppmvd corrected to 15-percent oxygen at 100-percent operating loads and 4.2 ppmvd corrected to 15-percent O_2 for operating loads from 75- to 60-percent. An emission rate of 4.6 ppmvd corrected to 15-percent O_2 or less, will be achieved during power augmentation and duct firing. The DLN technology and low emissions duct burners will limit emissions of VOCs. The proposed BACT emission levels are consistent with BACT determinations made for other similar combined-cycle projects.

3.4.3.4 Sulfur Oxides (SO_2 and H_2SO_4 Mist)

Natural gas has very low concentrations of sulfur with levels less than 0.01-percent by weight. The only feasible control for SO_2 at combined-cycle facilities is clean fuel, i.e., natural gas. Sulfuric acid mist production will be limited by the amount of sulfur in the fuel.

3.4.3.5 Particulate Matter and Other Regulated Pollutants

The combustion of natural gas in combustion turbines produces very small amounts of PM emissions. Clean-burning fuels that have low PM and trace contaminant contents are being proposed as BACT.

Emissions of other pollutants associated with the combustion of natural gas are minimal and require no additional control technology. Therefore, no alternative emission controls for these other pollutants are necessary.

The cooling towers will have emissions of PM associated with drift. The use of high-efficiency drift eliminators (0.002-percent of circulating water) will minimize PM emissions and is consistent with other projects using freshwater cooling towers. Drift eliminators minimize the amount of drift emitted from each cooling tower cell through inertial separation caused by air flow direction charges. As the drift aerosols accumulate on each drift eliminator, they combine into longer and longer aerosols, eventually becoming large enough to fall as a large water droplet into the circulating water basin. A fraction of the drift emitted from the tower may become PM_{10}. Based on data from cooling tower manufacturers, 50-percent of the drift was conservatively assumed to be PM_{10}.

Table 3.4.3-1. Summary of Maximum Potential Annual Emissions for the Osprey Energy Center

Pollutant	Annual Emissions (tons/year) 2 CT/HRSG with Duct Burners[a]	Cooling Tower	Emergency Gas-Fired Generator[b]	Diesel Fire Pump[b]	TOTAL	PSD Significant Emission Rate (tons/year)
SO_2	95	--	0.006	0.056	95	40
PM	190	8.6	0.03	0.34	199	25
PM_{10}	190	4.3	0.03	0.34	194	15
NO_x	249	--	3.8	4.8	258	40
CO	792	--	3.79	1.04	797	100
VOC (as methane)	69.1	--	0.09	0.38	70	40
Sulfuric Acid Mist	14.6	--	Neg.	Neg.	15	7
Mercury	0.000014	--	Neg.	Neg.	0.000014	0.1

[a] Maximum potential annual emissions for SO_2, PM, PM_{10}, NO_x, VOC, sulfuric acid mist, and mercury based on 5,880 hours/year at 100 percent load, 59°F compressor inlet temperature and 2,880 hours at 100-percent load with power augmentation and maximum duct-firing at 95°F compressor inlet. See Section 2.0 in Appendix 10.1.5 for detailed calculations.

[b] These units are considered categorically exempt under Rule 62-210.300(3) F.A.C. Emissions based on combined fuel use limits in the Rule. See Section 2.0 in Appendix 10.1.5.

3.4.4 DESIGN DATA FOR CONTROL EQUIPMENT

The control equipment will consist of the DLN combustors and SCR. The SCR reactor will be located in the HRSG to provide the proper operating temperature range for the required reaction between ammonia and NO_x to achieve the proposed BACT emission rate and to assure the economical operation of the system. The NO_x is reduced by a chemical reaction with the ammonia in the presence of the catalyst. The catalyst will be provided in modules, which will be installed into a structural steel reactor housing which is incorporated into the HRSG. Ammonia is carried by a dilutent and injected into the exhaust gas upstream of the catalyst modules.

The reactor housing will include an internal support structure for the catalyst modules, man-access and catalyst loading openings and instrument connections for monitoring catalyst performance.

The gaseous aqueous ammonia handling system will include a dilutent air blower, ammonia flow control and measurement devices, an ammonia/air mixing chamber, distribution header(s) and an ammonia injection grid (AIG).

Overall control of the system will be by the distributed control system (DCS). This control system includes continuous emission monitors measuring the stack exhaust NO_x concentrations to ensure that NO_x emissions do not exceed 4 ppmvd corrected to 15-percent O_2.

3.4.5 DESIGN PHILOSOPHY

The design philosophy for the Osprey Energy Center minimizes air pollutant emissions by using the most efficient and pollutant-preventing electrical generating technology. This concept has been incorporated into the design with the selection of a combined-cycle process utilizing advanced CTs. Combined-cycle plants can be expected to achieve fuel conversion rates on the order of 6,800 Btu/kWh (HHV), as opposed to values ranging from 9,000 to 12,000 Btu/kWh range for more conventional steam generating plants. This is an improvement of about 30- to 50-percent or better. By maximizing the megawatt output per unit of fuel consumed, the air pollutant emissions per megawatt output are minimized. The selection of highly efficient CTs also minimizes emissions with respect to power output. Pollution prevention is incorporated as part of the design by the use of clean fuels and combustion technology. Moreover, dry low-NO_x

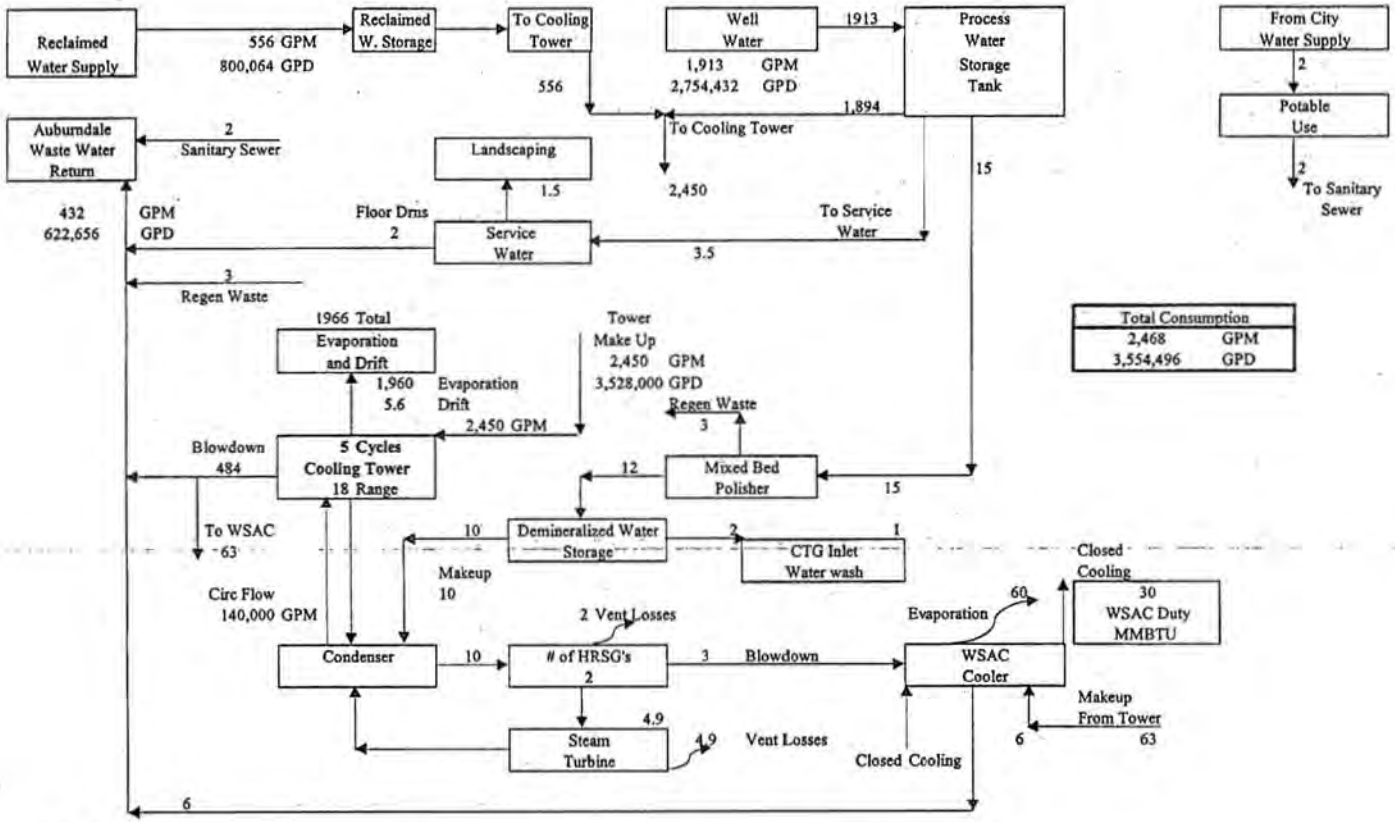
combustion technology and SCR will be used to minimize NO_x emissions while ensuring that CO and VOC emissions are within accepted limits. Taken together, the design will incorporate features that will make the Osprey Energy Center one of the most efficient and pollution-free power plants in the State of Florida.

3.5 PLANT WATER USE

Water Needs – The water demands and uses for the Osprey Energy Center include condenser cooling (i.e., cooling tower make-up), potable water, general plant service water, emergency (fire control) water, evaporative cooler make-up water, power augmentation water, and steam cycle make-up water. Various water and wastewater tanks will be placed in service at the Site as depicted in **Figure 3.2.0-2.**

Condenser cooling demands for the Osprey Energy Center will be minimized by using closed-cycle cooling with a mechanical draft-cooling tower. The cooling tower will be operated to maximize cycles of concentration and to reduce water consumption.

Water balances for the 527-MW (average ambient) plant for average annual daily and maximum monthly daily make-up conditions are presented in **Figures 3.5.0-1 and 3.5.0-2.** These figures show the reclaimed water rates, groundwater withdrawal rates from the Upper Floridan aquifer, and the overall water budget for the plant. Maximum consumption considers both reduced cycles of concentration (increased blowdown and make-up) and increased water consumption due to power augmentation (steam injection) and inlet air cooling. Average consumption is based on the conservative assumption of 5 cycles of concentration. Preliminary water analyses suggest that even higher cycles of concentration (7) may be safely achieved. At seven cycles of concentration, the Project's average water consumption would be 3,319,296 gpd and discharge would be 387,456 gpd.



Note: (1) All numbers are in gallons per munite (GPM) unless otherwise noted.
(2) GPD = gallons per day.
(3) Water use estimates are based on 5 cycles of concnetration.
(4) Excludes duct firing, foggine and power augmentation.

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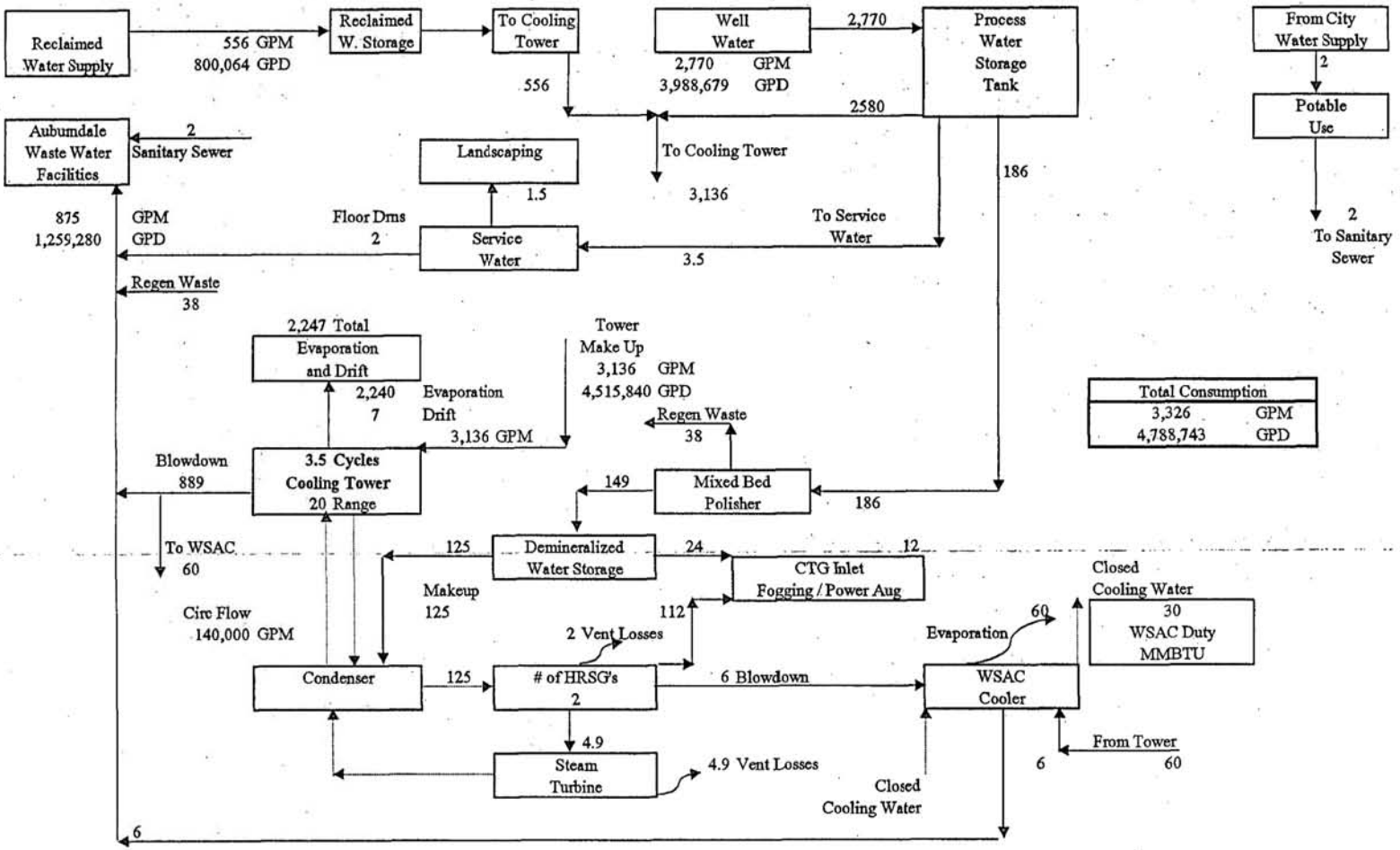
Tampa, Florida

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

Average Annual Daily Water Balance Diagram

CAD BY: CDT	SCALE: NTS	Job No. 993-9570
CHK BY: RAZ	DATE: 03/10/00	FIGURE 3.5.0-1
REV BY: —	FILE No.: fig3_5_0-1.dwg	



Note: All numbers shown are in gallons per minute (GPM) unless otherwise noted.
GPD = gallons per day.
Water use estimates are based on 3.5 cycles of concentration.
Maximum water usage scenario reflects the use of duct firing, power augmentation and inlet fogging.

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Tampa, Florida

Peak Month Daily Water Balance Diagram

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	NTS	Job No.	993-9570
CHK BY:	RAZ	DATE:	03/10/00	FIGURE	3.5.0-2
REV BY:	-	FILE No.:	fig3_5_0-2.dwg		

Maximum make-up is based on summer climatological data and the following operating conditions:

- 100-percent load, and capacity factor,
- Relative humidity of 70-percent,
- Power augmentation (steam injection) and CT inlet fogging between June and September, when ambient temperature exceeds 27°C (85°F),
- duct firing, and
- 3.5 cycles of concentration.

Average daily make-up is based on the average monthly climatological data and the following operational conditions:

- 100-percent plant load and 100-percent capacity factor,
- 74 °F ambient temperature,
- 60-percent relative humidity, and
- 5 cycles of concentration.

The various components of the Osprey Energy Center's water balances (i.e., **Figures 3.5.0-1 and 3.5.0-2**) are discussed in Sections 3.5.2 through 3.5.4. Section 3.5.5 presents a discussion of plant size and water use (e.g., a 527-MW combined-cycle configuration).

The make-up water requirements for the cooling tower for a 527-MW (average ambient) configuration, were estimated using a water balance model. This water balance approach considers all the water inflows and outflows in order to calculate water make-up and discharge requirements.

Based on this methodology, the cooling tower make-up requirements are shown in **Figure 3.5.0-1** for average conditions and in **Figure 3.5.0-2** for maximum daily conditions. As seen in these balances, the average monthly make-up requirement is estimated to range from 3.55 mgd under average load conditions to a monthly maximum water demand of 4.79 mgd under maximum load conditions.

The average annual groundwater make-up for the Osprey Energy Center will be initially approximately 2.75 mgd. This number represents the difference between the overall Project demand as identified on the water balance and the volume of reclaimed water to be received from the Allred Wastewater Treatment Plant. The maximum daily make-up for the Project initially is estimated to be approximately 4.79 mgd and, therefore, the initial maximum groundwater requirements are 3.9 mgd, based on available reclaimed water volume. Groundwater make-up volumes are expected to decline as more reclaimed water becomes available from the Allred Wastewater Treatment Plant (increasing from 800,000 gpd to more than 1,400,000 gpd). A detailed discussion of the derivation of the average annual and daily maximum make-up volumes is presented in the Water Alternatives Study (see **Appendix 10.10**).

Water Sources – The Project's water needs will be satisfied through the use of existing and new sources. The major sources of water for cooling, landscaping and industrial uses at the plant are reclaimed water from the City of Auburndale and direct withdrawals from the Upper Floridan aquifer from on-site wells. Potable water will be obtained from the City of Auburndale. All water demands for the Osprey Energy Center will be met through the water use allocation for the plant that is requested herein (see SWFWMD Water Withdrawal Application).

Water quality characteristics for the reclaimed water and the Upper Floridan aquifer are presented in **Table 3.5.0-1**. The reclaimed water from the City of Auburndale will serve as the primary water source for condenser cooling, and the Upper Floridan aquifer will be the source of plant service water and support make-up to the cooling tower, when needed. Water from the Upper Floridan aquifer will be obtained from on-site wells.

Reclaimed water will be received and stored in a storage tank prior to being sent to the cooling tower basin. This will allow for monitoring of the water chemistry to assure it is within expected limits. Groundwater will be stored in a raw water storage tank. This tank will supply the balance of the cooling tower makeup, makeup to the plant (demineralized water supply), and serve as the plant's fire water storage tank (a portion of the tank's volume will be held in reserve for this function).

Table 3.5.0-1. Supply and Wastewater Chemistry Limits[4]

Parameter	Wastewater Return (mg/l)[5,6,7]		Water Supply (mg/l)		Remarks
	3.5 Cycles	5 Cycles	Groundwater	Reclaimed	
pH	adjusted	Adjusted	8.1	8.02	
Total Suspended Solids	<5.0	<5.0	<5.0	<5.0	
Total Dissolved Solids	617	880	124.5	330	
Total Hardness (as $CaCO_3$)	322	457	74	156	Note 1
Calcium	247	350	68	81	
Magnesium	98	139	29	25	
Sodium	128	182	4	150	
Potassium	33	47	9.4	9.4	
Alkalinity (as $CaCO_3$)	120	150	90	96	Note 2
Sulfate	40	56	3	40	
Chloride (as $CaCO_3$)	89	126	5	96	
Total Nitrogen	7	10	<0.5	<5	Note 3
Silica (as SiO_2)	58	83	17	16	
Iron (Fe^{2+} and Fe^{3+})	<1.0	<0.1	<0.1	<0.08	
Lead	<0.083	<0.083	<0.01	<0.1	
Barium	40	40	40	<0.1	
Strontium	<1	<1		0.07	
Arsenic	<0.15	<0.15	<0.01	<0.01	
Beryllium	0.0025	0.0025	0.0025		
Sulfur (SO_4)	27	12	–	44	
Boron	<0.05	<1	–	0.3	
Cadmium	0.018	0.018	0.018		
Chromium (hexavalent)				<0.01	
Total Chromium	3.3	3.3	3.3	<0.01	
Cobalt	0.48	0.48	0.48		
Copper	<0.05	<0.15	<0.01	<0.01	
Cyanide	0.073	0.073	0.073		
Fluoride	2.94	2.94	2.94		
Manganese	0.03	0.1	<0.01	<0.01	
Mercury	<0.0015	<0.0015	<0.0002	<0.0002	
Nickel	1.75	1.75	1.75	2	
Oils and Grease	100	100	100	50	
Phenolics				10	
Silver	0.005	0.005	0.005		
Zinc	0.035	0.07	<0.01	<0.01	
CBOD5	10	975	975	<2.0	
Total phosphorus	3.5	24	24	0.7	
Tetrachlorethylene	0.53	0.53	0.53		
Trichloroethylene	0.71	0.71	0.71		
Toluene	1.31	1.31	1.31		
Vinyl chloride	0.004	0.004	0.004		
CBOD5	<100	<100	<2.0	<2.0	
Phosphate (PO_4)	11	20	0.2	14	
Total phosphorus	2	3.5	0.2	0.7	
Conductivity	1,500	2,000	210	530	

[1] Sum of Calcium ($CaCO_3$), Magnesium ($CaCO_3$), and Sodium ($CaCO_3$)
[2] Methyl Orange ($CaCO_3$)
[3] Below laboratory detection limit (BLD) of 5 mg/l
[4] All figures are in mg/l, unless otherwise indicated.
[5] Calculations are based on the reclaimed water and groundwater supply concentrations shown.
[6] Variations in reclaimed water chemistry will affect discharge parameters.
[7] Wastewater concentrations are calculated based on preliminary figures and as a function of cycles of concentration.
Source: Nalco Chemical Company, November 1999; Calpine, Inc., 1999.

Discharge – There will be three means of disposal for the plant's wastewater:

1) Domestic sanitary wastes will be piped to Auburndale's Allred Wastewater Treatment Plant (see Section 3.5.2);
2) Process wastewater will be piped to Auburndale's Allred Wastewater Treatment Plant discharge pond, and/or
3) Plant process wastewater will be piped to Auburndale's North Regional Wastewater Treatment Plant.

The sanitary wastes will be sent to the local wastewater treatment facilities using an existing line within Recker Highway. Reclaimed water will be supplied from the Allred Wastewater Treatment Plant for use by the Project via a new line installed in Recker Highway. Process wastewater sent from the Project to the Allred Facility will use a new wastewater return line installed in Recker Highway. Project process wastewater disposal to the City's North Regional Wastewater Treatment Plant will be accomplished using an existing abandoned wastewater line, which will be upgraded and interconnected to the North Regional Wastewater Treatment Plant. Two disposal paths are needed due to the wastewater volume and chemical make-up limitations imposed on discharges to the Allred Wastewater Treatment Plant facilities. The Project's wastewater volumes and chemical make-up are principally driven by the number of cycles of concentration maintained in the cooling tower and the quality of reclaimed water received from Auburndale. Knowing that the reclaimed water quality can vary over time requires that both the reclaimed water and process wastewater quality be monitored to ensure that their chemistries remain within prescribed limits.

The expected wastewater chemistry is based on the expected reclaimed water supply chemistry and 5 cycles of concentration in the cooling tower (see **Table 3.5.0-1**). Should the Project's wastewater volume exceed the capacity of the Allred Wastewater Treatment Plant, then the Project's wastewater will be diverted to Auburndale's North Regional Wastewater Treatment Plant for processing and disposal.

3.5.1 CIRCULATING WATER HEAT REJECTION SYSTEM

3.5.1.1 System Design

Based on the plant design for the Osprey Energy Center, the following engineering design criteria were used for the cooling system:

1. The cooling system shall be capable of rejecting approximately $1{,}200 \times 10^6$ Btu/hr at 35°C (74°F) ambient temperature, excluding duct firing.
2. The cooling system shall be optimized for the expected ambient conditions, the plant's performance characteristics, and the requirements of the various heat rejection components and steam turbine.
3. The cooling system shall be capable of supplying a daily average water temperature necessary to maintain a steam turbine back pressure of 2 inches of mercury at 100-percent load at average ambient conditions.

Cooling system water shall be maintained at satisfactory quality to allow optimum cooling tower performance and continuous condenser cooling operation.

Demineralized Water Production System

High purity water for the heat recovery steam generators will be supplied by a dual train demineralizer water treatment system consisting of a primary cation exchanger, primary anion exchanger, polishing mixed bed exchanger, and associated regeneration equipment. A water storage tank will be constructed on-site to store approximately 100,000 gallons of demineralized water. Average daily full load operation requires a supply of 21,456 gpd to the demineralizer system. The daily maximum equals 267,863 gpd.

During periods when the Project will inject steam into the combustion turbines for power augmentation, the demineralized water generation rate must increase to account for the water used to produce steam.

High purity water is needed to replace losses in the steam cycle (HRSG blowdown, steam vents, etc.), as makeup to the closed cooling water system, as steam for power augmentation, and for injection into the combustion turbine when inlet air fogging is needed.

High purity water will be produced by taking water from the on-site wells and passing it through ion-exchange resins that remove the undesirable minerals. The demineralized water will be stored in a 100,000 gallon treated water storage tank where it will be available when needed for system make-up injection into the combustion turbines for power augmentation or when inlet air fogging is required. The demineralizer system capacity is sufficient to meet the continuous requirements for steam losses and boiler blowdown. The system's throughput capacity will be such that it can meet the demand imposed by the plant, support power augmentation and fogging needs (which may occur during peak hours of the day), and replenish storage tank volume. Other short-term needs (boiler blowdown during startup) will be met by withdrawing water from the demineralized water storage tank along with operation of the demineralized water system.

Steam cycle losses include steam losses to the atmosphere (Gland steam condenser vent, packing leaks, etc.) and boiler blowdown. Continuous losses to the atmosphere are estimated to be 7 gpm and are constant when the plant is operating. Boiler blowdown, needed to maintain water chemistry in the steam cycle, is estimated to be 3 gpm. Boiler blowdown will be recycled to the wet surface air cooler system and will not be discharged directly as wastewater.

Power augmentation will be accomplished by injecting steam into the combustion turbines. All of the steam will be exhausted up the stack; none will be discharged as wastewater. Augmentation will be used when demand conditions are reaching peak on a daily and/or seasonal basis (summer). The demineralized water system and storage tank capacity will be such that it will store enough water and be able to produce enough water to meet the power augmentation water demands. This water demand is shown on the maximum monthly water balance as a daily average value.

Inlet air fogging at a maximum rate of 24 gpm has been assumed for the maximum case on a full-time basis. The water for the inlet air fogging system will be supplied from the demineralized water storage tank.

The ion exchange medium (resin beds) must be regenerated periodically. This is accomplished by washing the resin beds with solutions of sulfuric acid and sodium hydroxide. The spent

regeneration solutions will be routed to the neutralization tank for storage and treatment. The acid and caustic will neutralize to some extent depending upon how much of each is used in the regeneration process. Chemical feed equipment will add additional acid or caustic to balance the pH to acceptable levels. Spent regeneration solution will be pumped to the neutralization tank following regeneration.

Regeneration rates are proportional to the demineralized water treatment system's throughput – the frequency of regeneration will vary as plant water needs vary. In general, the volume of wastewater generated can be estimated as a percentage of throughput. A value of 25-percent of demineralizer throughput was used.

Neutralization Tank

A 15,000 gallon (approximately) neutralization tank will receive wastewater from regeneration of the demineralizer (described above) and from drains in the chemical storage area. Drainage from chemical storage area, if it occurs, will be routed to the neutralization tank for pH adjustment prior to discharge. No discharge is expected from the chemical storage area unless there is a spill, which is unlikely.

The pH of the contents of the neutralization tank will be adjusted to an acceptable level through the addition of sulfuric acid or sodium hydroxide. The contents of the tank will be pumped out when needed and combined with the plant's wastewater stream. The average flow is estimated to be 5 gpm (based on regeneration waste of 3 gpm and floor drains of 2 gpm).

Auxiliary Water Cooler

A wet surface air cooler (WSAC) will be used to cool the closed cooling water system. The closed cooling water system will circulate water through the tube bundle located in the WSAC. The system will have two 100-percent capacity pumps to pump cooling water from the WSAC surge tank to all required auxiliary loads and back to the WSAC. The system will cool the steam turbine generator oil coolers, steam turbine lube oil coolers, CT lube oil coolers, HRSG feed pump mechanical seal water heat exchangers and lube oil coolers, instrument air compressors and aftercoolers, service air compressors and aftercoolers, steam and water analysis sample

coolers, and mechanical vacuum pump heat exchangers. The system shall be designed to cool the maximum cooling load at 95°F ambient dry bulb.

The WSAC is an induced draft design with concurrent flow of air and spray water downward over the tube bundles. Variable speed fans are used to induce the air flow over the coils. The air leaving the tube bundles shall make a 180°turn into the plenum chamber to remove any entrained water droplets. The fan plenum wall, fan deck, basin and sump will be poured in place reinforced concrete. Tube bundles shall be straight tube, constructed of carbon steel and hot dip galvanized outside after fabrication. A basin water treatment system shall be furnished to inhibit biological growth and for pH adjustment. An automatic blowdown control system shall be furnished to accurately maintain the desired chemical control. This configuration allows for high cycles of concentration and the reuse of other plant waste waters. Make up water will be provided from the cooling tower blowdown, the HRSG blow down and from raw water as required.

Three 50-percent capacity vertical spray water pumps shall be furnished to pump cooling water from the WSAC basin to the spray distribution manifold. The WSAC heat exchanger will circulate closed cooling water through the tubes.

Sources of Cooling Water

A cooling tower will be used for condenser cooling for the Osprey Energy Center. The WSAC for the closed cooling water system will use make-up water from boiler blowdown and cooling tower blowdown in the WSAC basin to assist in cooling. This water will be treated as shown in the water balance diagrams (see **Figures 3.5.0-1 and 3.5.0-2**).

The Water Alternatives Study (see Section 5.1 and Appendix 10.10) indicates that existing water sources (i.e., reclaimed water) will be able to accommodate approximately one quarter (average) to one fifth (maximum) of the average demands for the Osprey Energy Center.

As part of the Water Alternatives Study conducted for the Osprey Energy Center (Appendix 10.10), refinements to the cooling tower water balance were developed. Based on

these inputs and modeling results from the Water Alternatives Study, it was determined that additional water is required to complement the existing sources for cooling water make-up. Therefore, groundwater withdrawals will be requested for the Project. The Upper Floridan aquifer well water will not be treated before use as direct make-up to the cooling tower.

A peak-month daily groundwater withdrawal rate of approximately 3.99 mgd is proposed for the 527-MW plant at the Site with an annual-average daily withdrawal of 2.75 mgd (unless reclaimed water is unavailable, in which case groundwater will be used to replace reclaimed water). Small quantities of make-up water will be used for landscaping, plant maintenance (cleaning), and miscellaneous water uses at the plant.

The variations between the maximum month and average month withdrawal rates are primarily due to evaporative losses from the cooling tower, and increases in water needs due to the need for inlet fogging, power augmentation, or duct firing.

3.5.1.2 Dilution System

No heat dissipation cooling water discharge to a receiving water body is proposed.

3.5.1.3 Blowdown, Screened Organisms, and Trash Disposal

Blowdown from the cooling tower will be disposed of at the City of Auburndale's permitted wastewater facilities. Trash from the cooling tower, if any, will be manually removed and managed at a licensed solid waste facility.

3.5.1.4 Injection Wells

Injection wells are not proposed to be constructed or used.

3.5.2 DOMESTIC/SANITARY WASTEWATER

Domestic/sanitary wastewater generated within the Site is conservatively estimated at 1.5 – 2.0 gpm (2,160-2,880 gpd). This volume includes discharges from showers, wash basins, bathrooms, drinking fountains, and other potable facilities within the plant. Domestic wastewater will be discharged to the City of Auburndale's sewer system. A 12-inch sewer force

main runs along the southern boundary of the Site. A sanitary wastewater line from the plant will be connected to the existing pipeline (see **Figure 3.5.2-1**).

3.5.3 POTABLE WATER

Potable water uses at the facility include water for drinking, washing, and toilets. Potable water for the plant will be obtained from the City of Auburndale and outside suppliers of bottled water. Water in the City of Auburndale supply system is obtained from the Upper Floridan aquifer and treated prior to usage.

3.5.4 PROCESS WATER

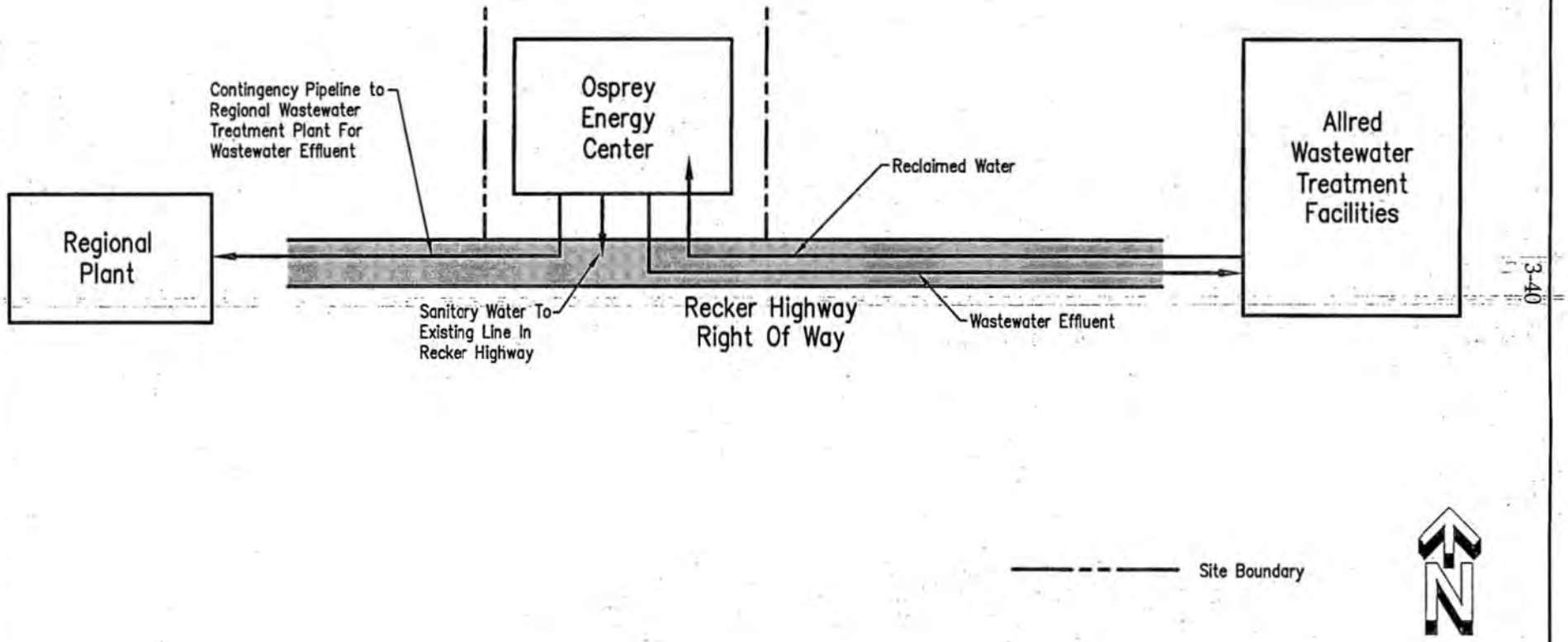
3.5.4.1 Demineralized Water

The second largest water use in the Osprey Energy Center will be for demineralized water. Demineralized water is required for:

1. Make-up to the condensate system which replaces blowdown from the HRSG (necessary to maintain a low dissolved solids content in the steam cycle), and miscellaneous steam losses in the heat recovery cycles,
2. Make-up to the CT inlet evaporative cooling system, and
3. Steam injection into the CT for the purpose of power augmentation.

Water samples and sample data have been obtained for both the well water and the reclaimed water. The data suggest that the water treatment system at the Osprey Energy Center may be a mixed bed demineralizer train.

As described in Section 5, the MODFLOW study indicates there is sufficient water available in the UFA to support the Project's needs. Accordingly, well water will be used (in lieu of reclaimed water) to satisfy the Project's demand for make-up water for the demineralizer treatment system. The demineralizer system consists of ion exchange vessels which will be regenerated with solutions of sulfuric acid and sodium hydroxide (NaOH) on site. The resulting regenerant wastestreams will be collected in a neutralization unit and treated as described in Section 3.6.7.



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Tampa, Florida

Wastewater Schematic

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	Not to Scale	Job No.	993-9570
CHK BY:	RAZ	DATE:	02/15/00	FIGURE	3.5.2-1
REV BY:	-	FILE No.:	fig3_2_5-1.dwg		

3.5.4.2 General Service Water

General usage water, including cleaning and landscaping water, and emergency (fire control) water make-up, will be provided by well water. Water requirements are expected to average 3.5 gpm (5,040 gpd) for the facility. Service water will be aquifer water from on-site wells developed into the Upper Floridan aquifer. Potable water will be obtained from the City's water treatment plant at 2 gpm. A general diagram of the Osprey Energy Center's water system is shown in **Figure 3.5.4-1**.

3.5.5 WATER USE VARIATIONS

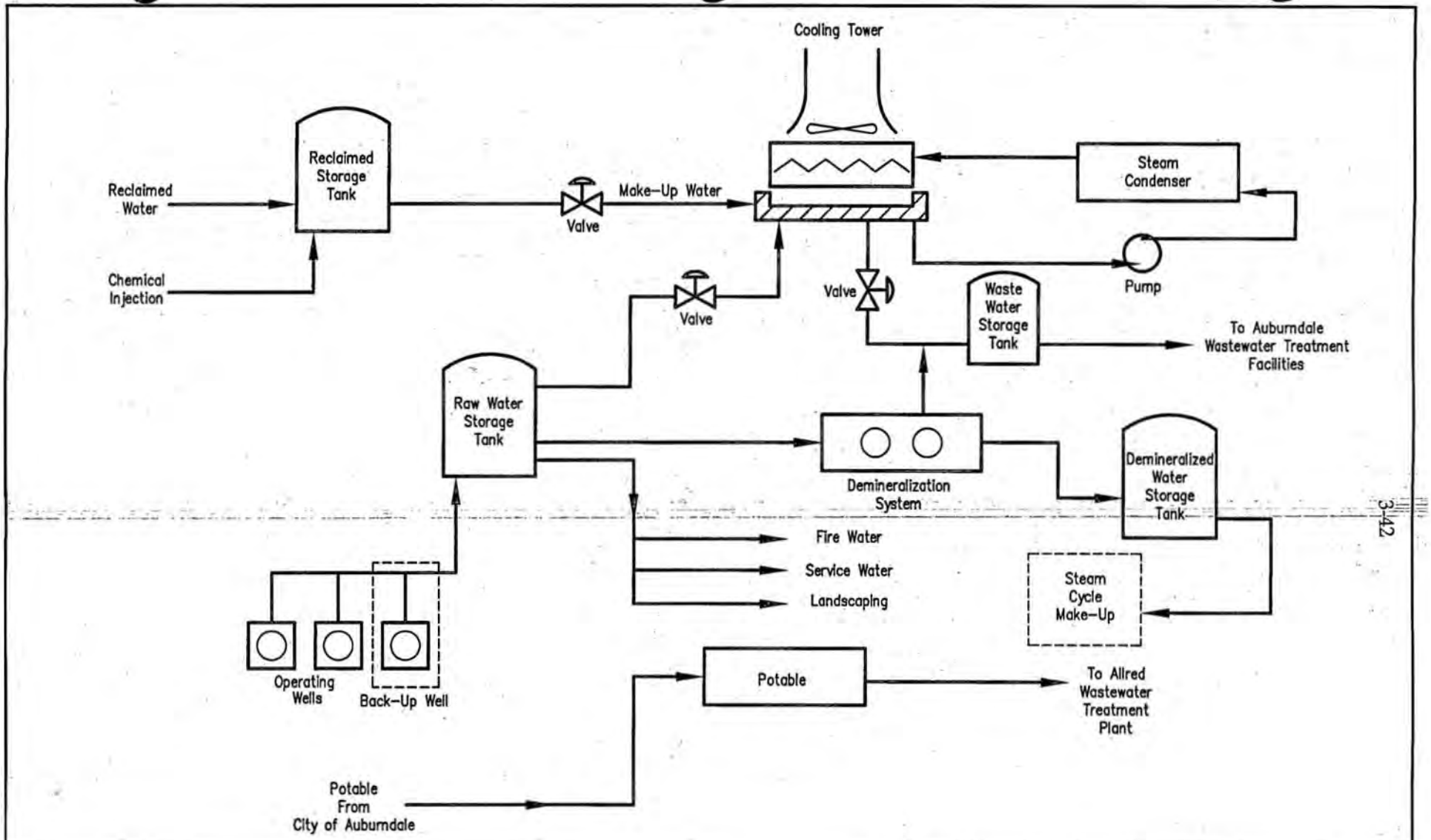
The maximum daily water requirements for the Osprey Energy Center, as discussed in the preceding sections, are based on a 527-MW facility operating at 100-percent load, 100-percent capacity, when ambient meteorological conditions would necessitate the greatest overall consumption of water. For the major plant water uses (i.e., cooling tower evaporative losses, power augmentation, and CT inlet cooling), water use is somewhat proportional to operating load. Thus, a reduction in load would result in a reduction in water demand. The balance of plant water uses (potable and general service uses) is less dependent on operating load.

Variations in ambient meteorological conditions will also result in variations in water demand for evaporative cooling.

3.6 CHEMICAL AND BIOCIDE WASTE

The overall wastewater flow schemes for the Osprey Energy Center are shown in **Figure 3.6.0-1**. All wastewaters generated within the facility will be discharged, after appropriate treatment (as described below), with the cooling water discharge. The principal water/wastewater discharges to the cooling system include:

1. Cooling tower blowdown,
2. Service treatment system wastewater,
3. Sanitary treatment system wastewater,
4. Equipment and floor drains,
5. Neutralization unit effluent,
6. Steam cycle blowdown through the WSAC,



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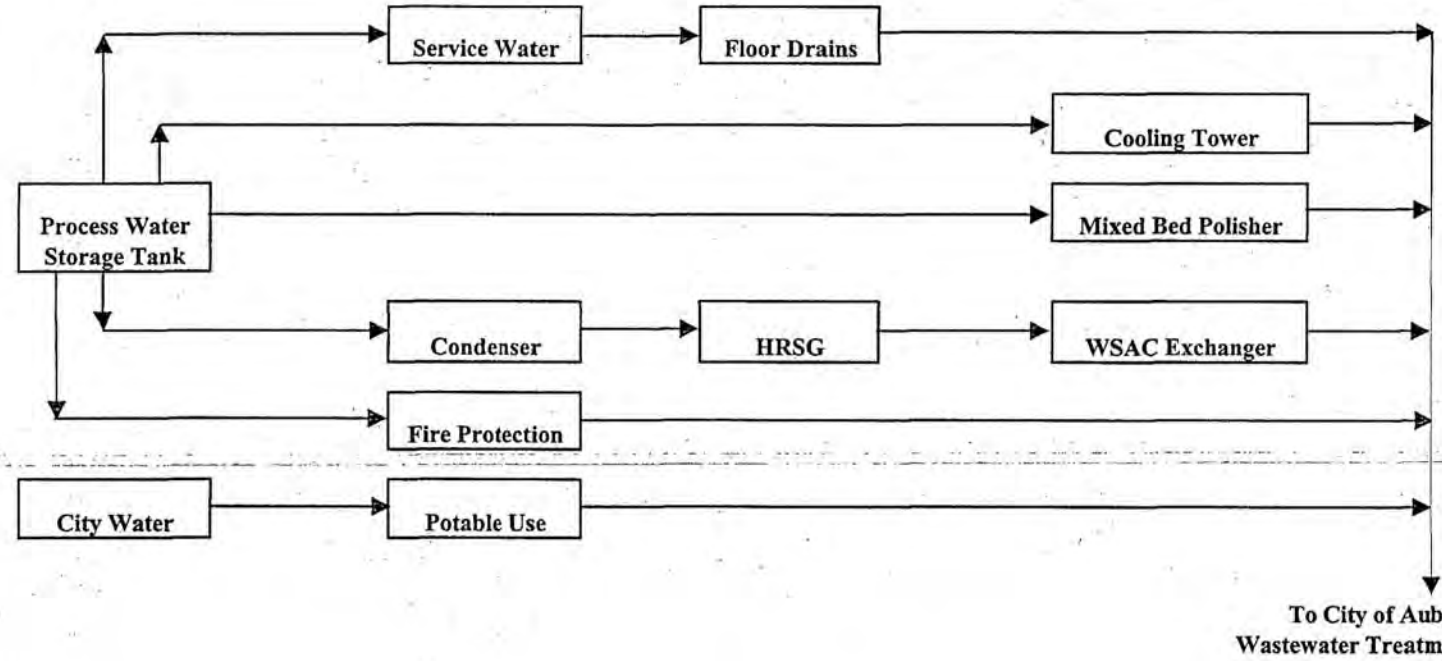
Tampa, Florida

Osprey Water Systems Diagram

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	Not to Scale	Job No.	993-9570
CHK BY:	RAZ	DATE:	03/10/00	FIGURE	3.5.4-1
REV BY:	-	FILE No.:	fig3_5_4-1.dwg		



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Tampa, Florida

Plant Wastewater Schematic Flow Diagram

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: NTS	Job No. 993-9570
CHK BY: RAZ	DATE: 03/10/00	FIGURE 3.6.0-1
REV BY: –	FILE No.: fig3_6_0-2.dwg	

7. Evaporative cooler blowdown, and
8. Emergency and fire protection effluent.

The principal uses of chemicals and biocides at the facility will be for cooling system circulating water quality control, steam cycle water quality control, sanitary wastewater, make-up water demineralization, chemical cleaning of the boiler and pre-boiler piping systems, and miscellaneous chemical drains.

3.6.1 COOLING SYSTEM WATER CHEMICAL TREATMENT

Intermittent shock chlorination or other oxidizing or non-oxidizing biocides will be used to prevent biofouling of the circulating water system. A chlorine solution will be fed into the intake structure at the circulating water pump intake.

A scale inhibitor may be fed to the circulating water system to control the formation of calcium carbonate scales, which adhere to heat transfer surfaces and reduce cooling condenser performance.

The steam-condensate-feedwater cycle will be chemically treated to prevent corrosion or scaling of the condensate piping and the HRSG pre-boiler piping and boiler drums. The steam cycle water will be treated with an oxygen scavenger, such as hydrazine, for dissolved oxygen control and with ammonia or an amine for pH control. Sodium phosphate will be fed to the boiler for Figure 3.6.0-1 control of pH and hardness. Residual phosphate in the boiler will react with hardness to form a non-adherent precipitate.

3.6.2 SANITARY WASTEWATER TREATMENT

Sanitary wastewater produced during normal plant operation will be routed to the City of Auburndale's Wastewater Treatment Plant facilities for treatment and disposal.

During construction and prior to completion of the sewage lines, construction-related sanitary wastes will be managed by the installation, use, and maintenance of portable chemical toilets.

As necessary, sanitary wastes will be pumped from these individual toilets and disposed of off site in an approved facility by a licensed contractor.

3.6.3 MAKE-UP WATER DEMINERALIZATION

As discussed in Section 3.5.4, the make-up water for the steam cycle, evaporative cooling, and power augmentation will be demineralized using a dual train system; consisting of cation exchange, anion exchange, and mixed bed-type demineralizer train. The demineralization system will use sulfuric acid for cation resin regeneration and sodium hydroxide for anion resin regeneration. The sulfuric acid and sodium hydroxide will be stored in bulk storage tanks with secondary containment located in, or adjacent to, the water treatment building. The use of these chemicals will be on an intermittent and as-needed basis, dependent on duration of the demineralizer service run and regeneration requirements.

Cation resin regeneration will produce regenerant wastewater containing unreacted sulfuric acid and dissolved sulfate salts of the cations removed from the resins during regeneration. Anion resin regeneration will produce regenerant wastewater containing unreacted sodium hydroxide and dissolved sodium salts of the anions removed from the resins during regeneration. The wastewater will be conveyed to Auburndale's wastewater facilities for disposal.

The estimated regenerant wastewater flow will average approximately 38 gpd (9 gpm) based on the maximum (average) make-up requirement conditions. The regenerant wastewater will be drained by gravity to the neutralization unit for pH adjustment prior to discharge to the wastewater collection sump and ultimately combined with cooling tower blowdown to be sent to the City of Auburndale's wastewater facilities. The neutralization unit is described in Section 3.6.7.

3.6.4 CHEMICAL CLEANING

The HRSG boiler and pre-boiler piping will be chemically cleaned initially during commissioning and also periodically during the life of the plant. The chemicals used will not be permanently stored on site but will be delivered to the Site by a licensed contractor at the time of the scheduled periodic cleanings. The chemical cleaning solutions to be used for acid and

alkaline cleaning of the HRSG will be dependent on the cleaning contractor selected. The actual cleaning solutions used must be consistent with the HRSG manufacturer's recommendations. Chemicals typically used in HRSG and feedwater pipe cleaning include the following:

1. Inhibited hydrochloric acid,
2. Ammonium bifluoride,
3. Hydroxyacetic acid,
4. Formic acid,
5. Disodium phosphate,
6. Trisodium phosphate,
7. Soda ash,
8. Nonfoaming wetting agents, and
9. Foam inhibitors.

Wastewaters will consist of the cleaning solutions and material removed during the cleaning process. The chemical cleaning contractor will dispose of the chemical cleaning wastes off site. Liquid wastes produced by chemical cleaning, as an infrequent maintenance operation, do not contribute to the liquid wastes produced by the normal operation of the plant, and therefore, are not shown on the water balance.

3.6.5 MISCELLANEOUS CHEMICAL DRAINS

Chemical wastewater can result from draining a chemical storage tank or from cleaning and maintenance operations such as washdown of chemical storage areas. A dedicated chemical waste drainage system will be provided to route miscellaneous chemical wastes to the neutralization unit for treatment. Chemical storage will be in separate self-contained (diked) areas. Drains from these areas will be isolated from other normal plant discharge. Flows from the miscellaneous chemical drains will be intermittent and will not normally contribute to the wastewater flows.

3.6.6 NEUTRALIZATION UNIT

A neutralization unit will be provided for pH adjustment of chemical wastes on a batch basis. The unit will be of sufficient volume to accommodate the wastewaters produced during regeneration of the demineralizer system. The neutralization unit will be a reinforced concrete

basin lined with a chemical-resistant membrane. A chemical waste mixer will be provided to mix the acid and alkaline wastewaters to enhance their self-neutralizing tendencies. Sulfuric acid and sodium hydroxide, as required for neutralization, will be available from the demineralizer regeneration equipment. The pH-adjusted chemical wastewaters will be routed to the wastewater collection sump. The estimated discharge from the neutralization unit under maximum daily conditions is 4,320 gpd (i.e., 3 gpm).

3.6.7 MISCELLANEOUS EQUIPMENT AND FLOOR DRAINS

Separate collection systems will be used to collect chemical drain wastewater and miscellaneous equipment and floor drain wastewater. Chemical drain wastewaters are addressed in Section 3.6.6. Miscellaneous equipment and floor drain wastewater can result from maintenance drains of equipment, seal water drains, and drains from general cleaning and maintenance, such as washdown of general plant (i.e., non-chemical) areas. Miscellaneous equipment and floor drains will be directed to an oil/water separator and then routed to the wastewater collection sump for recycling to the cooling reservoir. The estimated discharge from equipment and floor drains under maximum daily conditions is 2,880 gpd (2 gpm).

3.7 SOLID AND HAZARDOUS WASTE

3.7.1 SOLID WASTE

Due to the nature of combined-cycle technology burning only natural gas, only small quantities of solid wastes will be generated by the Osprey Energy Center. Solid wastes will be limited to municipal solid waste and infrequent replacement of demineralizer resins. All municipal solid wastes will be managed by a licensed solid waste collection, transfer, and disposal contractor. Spent demineralizer resins will be removed from the Site by a qualified vendor and taken to an approved solid waste management facility.

3.7.2 HAZARDOUS WASTE

Generation of hazardous waste at the facility will be limited to small quantities (less than 100 kg/month) of spent solvents and other chemicals. These wastes will be collected on site and managed by a licensed hazardous waste contractor. The demineralizer regenerant wastewaters can contain up to 10-percent sulfuric acid or up to 5-percent sodium hydroxide along with the minerals removed from the ion exchange resins. Spent acidic and basic solutions used to treat

the demineralizer resin bed ion exchangers will be treated to eliminate corrosivity. Since these solutions will be treated in "an enclosed neutralization unit" or "elementary neutralization unit," they will not be classified as hazardous wastes according to Florida hazardous waste rules (F.A.C. 62-730.270) or Federal hazardous waste rules [40 CFR 264.l(g)(6) and 40 CFR 265.l(c)(10)]. The neutralized wastewater will be routed from the neutralization unit to the wastewater collection sump and ultimately combined with blowdown water from the cooling tower as a non-hazardous waste.

Spent SCR catalysts will be recycled or disposed of by a qualified contractor at a licensed waste management facility.

3.8 ON-SITE DRAINAGE SYSTEM

Stormwater management facilities will be designed in accordance with SWFWMD criteria (Chapter 40D-4, F.A.C.) for water quality and water quantity control. An on-site drainage system of catch basins, pipes, channels, and culverts will convey runoff to two on-site stormwater detention ponds. Discharges from the south stormwater detention pond will flow to a ditch along the southern property line in the Recker Highway right-of-way and eventually into Lake Lena Run via an existing culvert under Recker Highway. The discharge from the northeast detention pond will flow into a swale along Derby Avenue. A conceptual stormwater management plan for the Osprey Energy Center is presented in **Appendix 10.12.1**.

3.8.1 STORMWATER DETENTION PONDS

Non-contact surface runoff from the area disturbed for the facility construction and plant operation will be collected and routed to one of two stormwater detention ponds. Detention ponds will be located in the northern and southern portions of the Site and will receive non-contact surface drainage from the entire Project.

The stormwater detention ponds have been sized to address both the water quality and water quantity control criteria of SWFWMD. For water quality control, the stormwater detention ponds will provide "on-line" wet detention for runoff from the first 2.5 cm (1 inch) of runoff. Treated stormwater from the ponds, which will be discharged to the adjacent swales, complying

with either Polk County (Derby Road) or Florida Department of Transportation (Recker Highway) requirements.

For water quantity control, the stormwater detention ponds will provide sufficient volume for peak attenuation to limit the peak pond discharge rate to the pre-development Site peak discharge rate for a 25-year, 24-hour rainfall event. The overflow weir structure will pass any flows that exceed the flow resulting from the 25-year, 24-hour rainfall event. Design calculations for the drainage system are presented in **Appendix 10.12.1**.

3.8.2 STORMWATER RUNOFF CONTROL DURING CONSTRUCTION

The stormwater detention ponds will be built during initial construction to serve as construction stormwater detention ponds. A system of temporary construction ditches and piping will direct the stormwater runoff to the ponds. The construction drainage system will follow the layout of the permanent ditch system, where possible.

Site development will not significantly alter the grades or drainage patterns of the Site. Existing vegetation will be removed as required during initial Site preparation operations. Final grading will include seeding all disturbed areas not occupied by plant facilities or not surfaced with asphalt or crushed aggregate. Existing natural drainage patterns will be followed so that all runoff from the Site will be directed to the runoff detention ponds.

Temporary erosion and sedimentation control measures will be deployed to prevent sediment from being displaced and carried off site by construction runoff. The primary destination of construction runoff will be the runoff detention pond.

Prior to beginning excavation activities, a silt fence with hay bales will be installed along the perimeter of the Project where runoff to off-site areas is expected. This silt fence will filter sediments from construction runoff. During construction, the extent of earth disturbances will be minimized as much as practical. Aggregate-surfaced areas will be provided for laydown, construction parking and roads. The silt fence and other measures identified in the plan will be capable of controlling siltation. These temporary erosion and sedimentation controls have been

developed to meet the requirements for NPDES construction requirements as specified in 33 USC 1251 and 40 CFR 124.

Erosion control during construction will also include periodic spraying of water to minimize fugitive dust from the Project area and sweeping of any paved roads on-site. A sediment filter or hay bales will be provided at the culverts and ditches to reduce the sediment load carried into the drainage system (see **Appendix 10.1.7**).

Diversion ditches and/or berms will be constructed as necessary to divert runoff from off-site areas around the construction Site. Temporary control measures will be maintained as necessary throughout the construction period and removed at the end of construction.

Runoff from the entire Site will be collected in the stormwater drainage system and routed to the stormwater detention ponds. A sedimentation and erosion control plan for the Osprey Energy Center is included in **Appendix 10.9.**

As necessary, sediment collected during the construction phase will be removed from the ponds and the construction areas to ensure adequate pond volumes.

3.8.3 SITE DRAINAGE

Generally, the drainage at the Site will be directed away from the structures and routed to the stormwater detention ponds. The main plant complex area will be graded for effective drainage.

Site runoff will be conveyed to the stormwater detention ponds through a drainage system of pipes, channels, and culverts (see **Appendix 10.11.1**).

3.8.4 FLOOD ELEVATIONS

The Osprey Energy Center Site is not located in a 100-year floodplain. The 100-year flood elevation of the nearby unnamed tributary is approximately 132 ft-msl. The elevation of the Site facilities will be approximately 139 to 143 ft-msl, which is about 7 to 10 ft above the flood elevation.

3.9 MATERIALS HANDLING

3.9.1 CONSTRUCTION MATERIALS AND EQUIPMENT

Construction materials and equipment will be delivered to the Site by existing roads and railroads. As shown in **Figure 3.2.0-1**, the existing access road (i.e., Derby Avenue) will be used during construction and operation of the Osprey Energy Center. **Figure 3.2.0-1** also shows the existing CSX Transportation, Inc., rail line located approximately 250 feet north of the north boundary of the Site. Rail deliveries of equipment will be made at an existing siding near the Site and transported to the Site by truck.

Construction laydown areas for materials will be located as shown in **Figure 2.1.0-4**. Materials will be unloaded and moved around the Site using portable cranes and trucks. Some of the heaviest items such as the CTs, generators, HRSGs, and transformers may require rail delivery as discussed in Section 3.9.3. Stormwater control measures for the laydown areas will include silt fences, hay bales, and runoff collection as necessary to satisfy FDEP and NPDES requirements. Roads in the laydown area will be treated with water sprays as required to control dust due to traffic.

3.9.2 ROADS

Construction trucks will travel to the Site via U.S. Highway 92 from the north and State Road 655 (Recker Highway) from the west, and the existing Site access road (Derby Avenue) shown on **Figure 2.2.7-1**. This route was used during construction and operation of the existing Auburndale Power Plant, which is located immediately adjacent the Site to the east. Parking and loading/unloading facilities will be located on site to accommodate the 25 employees and operation service vehicles. The facility will be manned 24 hours per day/ 7 days a week.

During Project operations, regular deliveries (approximately 80 trips per year at maximum operation) of aqueous ammonia will be made to the Site.

3.9.3 RAILROAD

A CSX Transportation, Inc., rail line currently runs from the southwest to the northeast approximately 250 feet north of the north boundary of the Site. All rail deliveries of construction

materials and equipment for the facility will be off-loaded at a rail siding nearby and transported by truck to the Site. This rail line can accommodate the shipments required for the Project.

4.0 ENVIRONMENTAL EFFECTS OF SITE PREPARATION, AND PLANT AND ASSOCIATED FACILITIES CONSTRUCTION

4.1 LAND IMPACT

4.1.1 GENERAL CONSTRUCTION IMPACTS

The Osprey Energy Center will be located on a 19.5-acre parcel, which is currently a non-producing orange grove. Explosives will not be used in the construction of the Project. Overall, general Site preparation and construction activities will have minimal land impacts.

Lay-down areas for equipment, supplies, and storage for construction materials will be graded and portions surfaced with aggregate where needed. **Figure 4.1.1-1** depicts the proposed lay-down areas.

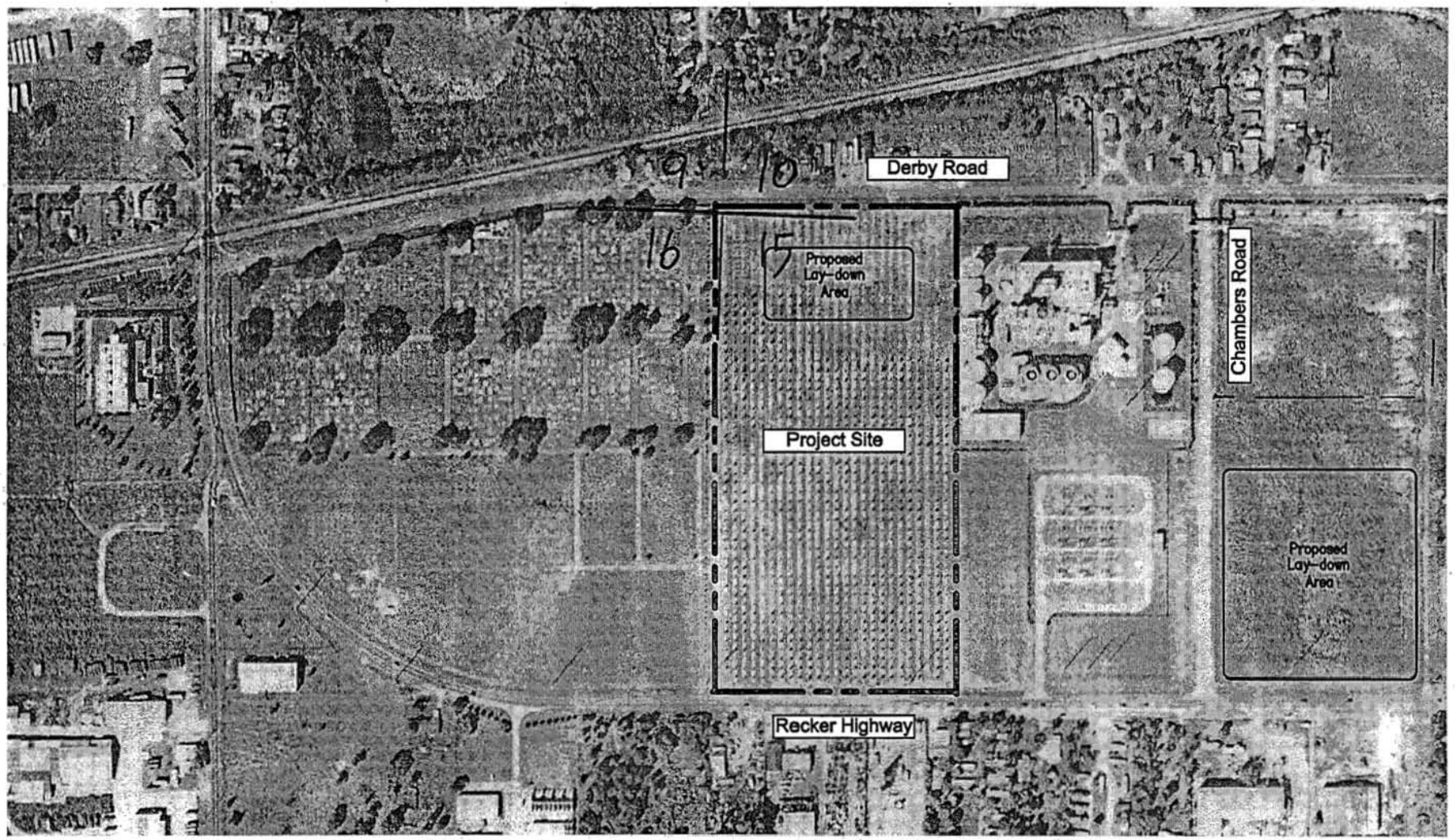
An access road encompassing the Osprey Energy Center will be constructed inside the property boundary. This road will connect to Derby Avenue (CR 544A) at the north end of the plant. In addition, an employee parking lot will be constructed on the east-central portion of the Site. The layout of the proposed Site road and parking lot are shown in **Figure 4.1.1-2**.

No impacts from the disposal of construction wastes are anticipated. Construction wastes will be removed from the Site for management at a facility approved by the Florida Department of Environmental Protection (FDEP). Any garbage (food containers, papers, etc.) will be collected in appropriate waste collection containers and disposed of in accordance with FDEP and local regulations. Any waste oils or other chemical wastes generated during construction will be removed from the Site and managed by a licensed contractor at an approved facility.

During construction, the construction labor force will utilize portable chemical toilets. A licensed contractor will frequently pump all sanitary sewage from the holding tanks for transportation to an approved disposal facility. Potable water for consumption during construction will be obtained from the existing supply line located at the southern end of the Site.

IMAGE QUALITY

AS YOU REVIEW THE NEXT FEW PAGES, PLEASE NOTE THAT THE ORIGINAL DOCUMENT WAS OF POOR QUALITY.



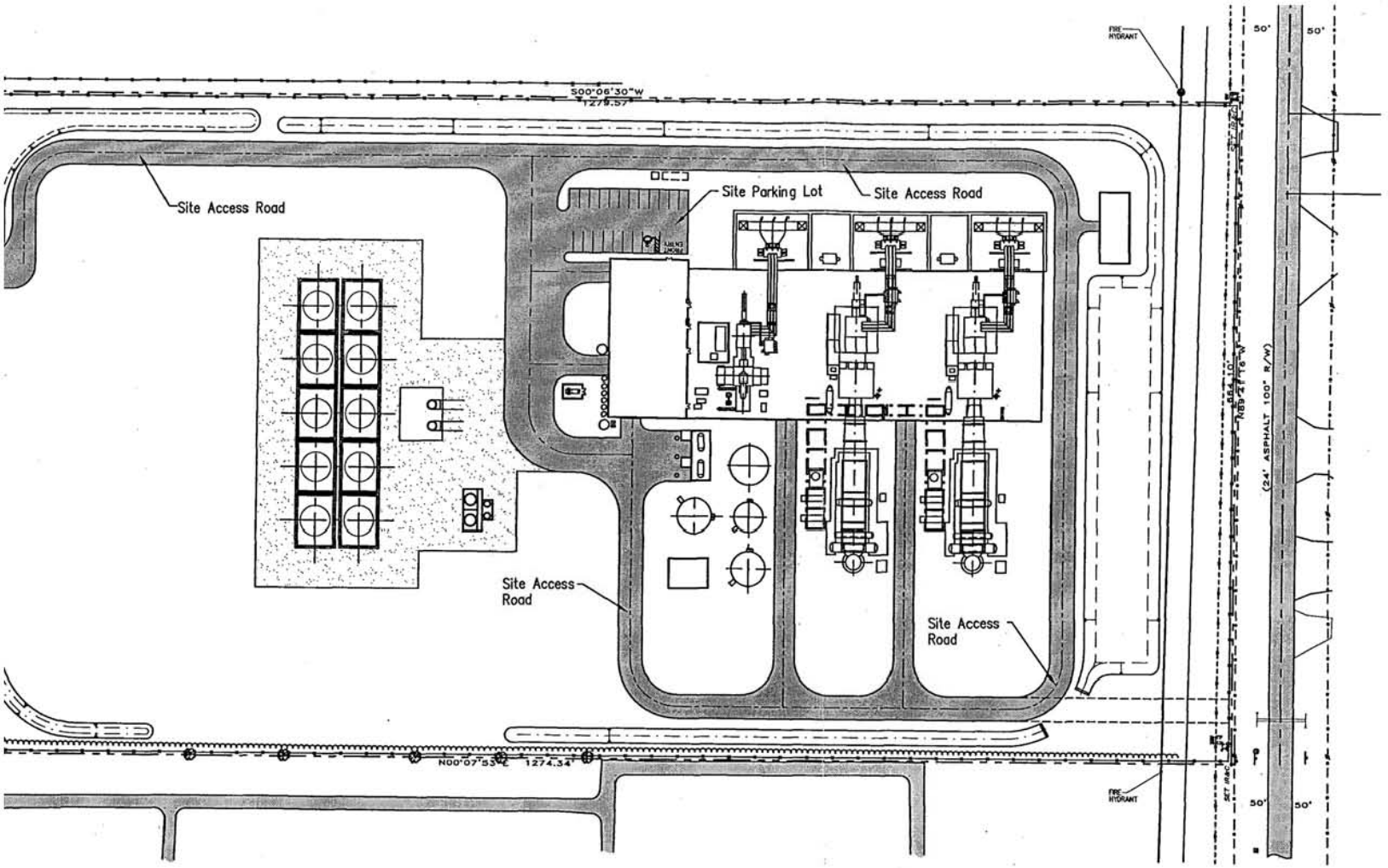
4-2

Golder Associates

Tampa, Florida

Construction Lay-down

Client / Project				
Calpine Construction Finance Company, L.P. Osprey Energy Center	CAD BY: CDT	SCALE: 1"=400'	Job No. 993-9570	
	CHK BY: RAZ	DATE: 03/08/00	FIGURE 4.1.1-1	
	REV BY: -	FILE No.: fig4_1_1-1.dwg		



Legend

- Asphalt – Proposed
- Limerock – Proposed
- Asphalt – Existing

N

120' 0 120

scale feet

Golder Associates

Tampa, Florida

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

Roads and Parking Lots

CAD BY:	CDT	SCALE: 1"=120'	Job
CHK BY:	RAZ	DATE: 03/08/00	FIGUI
REV BY:	–	FILE No.: fig4_1_1-2.dwg	

The Osprey Energy Center Site is relatively flat; however, some local Site grading and leveling will be necessary for construction. All existing vegetation will be cleared after erosion and sediment controls are in place. Only minor cut and fill activities will be employed to adjust the gradient, since Site topographic relief is minor with elevations ranging from 141′ to 148′ [United States Coast & Geodetic Survey, datum 1929 (USC&GS 1929)]. Overall, impacts to the terrain will be minor.

4.1.2 ROADS

The Osprey Energy Center will be accessed via a driveway that will connect to Derby Avenue (CR 544A) which borders the northern boundary of the Site. An existing driveway apron to the Site from Derby Avenue will be razed when the new driveway is constructed. A new access drive to SR 655 will be constructed and used for the construction period only. This access drive will provide an alternate access to Derby Avenue to deliver construction materials and equipment.

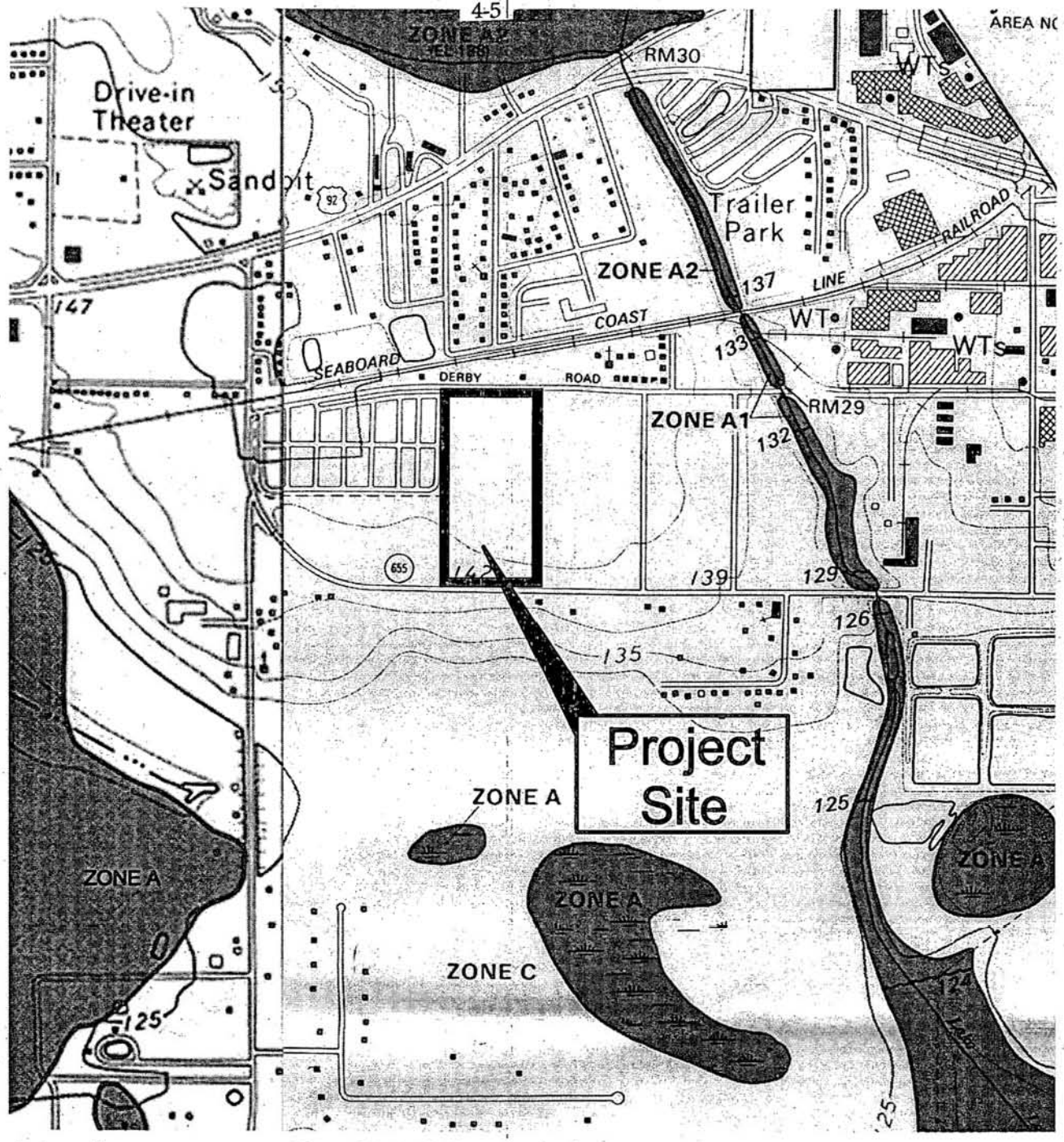
4.1.3 FLOOD ZONES

No portions of the Osprey Energy Center Site are located in or adjacent to a 100-year floodplain. **Figure 4.1.3-1** shows the water bodies located within a 5-mile radius of the Osprey Energy Center and their corresponding 100-year floodplains.

4.1.4 TOPOGRAPHY AND SOILS

Currently, the Site is relatively flat, ranging in elevation from 141′ to 148′ (USC&GS, 1929). As mentioned in Section 4.1.1, some local site grading and leveling, which will minimally affect topography, will be necessary for construction.

A stormwater-management system has been designed for the Site. Prior to construction, and during construction and operation of the Osprey Energy Center, stormwater runoff from the Site will be collected and routed into dry detention ponds to be located on the south side and in the northeast corner of the property (see **Figure 4.1.4-1**). Erosion controls will include the use of silt screens and hay bales (see Appendix 10.1.7, Drawings EP-1 and 2), as well as the use of water to wet exposed soils when needed. Drainage swales and detention ponds



Legend

100–Year Floodplain

Zone Description

Zone A: Area of 100–year flood; base flood elevations and flood hazard factors not determined.

Zone A1–2: Areas of 100–year flood; base flood elevations and flood hazard factors determined.

Zone C: Areas of minimal flooding (no shading)

N

0 500' 1000' 2000'

1"=2000'

REFERENCE

Flood Insurance Rate Map, Polk County, Florida, Panels 345 and 350 of 1025, January 19, 1983

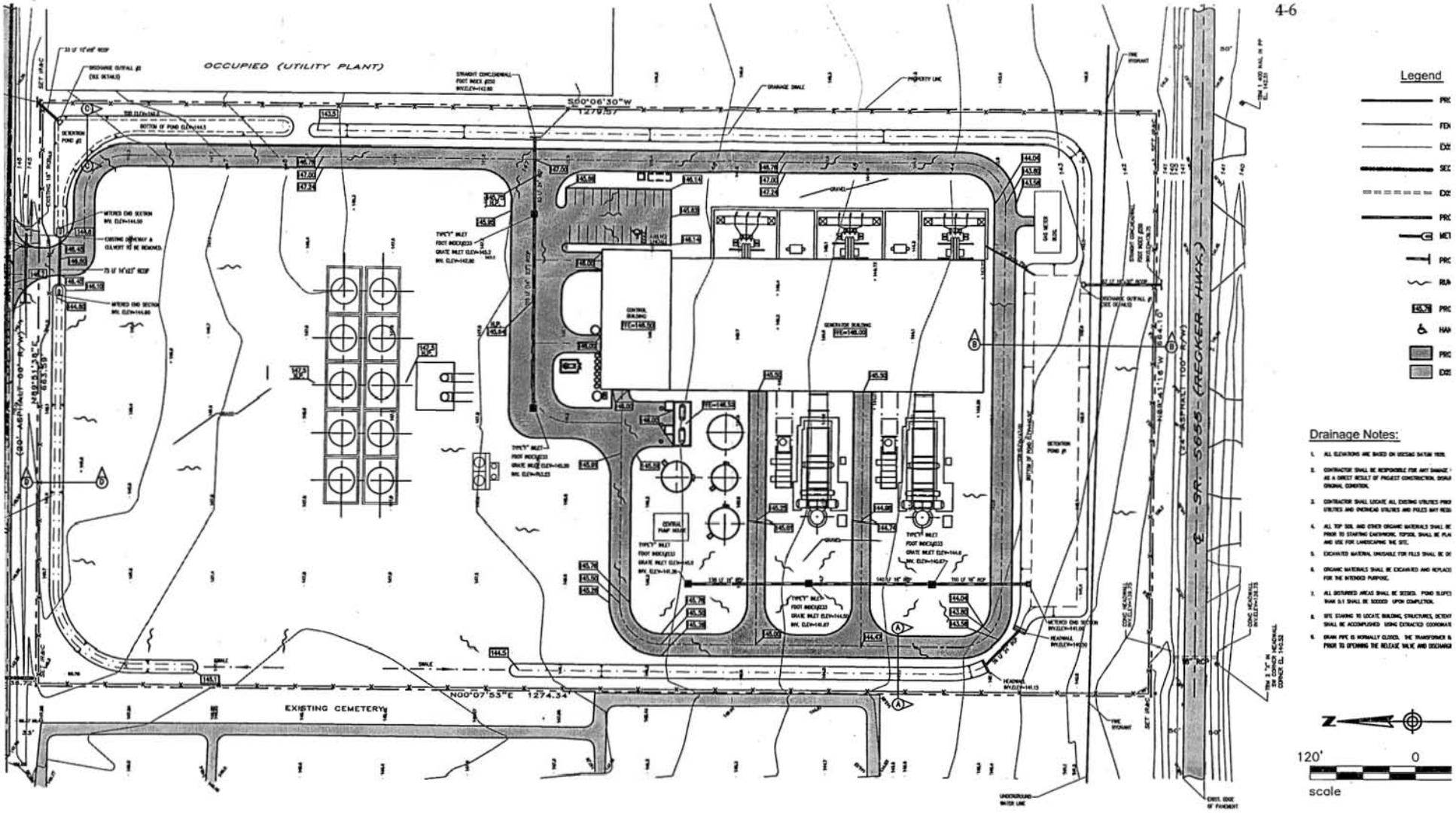
Golder Associates

Tampa, Florida

FEMA Flood Insurance Rate Map
100–Year Flood Zones

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: 1"=2000'	Job No. 993–9570	
CHK BY: CA	DATE: 03/08/00	FIGURE 4.1.3–1	
REV BY: –	FILE No.: fig4_1_3–1.dwg		



Golder Associates — Tampa, Florida			Drainage Plan
Client / Project: Calpine Construction Finance Company, L.P. Osprey Energy Center	CAD BY: JPE	SCALE: 1"=120'	Job
	CHK BY: RAZ	DATE: 03/08/00	FIG
	REV BY: —	FILE No.: fig4_1_4-1.dwg	

Drainage swales and detention ponds will be seeded immediately after final grading to minimize erosion. Based on the existing Site layout and design, it is not anticipated that construction related alteration of the Site will affect percolation rates, subsidence, sinkhole formation, bearing strength, or soil stability.

Aesthetics will be improved during later stages of construction of the Osprey Energy Center. The Site will be converted from a relatively flat, non-producing orange grove to a modern, well-landscaped Osprey Energy Center. Appendix 10.12 depicts the landscape plan for the Osprey Energy Center.

4.2 IMPACT ON SURFACE WATER BODIES AND USES

4.2.1 IMPACT ASSESSMENT

There are no natural surface-water features on the Site. Lake Lena and Lake Lena Run are the only water bodies within a radius of one mile from the Site. Lake Lena is located approximately 2,000 feet north-northeast of the Site. Lake Lena Run is a channelized stream connecting Lake Lena to Lake Hancock approximately 4.2 miles south of the Site. Lake Lena Run flows from the north-northeast to south-southwest. It is located approximately 0.5 mile east of the Site.

There will be no direct discharges of stormwater or wastewater from the Site to any surface waters. Stormwater runoff from the facility will be collected in detention ponds on the north and south side of the property. The stormwater management system has been designed with a storage capacity for a 25-year, 24-hour storm event. The overflow from the stormwater detention ponds, if any, will discharge into swales along Recker Highway and Derby Avenue. These swales convey stormwater to the west and south, eventually reaching Lake Lena Run. The Project's stormwater management system has been designed in accordance with SWFWMD requirements to ensure that any discharges occurring after development of the Project are equal to or less than that of the pre-development discharge rates. Consequently, the stormwater management system's off-site impact on surface water bodies will be negligible.

The primary potential impacts to surface water from Site preparation and plant construction will be erosion and sedimentation due to earthmoving and material placement associated with the construction activities. Erosion and sedimentation impacts will be controlled and minimized through proper design and placement of runoff-control features (see Stormwater Management Plan, Erosion and Sedimentation Control Plan and Details, Drawings EP-1 and EP-2, respectively, Appendix 10.1.7).

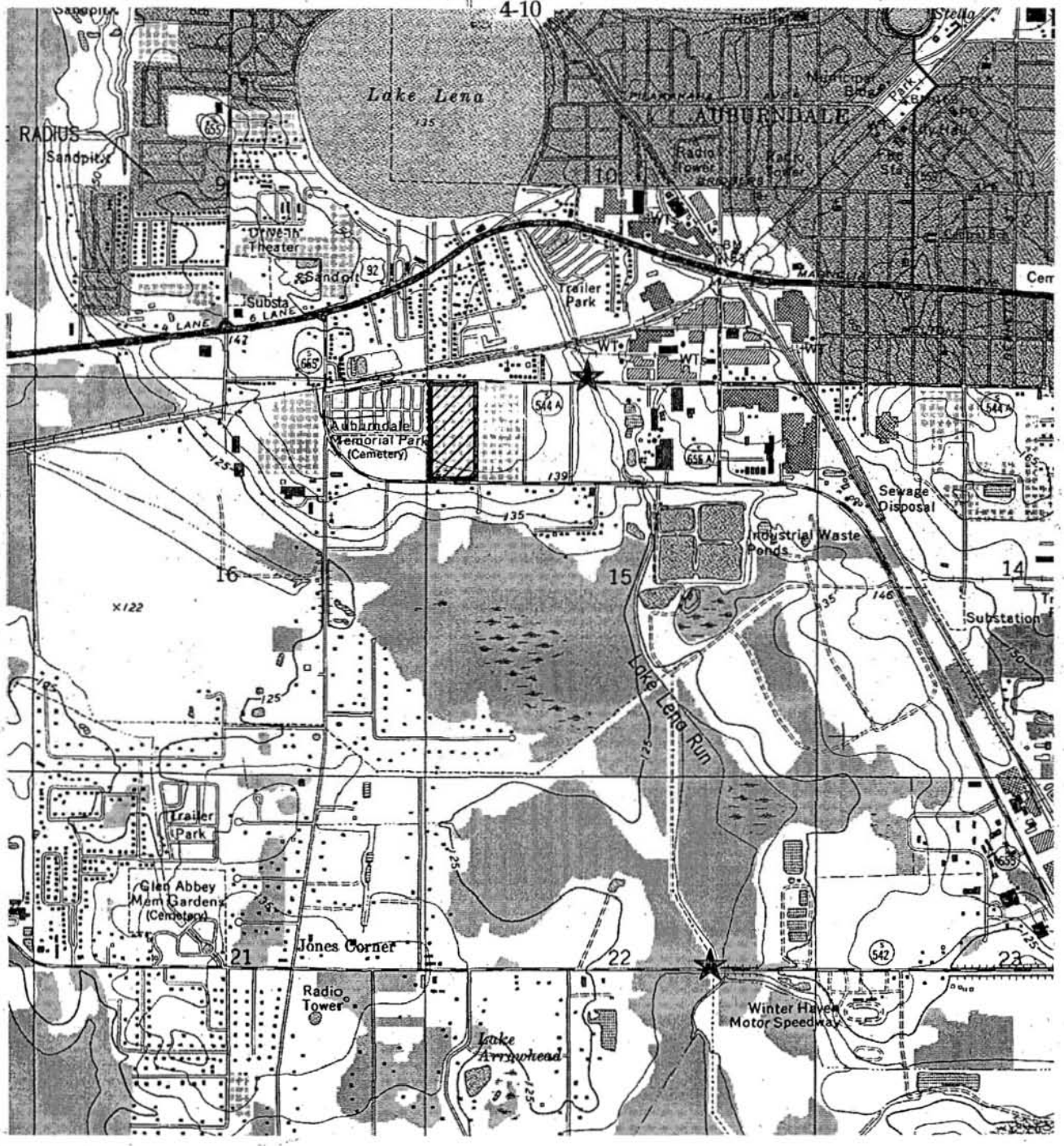
Runoff from areas of the Site disturbed by construction activities, including material laydown areas, will be collected in an open channel system, via catch basins, and directed to the permanent stormwater detention ponds. As noted above, these detention ponds will be located on the south and north portion of the property, adjacent to the north side of Recker Highway or the south side of Derby Avenue, respectively. The dry detention ponds will be built early during construction to serve as construction runoff detention ponds. Fugitive dust during construction will be controlled with a water spray truck. Sediments, which are trapped by and accumulate in the stormwater detention pond, will be removed as necessary. The construction drainage system will follow the layout of the permanent ditch system where possible. The treated runoff will be discharged into either the Recker Highway drainage swale or the Derby Avenue drainage swale.

No dewatering of the aquifers underlying the site is expected because the planned excavation depth is approximately 6 feet and the known depth to the water table is 14.25 feet. No direct impacts to the aquatic systems of surface waters or their associated floodplains will occur from construction activities on the Site. No structures will be placed in surface water bodies.

4.2.2 MEASURING AND MONITORING PROGRAMS

Because of the proposed erosion control measures, no water quality impacts to surface water bodies are expected. To establish a database for pre-development conditions, surface water samples from two locations along Lake Lena Run were collected. **Figure 4.2.2-1** shows the location of the surface water samples. Pre-development water quality is presented in Chapter 2, **Table 2.3.4-4.**

Since the facility will not discharge wastewater into surface waters, no impacts on surface water bodies are anticipated. Therefore, monitoring of surface waters is not planned.



★ Surface Water Sample Location

N

0 1000' 2000'

SCALE: 1" = 2000'

REFERENCE

USGS 7.5 Minute Topographical Quadrangle, Auburndale, Florida

Golder Associates

Tampa, Florida

Surface Water Sample Locations
(Sampled 11/18/99)

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	1"=2000'	Job No.	993-9570
CHK BY:	HGB	DATE:	02/07/00	FIGURE	4.2.2-1
REV BY:	–	FILE No.:	fig4_2_2-1.dwg		

4.3 GROUNDWATER IMPACTS

4.3.1 IMPACT ASSESSMENT

No dewatering of the aquifers underlying the Site is expected for construction of the Project. Maximum excavations are anticipated to reach approximately 6 feet BLS, and the average depth to the water table in the surficial aquifer system at the Site is 14.25 ft bls (as measured by Golder on December 9, 1999, see **Table 2.3.2-2**). Seasonal fluctuations in the water table are generally less than 5 feet (SWFWMD, 1993). As a result, there will be no dewatering impacts on the chemical and/or physical condition of the water table (i.e., surficial aquifer system).

4.3.2 MEASURING AND MONITORING PROGRAMS

Because no dewatering is necessary for the construction of the Osprey Energy Center, no monitoring is proposed to assess the potential effects of dewatering.

4.4 ECOLOGICAL IMPACTS

4.4.1 IMPACT ASSESSMENT

4.4.1.1 Terrestrial Systems

The terrestrial systems to be affected by the proposed Osprey Energy Center include 14.6 acres of non-producing citrus grove and 4.9 acres of undeveloped urban land discussed in Section 2.3.5, and illustrated on **Figure 2.3.5-1**. These areas will be utilized for the equipment lay-down, construction management and contractors' trailers, and parking. The proposed off-site lay-down area is currently cleared and maintained fields.

Due to the low ecological value of the Site and construction staging areas, clearing and construction will not cause significant adverse ecological impacts. These altered terrestrial systems do not contain important wildlife species and are not considered important wildlife habitats because of their disturbed nature. No significant adverse impacts to wildlife resources in these areas will occur as a result of construction in these areas. No significant impacts to federal or state listed terrestrial plants or animals are expected (see Appendix 10.8).

Fugitive dust generated by construction activities will be minimized through the use of best management practices. Any localized fugitive dust will not adversely effect the terrestrial systems surrounding the Site.

Noise from construction activities will not adversely affect wildlife in the vicinity of the Site. Presently the Site has noise associated with the nearby roads and railroad and the operation of the existing industrial and commercial facilities nearby. Any wildlife in the vicinity of the Site are acclimated to such activities. No noise sensitive wildlife is known to occur onsite or in the vicinity of the Site.

4.4.1.2 Aquatic Systems

Impacts to wetlands, water bodies and other aquatic ecological systems from construction are not anticipated. Erosion, sedimentation, and runoff control measures will mitigate the

potential for water quality degradation; therefore, associated impacts to aquatic biological communities are not expected to be significant.

4.4.2 MEASURING AND MONITORING PROGRAMS

Due to the absence of anticipated impacts to terrestrial and aquatic ecosystems, no biological monitoring is proposed.

4.5 AIR IMPACTS

4.5.1 AIR EMISSIONS

The air quality impacts during the construction of the Osprey Energy Center will be associated primarily with land clearing and Site preparation activities. These activities will result in the generation of fugitive particulate matter (PM) emissions and vehicle exhaust emissions.

Fugitive PM emissions will result primarily from land clearing and grubbing, ground excavation, grading, limited cut and fill operations, and vehicular travel over paved and unpaved roads when portions of the Site will be exposed. Vehicular traffic will include heavy-equipment traffic and traffic due to construction workers entering and leaving the Site. Construction personnel and equipment will enter the Site over surfaced roadways. Exposed land areas may also generate fugitive dust due to wind erosion. The Site Plan is shown in **Figure 3.2.0-2** and specific acreage requirements are discussed in Section 3.2.

Emissions of fugitive PM from construction are extremely difficult to quantify because of their variable nature. They can only be estimated because emissions are dependent upon a number of factors, including specific activities conducted, level of activity, meteorological conditions, and control measures utilized.

The PM_{10} (PM less than 10 microns) emissions associated with fugitive emissions from the construction activities on the Site are estimated to average about 4 TPY. An emission rate of 4 TPY of PM_{10} is less than the PSD significant emission rate of 15 TPY. As a result, the estimated fugitive emissions are not expected to significantly affect air quality outside the Site boundary.

Emissions will also result from the vehicular exhaust due to the on-site construction equipment, including cranes, trucks, compressors, etc., operating with diesel and gasoline engines. This equipment will produce emissions of CO, NO_x, VOC, PM and SO_2 that are estimated to be less than 10 TPY. These emission levels will not cause significant impacts to air quality in the vicinity of the Site.

4.5.2 CONTROL MEASURES

A number of control measures will be implemented during the construction period in order to minimize air emissions and potential impacts. After grading, the untraveled or lightly traveled areas will be either mulched, overlain with a crushed stone layer, or vegetated to minimize fugitive PM and wind erosion. Heavily traveled unpaved construction laydown areas and unpaved roads will be stabilized with shell or rock. Watering on an as-needed basis will be performed to control fugitive dust from highly traveled areas.

4.5.3 POTENTIAL IMPACTS

Potential air quality impacts due to the construction activities will vary depending on the level of activity, the specific operations, Site conditions, control measures, and prevailing weather conditions. Because of the type and nature of potential emission sources at the Site, the maximum impacts due to construction are expected to occur in areas within the Project boundary.

Many of the Site preparation and construction operations, such as land clearing, filling and grading, and foundation work, will be intermittent and of short duration. These aspects of the construction activities will act to reduce potential impacts, since better dispersion conditions exist during the daytime as opposed to night time.

Based on the intermittent nature of construction activities and the air emission control measures implemented to reduce emissions, air impacts offsite are not expected to be adverse due to construction activities or open burning.

Activities that potentially generate fugitive PM emissions will be monitored visually by construction personnel. If fugitive emissions become visible, water spraying will be applied to the affected areas. No ambient air quality monitoring is planned because the impacts from construction are short-term in nature and relatively small.

4.6 IMPACT ON HUMAN POPULATIONS

The nearest residential dwelling is approximately 100 feet northwest of the Site and north of Derby Avenue. The home is one of a few dwellings along Derby Avenue that are being rezoned by Polk County for commercial use. Other houses are located further from the Site, off Recker Highway. There also are several commercial establishments along Derby Avenue and Recker Highway. These houses and businesses are located in an area that already is significantly affected by traffic and nearby industrial and commercial facilities. The construction activities for the Project will not materially change or affect the existing environment immediately around the Site. Further, any potential construction impacts are only temporary in nature. The nearest residential neighborhood to the south of the Site is located on the south side of Recker Highway (southeast of the Site). The construction activities on the Site will have no significant adverse impacts on these residential neighborhoods.

4.6.1 NOISE IMPACTS

Construction of Osprey Energy Center is expected to occur in four phases:

1. Site preparation,
2. Foundation construction,
3. Erection of structures and equipment, and
4. Facility startup.

Typically, construction equipment associated with Site preparation includes earth-moving equipment necessary to prepare and grade the Site. Construction of foundation structures includes pouring of concrete and the placement of supporting piles, whereas erection of equipment typically includes the limited use of cranes and associated equipment to move and secure power plant equipment. Startup activities include Site finishing, cleanup, and plant startup. However, it should be noted that the intermittent and transitory operating nature of construction equipment reduces the overall average noise levels at critical receptors such as property boundaries and noise sensitive receptors.

Typical construction equipment sound pressure levels (SPLs), as provided in *Power Plant Construction Noise Guide* (BBN, 1977), range between 78 and 88 dBA, when measured at 50 ft. New and/or well-maintained construction equipment may generate noise levels even lower than those reported.

The construction activities for the Osprey Energy Center are expected to occur mainly during daytime hours. As previously stated, not all of the construction equipment will be operating simultaneously, at peak load conditions, or in one location during the entire construction portion of the Project.

4.6.2 CONSTRUCTION EMPLOYMENT

Employment opportunities created by the construction of the Project will begin in April 2001 and conclude in April 2003. **Figure 4.6.2-1** shows the estimated construction employment requirements for the Project. The average construction work force is estimated at 162 employees per month over the 2-year period. The peak employment period will last approximately 3 months in mid 2002 and total approximately 325 workers per month. Seventy percent of the employment demand is expected to occur during the first year of construction.

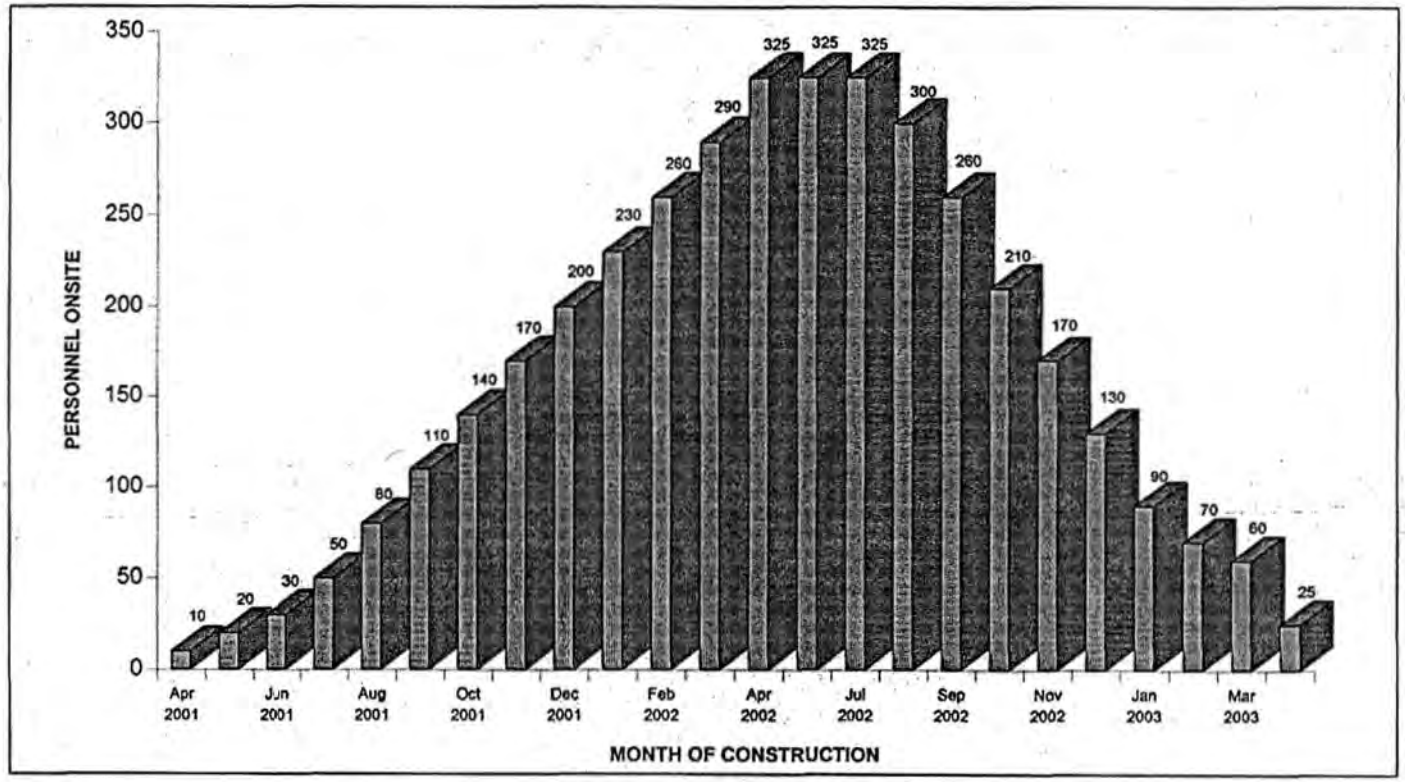
Approximately three out of every four jobs in the Central Florida Region are located within Polk County. The Central Florida Region consists of DeSoto, Hardee, Highlands, Polk, and Okeechobee Counties. Based on regional population distribution and workforce availability, it is anticipated that approximately 85-percent of the workforce will come from Polk County. The remaining 15-percent will likely originate from outside the Region (i.e., Orlando and Tampa Bay areas).

4.6.3 TRANSPORTATION IMPACTS

The proposed Project will result in impacts to the adjacent roadway network both while it is under construction, and after it is placed in full operation. An analysis of potential increased traffic demand shows that during the period when the peak construction work force is

present onsite, the existing highway network will function at a LOS of C or better. **Figure 4.6.3-1** identifies the highway segments analyzed.

Construction of the Osprey Energy Center will take place over a 24-month period and will require the use of several area highways. During construction there will be a maximum of 325 construction workers on site. The workers will be concentrated on site between the hours of 7:00 a.m. and 4:00 p.m. Delivery trucks will also be expected to arrive at the Site daily to bring in materials and equipment. Most of the deliveries, however, are expected to arrive during the day and will not have a significant impact in the peak hour. Worse case traffic impacts have been calculated for the p.m. peak hour when the peak construction work force is present.



AVERAGE MANPOWER = 162

PEAK MANPOWER = 325

REFERENCE

Calpine Eastern, 2000; Golder, 2000

Golder Associates

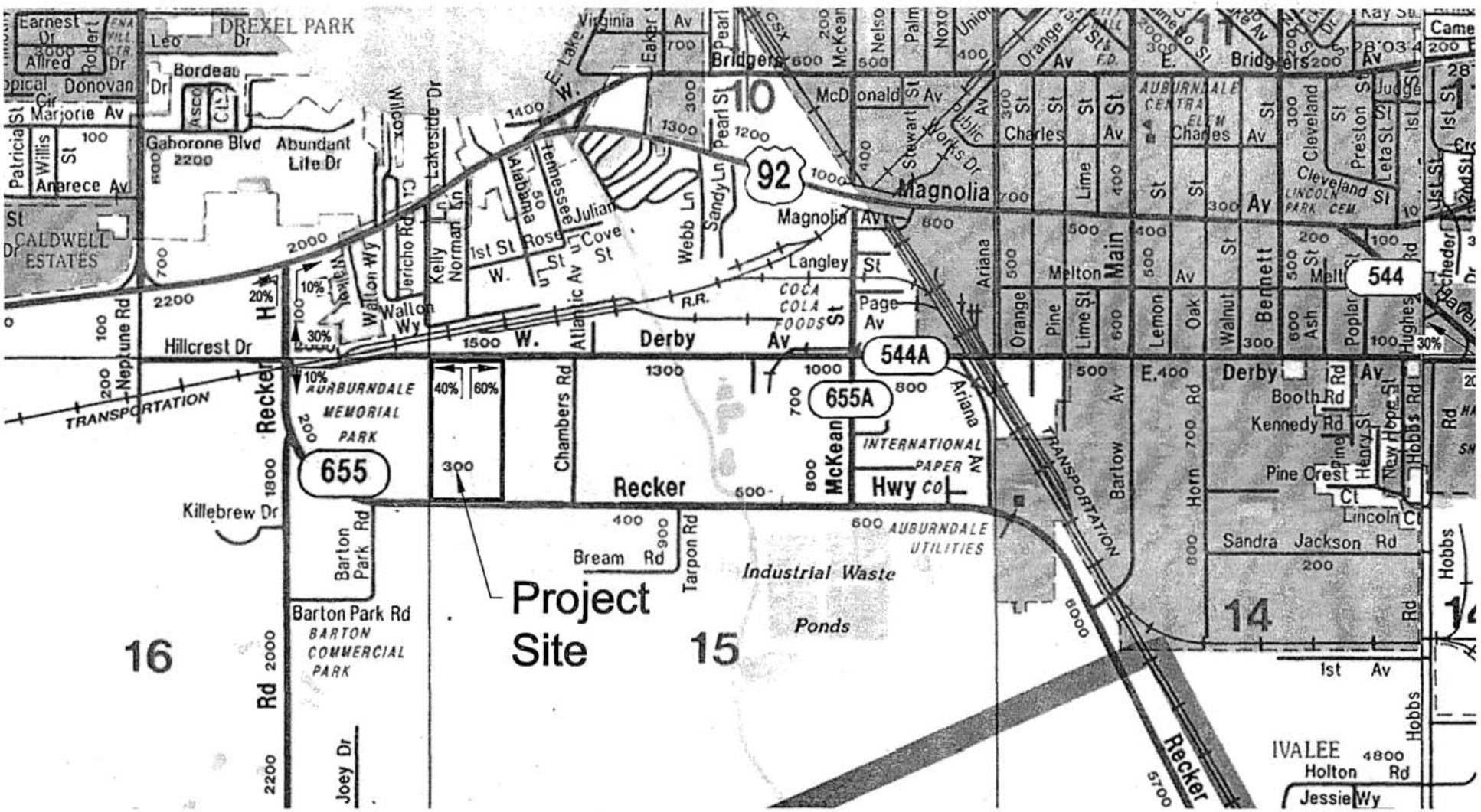
Tampa, Florida

Estimated Average Monthly Personnel On Site During Construction

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	NTS	Job No.	993-9570
CHK BY:	RAZ	DATE:	02/10/00	FIGURE	4.6.2-1
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10% of the eastbound traffic on Derby Avenue is assumed to use local roads.

:NCE

'inter Haven–Bartow, Street Atlas of Polk County, Florida; obe Store, 1997–1998

Golder Associates — Tampa, Florida

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

Major Transportation R

CAD BY:	CDT	SCALE:	1"=1000'
CHK BY:	RAZ	DATE:	02/10/00
REV BY:	–	FILE No.:	fig4_6_3-1.dwg

The p.m. peak-hour traffic departing from the Site is expected to include 100-percent of the peak construction workers. Assuming the use of single occupancy vehicles for the workers results in 260 exiting vehicles. Only miscellaneous inbound trips to the Site would be expected in the p.m. peak hour and these have been estimated at 10 trips.

Roadways that will be impacted the most by Project traffic include CR 544A (Derby Avenue), SR 655 (Recker Highway), US 92, and SR 544 (Havendale Boulevard). Estimated traffic assignment from the Project Site to these roadways was based upon the location of logical trip ends for the traffic generated by the Project. It is expected that 60-percent of the Project trips will depart the Site and travel to the east on Derby Avenue, with the remaining 40-percent traveling to the west. Most eastbound trips will likely travel to Havendale Boulevard where 30-percent will then travel to the northwest and 20-percent will travel to the southeast. The remaining 10-percent of the trips will travel on local connecting roads. Westbound trips will travel to Recker Highway where 30 percent of the trips will then travel to the north and 10-percent will travel to the south. At the US 92 and Recker Highway intersection, 20-percent will then travel to the west and 10-percent to the east on US 92 (see **Figure 4.6.3-1**).

Information was obtained from the Polk County Planning Department concerning the existing road lanes, the Level of Service standard that applies to the road segment, and existing peak season peak hour traffic volumes on these roads. This information is summarized in **Table 4.6.3-1**. The projected peak construction traffic has been added to these road segments to determine the maximum peak-season, peak-hour traffic volume. The Level of Service (LOS) for the total traffic volume has been determined using the Florida Department of Transportation's generalized LOS tables for transitioning areas. As is indicated in **Table 4.6.3-1,** all road segments that will be impacted by construction traffic will continue to operate at an acceptable level of service.

Table 4.6.3-1 Osprey Energy Center Traffic Impacts - Construction Phase

Road	Limits	Exist Road	Classification	LOS Std.	Direction	Existing Peak Hour*	Project Traffic	Total Traffic	LOS
CR 544A	SR 655 to Project Ent.	2LU	Major	E	EB	208	4	212	C
			Collector	E	WB	228	134	362	C
CR 544A	Project Ent. To SR 544	2LU	Major	E	EB	208	202	410	C
			Collector	E	WB	228	6	234	C
SR 655	US 92 to CR 544A	2LU	Major	E	NB	564	101	665	B
			Arterial	E	SB	684	3	687	B
SR 655	SR 544A to South	2LU	Major	E	NB	564	1	565	B
			Arterial	E	SB	684	34	718	B
US 92	SR 655 to West	4LD	Principal	D	EB	1609	2	1611	C
			Arterial	D	WB	1326	67	1393	C
US 92	SR 655 to SR 544	6LD	Principal	D	EB	1500	34	1534	B
			Arterial	D	WB	1242	1	1243	B
SR 544	US 92 to CR 544A	6LD	Major	E	EB	812	3	815	C
			Arterial	E	WB	986	101	1087	C
SR 544	CR 544A to South	6LD	Major	E	EB	812	67	879	C
			Arterial	E	WB	986	2	988	C

*Peak Season Peak Hour Directional Traffic Volume

Sources: Polk County Planning Department, RS&H, 1999

4.6.4 HOUSING AND EDUCATION IMPACTS

It is estimated that the workforce during the 24-month construction phase of the project would average 162 persons, with a peak workforce of 325 persons. A majority of these construction workers will be skilled tradesmen (cement masons, laborers, millwrights, pipe fitters, carpenters, electricians, plumbers, etc.), although there will be approximately 20 construction and project management personnel. The average duration of any particular trade onsite during construction will be approximately six (6) months. It is estimated that a significant number of these workers will travel to the job site from outside the immediate Auburndale area and from surrounding communities. Only about 10-percent of the construction workforce will seek temporary housing in the Auburndale area. As a result, it is anticipated that a maximum of 32 persons will become temporary residents during the construction phase of the Project.

Traditional practice is that the construction workers will not bring their families with them if they seek temporary housing. Therefore, the local population may increase by 32 new people in the area for a temporary period lasting from three to four months to up to two years. Due to the fact that construction workers do not bring their families for short-term construction assignments, minimal impacts on area schools and other local infrastructure is expected.

According to the Florida Department of Labor and Employment Security, approximately 10,314 construction workers reside within the Central Florida Region, with the majority of these in Polk County (1998 Florida Abstract). Since a more-than-adequate labor supply exists within commuting distance, it is anticipated that workers will be hired from within the region with minimal relocation required. Consequently, construction should have no effect on permanent housing within the region. As is typical with mid-term (i.e., 1 to 2 years) construction projects, some workers commuting from longer distances may choose to reside in transient accommodations (hotels and motels), returning to their permanent homes and families on weekends.

With the exception of the minor use of transient accommodations and related potable water and sanitary sewer services, no new impacts are expected on community services and facilities within the region as a result of the construction effort. Those workers hired from the area will have already established usage patterns and will probably continue to frequent the same facilities and establishments that they used prior to employment on this Project. Consequently, any new demands will be dispersed throughout the region and should not create any noticeable change in the availability of area community services and facilities due to the small number of potential employees that may relocate into the area.

4.7 IMPACT ON LANDMARKS AND SENSITIVE AREAS

No impacts to landmarks will result from the construction of the Osprey Energy Center. There are no federal, state, regional, or local scenic or cultural and natural landmarks within a five-mile radius of the proposed Project.

4.8 IMPACT ON ARCHEOLOGICAL AND HISTORIC SITES

Although there are archeological and historic sites within the 5-mile radius of the proposed Project, construction activities for the Project will not impact the sites identified in Section 2.2.6. The Division of Historical Resources (DHR) was contacted prior to submittal of the SCA and DHR confirmed that significant archaeological and historical sites are not considered likely to be present at the Site. The proposed Project will have no effect on any sites listed, or eligible for listing, in the National Register of Historic Places, or otherwise of national, state, or local significance.

If any archaeological or historic site or sites are found during construction, Calpine will implement a "chance find" procedure – i.e., a certified archaeologist will evaluate the Site and will determine the significance of the find in consultation with DHR. If the find is considered significant by DHR, measures will be taken by the applicant to preserve or mitigate the impact to the archaeological or historic resources.

4.9 SPECIAL FEATURES

There will be no unusual products, raw materials, garbage disposal services, incinerator effluents, or residues produced during construction that will have an influence on the environment or ecological systems of the Site or the adjacent areas.

4.10 BENEFITS FROM CONSTRUCTION

Numerous benefits will result directly from Site preparation and construction activities. Site preparation and construction will create job opportunities within the City of Auburndale and Polk County. These employment opportunities will result in wage and income increases in the area, and direct and indirect purchases of goods and services. A detailed description of the socioeconomic benefits associated with the construction of the Osprey Energy Center is presented in Chapter 7.0.

4.11 VARIANCES

No variances will be required for the construction of the Osprey Energy Center.

5.0 EFFECTS OF PLANT OPERATION

5.1 EFFECTS OF THE OPERATION OF THE HEAT DISSIPATION SYSTEM

5.1.1 TEMPERATURE EFFECT ON RECEIVING BODY OF WATER

The Osprey Energy Center will not discharge any wastewater into surface waters. Therefore, no temperature effect on surface water bodies will occur.

5.1.2 EFFECTS ON AQUATIC LIFE

Since the Project will not be discharging any wastewater into surface waters, there will be no impact to aquatic life.

5.1.3 BIOLOGICAL EFFECTS OF MODIFIED CIRCULATION

The Project will not receive surface water, nor discharge to surface waters. Therefore, no modification of natural circulation will occur.

5.1.4 EFFECTS OF OFF-STREAM COOLING

This Project will use mechanical draft wet cooling towers. Evaporative losses from the cooling tower will leave the system in the form of vapor. In addition, small quantities of water may be lost due to drift (0.002-percent of the circulating water rate). The proposed water used in the cooling system will be composed of approximately three-fourths groundwater and one-fourth reclaimed water. The reclaimed water will receive high level disinfection and will be used in compliance with Chapter 62-610, F.A.C. As a result, no biological and/or health impacts are anticipated (see **Appendix 10.1.5** for a discussion of cooling tower impacts on ambient air quality).

The impacts of the proposed cooling tower for the Osprey Energy Center Project were addressed by performing plume dispersion analyses that predicted the potential impacts of the Project with respect to:

- Plume length
- Fogging
- Icing

- Plume visibility
- Plume shadowing
- Salt deposition

Assessments of maximum annual cooling tower impacts of potential plume-induced fogging and icing, saline deposition, and shadowing were predicted with the seasonal and annual cooling tower impact (SACTI) model, which was developed through the Electric Power Research Institute (EPRI, 1984). Standard hourly meteorological data of surface weather observations and coincident twice-daily mixing height data are used in the analysis and processed with cooling tower data (e.g., tower size, height, latitude/longitude) by a preprocessor program. The output meteorological record is utilized by the SACTI model to predict the increase in annual frequencies of meteorological events due to a particular cooling tower's design and configuration. Icing and fogging frequencies at a particular location are based on the prediction of the cooling tower's visible plume length under various ambient meteorological conditions. The impacts of the visible plumes are evaluated in the model through use of physical plume dispersion in conjunction with an algorithm to take into account the thermodynamic interactions of the plume as well as any potential wake effects. The SACTI model can also determine the potential drift and deposition frequencies by wind direction and distance category from a cooling tower.

The general parameters used in the modeling are presented in Chapter 3.0, **Table 3.4.1-2**. A distribution of the predicted drift droplet sizes for the cooling tower design is presented in **Table 5.1.4-1**. The salt drift emissions from the cooling tower were based on the theoretical maximum concentration of total dissolved solids (TDS) of 1,400 ppm expected in the circulating water. In reality, the TDS concentrations are expected to be 50-percent or lower than this level. As a result, these analyses will produce conservative (i.e., higher than expected) impacts due to the cooling tower.

Hourly surface meteorological data and twice-daily mixing height data from the National Weather Service (NWS) stations at the Tampa International Airport and in Ruskin, respectively, were used for the years 1987 through 1991. This 5-year record coincides with

the meteorological data used for other air quality impact analyses presented in Section 5.6. Long-term monthly clearness indices and daily solar insolation values were also furnished.

The SACTI model calculations utilized a polar coordinate receptor grid system centered on the tower. Receptors were placed surrounding the source at 22.5-degree intervals and at varying distance intervals. For the salt deposition and plume length computations, 100-m intervals out to 10,000 m were used; for plume fogging and icing computations, 100-m intervals out to 1,600 m were used; for plume height, 10-m intervals up to 1,000 m were used; and for plume shadowing, 200-m intervals out to 8,000 m were used.

In order to estimate impacts conservatively, it was assumed that the tower would operate year-round. This would produce conservative estimates of plume length, fogging, icing, plume shadowing, and salt deposition. Appendix 10.13 presents the input and output parameters for seasonal and annual cooling tower impact.

5.1.4.1 Meteorological Impacts

The frequencies of visible plume length and height, fogging, and plume shadowing resulting from the proposed cooling tower for the Project are presented in Appendix 10.1.5. An elevated visible plume with a maximum length of 300 m is predicted to occur only 0.49-percent of the time and a maximum of 0.07-percent in any one direction. The plume length will be 100 m or less about 93-percent of the time. The highest frequency of this occurrence is in the west direction (wind blowing from the east) occurring 12-percent. However, in this direction beyond 100 m, it is expected that the plume would be barely perceptible (0.10-percent of the time at 200 m). Due to the low frequency of occurrence of the visible plume, the effect on local meteorology is expected to be insignificant.

The nearest main roads to the Project Site are Recker Highway (County Road 655) about 275 m (900 ft) to the south and Derby Avenue about 140 m (450 ft) to the north. Localized, temporary, ground-level fogging may occur infrequently during plume downwash conditions. This locally induced fog would dissipate rapidly due to the high winds associated with plume downwash conditions. Induced fogging to the cooling tower is not

expected to occur at 100 m or more from the towers. Icing is not predicted to occur from cooling tower drift.

Plume shadowing was estimated to decrease significantly with increasing distance from the cooling tower. Beyond 200 m (660 ft) from the tower, the annual average number of hours of plume shadowing in any direction is estimated to be less than 50 hours per year. While the plume visibility is related to plume shadowing, the effect occurs primarily close to the cooling tower. In addition, plume heights are predicted to be less than 50 m (164 ft) about 96-percent of the time. Plume shadowing due to the cooling tower is not expected to have a significant adverse effect on visibility in the surrounding area.

5.1.4.2 Salt Deposition Impacts

The maximum salt deposition predicted from the cooling tower proposed for the Osprey Energy Center Project is presented in **Table 5.1.4-2.** The maximum and second-highest monthly depositions from the cooling tower are predicted to be 8.3 and 8.2 kg/km^2/month (approximately 99.6 and 98.4 kg/km^2/yr), respectively. These depositions are predicted to occur about 0.4 km from the tower toward the west and west-southwest, respectively. At a distance of 1.0 km, the maximum deposition drops by about 70-percent to about 2.7 kg/km^2/month (32 kg/km^2/yr).

Saline drift can impact plants through direct absorption of salt deposited on leaf tissue as well as through absorption of salt accumulated in the soil. A literature search was conducted to determine the threshold limits of salt exposure that produce injury in native and agricultural species of vegetation.

The most extensive studies to date on the effects of saline cooling tower drift were made as part of the Chalk Point Cooling Tower Project in Maryland (Davis, 1979; Moon, 1979). These studies included a series of experiments and field observations on the impact of saline aerosols on seedlings of several woody perennial species (Patterson *et al.*, 1978, 1979; Curtis *et al.*, 1976, 1977; Francis, 1977). Of the species studied, only white flowering dogwood (*Cornus florida*) was found to exhibit sufficient injury symptoms to be useful as a bioindicator at the depositions expected under cooling tower operation conditions at Chalk Point (Curtis *et al.*,

1976). The expected onsite depositions ranged from 800 to 16,000 kg/km^2/yr. Offsite deposition of approximately 1,200 kg/km^2/yr (1,000 kg/km^2/month), which were about equivalent to natural salt deposition for the area, were predicted from the Chalk Point towers.

A similar evaluation on effects on soils and agricultural crops was also conducted in the Chalk Point project (Mulchi, 1980, 1981; Armbruster, 1979; Mulchi *et al.*, 1976, 1977, 1978, 1979). Evaluated crops included corn (*Zea mays*), soybean (*Glycine max*), and tobacco (*Nicotiana tobacum*). Davis (1979) reported statistical analyses on this data for dogwood, corn, and soybeans. He was able to develop regression equations between salt deposition and leaf chloride concentration, and between leaf chloride concentrations and leaf injury in dogwood, and between leaf chloride concentration and yield in corn and soybean.

At deposition rates between 6,100 and 24,000 kg/km^2/yr (508 and 2,017 kg/km^2/month), Curtis *et al.* (1976) found that resultant leaf chloride levels of 3,466 to 6,124 μg/gram dry weight (gdw) caused injuries in about 5- to 40-percent of the leaves of dogwood. Statistical correlation indicates a threshold leaf injury level of 9,000 kg/km^2/yr (750 kg/km^2/month). Their conclusion was that "some injury may occur to a sensitive species such as dogwood under certain cooling tower operations," as based on the estimated deposition rate of 9,800 kg/km^2/yr (816 kg/km^2/month). Statistical refinement of these data (Davis, 1979) indicates that the threshold value might be somewhat lower, in the vicinity of 6,200 kg/km^2/yr (516 kg/km^2/month).

A second major series of studies has been performed at Boyce Thompson Institute (BTI) (McCune *et al.*, 1977; Silberman and McCune, 1978). Silberman and McCune tested dogwood as well as northern red oak (*Quercus borealis*), Carolina hemlock (*Tsuga caroliniana*), Canadian hemlock (*T. canadensis*), corn, and potato (*Solanum tuberosum*). These studies were conducted in controlled environmental chambers in which plants were exposed to simulated salt drift for 6 hour periods and then returned to separate controlled chambers for injury evaluation after 7 days. The data of Silberman and McCune (1978) indicate the deposition threshold for dogwood to be about 0.17 g/m^2 (170 kg/km^2) of total accumulated salt. Reported values for other species include corn at 1.1 g/m^2 (1,100 kg/km^3), potato at 0.67 g/m^2

(670 kg/km^3), northern red oak at 0.67 g/m^2 (670 kg/km^2), Carolina hemlock at 1.1 to 2.1 g/m^2 (1,100 to 2,100 kg/km^3), and Carolina hemlock at 0.06 g/m^2 (60 kg/km^3). As shown by the two hemlock species, salt tolerance may vary between closely related species. Studies conducted at BTI found that the majority of species have an injury threshold level approximately four to seven times higher than that of dogwood.

Freudenthal and Beals (1978) have proposed a method for estimating salt injury potential based on the injury levels developed by Silberman and McCune (1978) and McCune *et al.* (1977). Their method includes several assumptions based on work of McCune and Silberman. These include an underlying assumption that the potential for botanical injury is a function only of the accumulated chloride ion and associated deposition of salt. It is therefore independent of the rate at which salt is deposited and whether the deposition is applied in a single dose or in several cumulative doses. They also assumed rainfall would wash all salt from the leaves. Using their model with their assumption of 2-week intervals between rain events, the annual deposition rate for damage in dogwood would be 4,500 kg/km^2/yr (375 kg/km^2/month).

An approximate ordering of plant species based on available data from the above-cited research and best estimates of tolerances is presented in **Table 5.1.4-3**. The species that may occur in the vicinity of the Project Site are also identified in this table. As noted on the table, these species generally have very high to moderate resistance to salt levels consistent with the surrounding environment. However, three salt-sensitive species, including flowering dogwood, cinnamon fern (*Osmunda cinnamomea*), and royal fern (*Osmunda regalis*), may occur in the vicinity of the site. However, since the predicted annual deposition is extremely low (99.6 kg/km^2/yr) and within close proximity to the cooling tower, no adverse impacts are expected.

In addition to direct absorption of salt deposited on leaf tissues, vegetation may be affected by absorbing salts that accumulate in the soil. Accumulation will occur if the annual deposition rate of salt exceeds the rate at which salt is leached from the soil by rainfall. However, it is difficult to predict which plant species would be most affected by soil salinity, as tolerance to salt spray does not necessarily parallel known plant tolerances to soil salinity,

but is governed by rate of foliage absorption (Grattan *et al.*, 1981). Studies with sandy loam soil indicate that a deposition rate of approximately 10,000 kg/km2/month of sodium chloride can cause some accumulation of salt in soil. Most of the soils onsite are quite sandy throughout the profile and exhibit high permeability and leaching capability. Since the maximum deposition rate predicted for the Osprey Energy Center is only 0.4-percent of the monthly threshold value that could cause salt accumulation in the soil, no significant soil impacts are expected.

5.1.5 MEASURING PROGRAM

No heat dissipation monitoring program is proposed.

Table 5.1.4-1. Estimated Drift Emission Spectrum for the Cooling Tower for the Osprey Energy Center

Particle Size Range (micrometers)	Total in Size Range (percent)
0 – 50	50.00
51 – 100	25.00
101 – 150	12.00
151 – 250	9.10
251 – 400	3.15
401 – 500	0.48
>500	0.27

Source: The Marley Cooling Tower Company, 1992.

Table 5.1.4-2. Maximum Salt Deposition Predicted for the Osprey Energy Center

Direction	Salt Deposition (kg/km²/month) at Distances (km) from Center of Cooling Tower											
	0.1	0.2	0.3	0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0
North	1.9	3.1	3.5	3.8	2.9	2.9	1.3	0.5	0.1	0.1	0.1	0.04
North-northeast	1.4	2.2	2.4	2.5	1.7	1.7	0.8	0.4	0.1	0.1	0.1	0.03
Northeast	1.1	1.5	1.5	1.9	1.8	0.6	0.5	0.3	0.05	0.03	0.03	0.08
East-northeast	1.4	2.0	2.0	2.2	1.3	0.5	0.4	0.3	0.04	0.02	0.02	0.01
East	2.2	3.9	3.9	4.2	2.7	1.4	0.8	0.4	0.07	0.03	0.03	0.01
East-southeast	1.4	2.3	2.8	2.8	1.9	1.1	0.7	0.4	0.08	0.04	0.03	0.02
Southeast	1.5	2.4	2.4	2.9	3.0	1.4	1.0	0.7	0.1	0.07	0.06	0.1
South-southeast	1.4	2.2	2.6	2.5	1.9	1.8	0.8	0.3	0.1	0.1	0.1	0.03
South	2.4	3.7	4.3	4.6	3.5	3.5	1.7	0.6	0.2	0.2	0.2	0.07
South-southwest	1.6	2.6	3.0	3.5	2.8	2.8	1.4	0.4	0.2	0.2	0.2	0.05
Southwest	2.4	3.5	3.6	4.1	5.5	3.7	3.4	1.7	0.6	0.2	0.2	0.2
West-southwest	4.5	6.8	6.8	8.2	7.1	5.7	5.1	2.7	1.0	0.2	0.4	0.1
West	4.3	6.9	6.9	8.3	6.8	5.1	4.3	2.3	1.0	0.4	0.3	0.08
West-northwest	3.0	4.4	4.4	5.3	4.1	2.8	2.4	1.4	0.4	0.4	0.4	0.04
Northwest	1.7	2.5	2.5	2.8	3.1	1.8	1.5	0.9	0.3	0.2	0.1	0.07
North-northwest	1.6	2.4	2.7	3.1	2.3	2.3	1.2	0.4	0.1	0.1	0.1	0.05

Source: Golder Associates Inc., 2000.

Table 5.1.4-3. Approximate Salt Tolerance Levels of Some Plant Species (Page 1 of 2)

Very Tolerant (Threshold: >4,000 kg/km²; LD50: >10,000 kg/km²)[a]	
Marsh-elder	*Iva imbricata*
Marsh-elder	*Iva frutescens*
Very High or High Resistance (Threshold: 1,000 to 5,000 kg/km²; LD50: 4,000 to 10,000 kg/km²)[a]	
Red cedar[b]	*Juniperus virginiana*
Saltbush[b]	*Baccharis halmifolia*
Yaupon[b]	*Ilex vomitoria*
Northern bayberry	*Myrica pennsylvatica*
American holly	*Ilex opaca*
Large cranberry	*Vaccinium macrocarpon*
Pitch pine	*Pinus rigida*
Switchgrass	*Panicum virgatum*
Cattail[b]	*Typha latifolia*
Black Cherry[b]	*Prunus serotina*
Live oak[b]	*Quercus virginiana*
Waxmyrtle[b]	*Myrica cerifera*
Low gallberry[b]	*Ilex glabra*
Bullbrier greenbrier[b]	*Smilax bona-nox*
Lettuce	*Lactuca sativa*
Moderate Resistance (Threshold: 400 to 1,000 kg/km²; LD50: 1,000 to 4,000 kg/km²)[a]	
Winged sumac[b]	*Rhus copallina*
Tulip tree	*Liriodendron tulipifera*
Norway spruce	*Picea abies*
Virginia Pine	*Pinus Virginiana*
California privet	*Ligustrum ovalifolium*
Snap bean	*Phaseolus vulgaris*
Carolina hemlock	*Tsuga caroliniana*
Virginia creeper[b]	*Parthenocissus quinquefolia*
Grape[b]	*Vitis* spp.
Common greenbrier[b]	*Smilax rotundifolia*
Low Resistance (Threshold: 200 to 400 kg/km²; LD50: 500 to 1,000 kg/km²)[a]	
Soybean	*Glycine max*
White ash	*Fraxinus americana*
Red maple[b]	*Acer rubrum*
Highbush blueberry[b]	*Vaccinium corymbosa*
Staggerbush	*Lyonia mariana*
Southern red oak	*Quercus falcata*
Azalea	*Rhododendron* sp.
Corn	*Zea mays*
Peach	*Prunus persica*

Table 5.1.4-3. Approximate Salt Tolerance Levels of Some Plant Species (Page 2 of 2)

Very Low Resistance or Intolerant (Threshold: 40 kg/km^2; LD50: 200 kg/km^2)[a]	
Sassafras [b]	*Sassafras albidum*
Southern arrowwood	*Viburnum dentatum*
Northern red oak	*Quercus borealis*
Potato	*Solanum tuberosum*
Sedge [b]	*Cyperus grayii*
Royal fern [b]	*Osmunda regalis*
Cinnamon fern [b]	*Osmunda cinnamonea*
Marsh fern	*Thelypteris palustris*
Apple	*Malus pumila*
Grapefruit	*Citrus* sp.
Avocado	*Persea americana*
Silver maple	*Acer saccharinum*
Flowering dogwood [b]	*Cornus florida*
Canadian hemlock	*Tsuga canadensis*

[a] Approximate threshold of response and 50-percent leaf damage (LD50) levels for accumulated salt deposition.

[b] Species (or closely related species) which may occur in the vicinity of the Osprey Energy Center.

5.2 EFFECTS OF CHEMICAL AND BIOCIDE DISCHARGES

5.2.1 INDUSTRIAL WASTEWATER DISCHARGES

5.2.1.1 Surface Water Discharges

The Osprey Energy Center will not have any direct surface process water discharges. The Site will have four types of off-site discharges: (1) cooling tower blowdown; (2) low-volume plant wastewater; (3) off-site sanitary wastewater; and (4) Site stormwater. Power plant low-volume wastewater includes plant and equipment drain wastes, demineralizer regenerant waste streams, plant water pretreatment filter backwash, and sanitary wastewaters. Anticipated generation rates for these wastewater streams are presented in **Figure 3.5-3.** With the exception of stormwater, all other types of wastewater from the Site will be discharged to the City of Auburndale's wastewater treatment facilities for treatment and disposal. Sanitary wastewater will be disposed of separately from the cooling tower and plant process wastewater. Treatment and potential impacts of low-volume plant wastewater are discussed below. The Site stormwater and plant-related sanitary wastewater are discussed in Sections 5.3.4 and 5.5, respectively.

The proposed Project will discharge wastewater generated from cooling tower blowdown and low-volume process wastewater at the Site to the City of Auburndale's wastewater treatment facilities. A dedicated pipe will carry this discharge to the Allred Wastewater Treatment Plant. The City of Auburndale has a permit from the Florida Department of Environmental Protection (FDEP) for the operation of the Allred Wastewater Treatment Plant and for the discharge of treated wastewater from the Allred Wastewater Treatment Plant to a sprayfield and a surface water feature (Lake Lena Run). The City's treatment plant is operating in compliance with FDEP permit requirements. Under normal operating conditions, the Allred Wastewater Treatment Plant will be able to receive, treat, and dispose of the Project's wastewater while maintaining compliance with the FDEP permit. As such, the wastewater from the Project will have virtually no adverse surface water quality impacts on the downstream water quality of Lake Lena Run.

The proposed wastewater discharge plan will be to combine cooling tower blowdown with plant process wastes (sanitary wastewater is discharged separately). This plant wastewater

can be sent either to Allred's Wastewater Treatment Plant or the North Regional Plant for treatment. Plant wastewater will be collected in a tank prior to disposal and monitored for flow and sampled for quality prior to disposal. Under certain conditions, the wastewater discharge will be routed to the City of Auburndale's North Regional Treatment facility:

- If the Allred facility cannot accommodate the volume of wastewater from the Project due to sprayfield limitations, and
- If results from the Project wastewater storage tank indicate that additional treatment is necessary.

5.2.2 COOLING TOWER BLOWDOWN

Evaporative losses in the cooling tower will result in a concentration of constituents in the cooling tower circulation water. To prevent accumulation of undesirable constituents from exceeding acceptable limits, chemicals will be added to control water chemistry, and a stream of water (blowdown) will be removed from the tower continuously and discharged to the wastewater effluent stream. The concentrations of constituents in the cooling tower blowdown are directly related to the number of cycles of concentration. Based on the water quality of the reclaimed water received from the City of Auburndale and the cycles of concentration in the lower basin, the concentrations of effluent constituents will vary. **Table 5.2.2-1** presents a range of water quality for cooling tower blowdown as a function of cycles of concentration.

Groundwater, from the Upper Floridan aquifer, will be used as a supplemental source for cooling tower make-up and will be used as a backup source, should reclaimed water from Auburndale become temporarily unavailable.

5.2.3 MEASUREMENT PROGRAMS

The circulating water system and cooling tower basin will be monitored to determine water quality. This will be accomplished using grab-samples, which will be taken several times a day to determine pH and other specific parameters. Water conductivity will be continuously monitored. Conductivity provides an inclusion of the relative amount of chlorides, sodium, and other ionic (conductive) constituents.

Wastewater will be collected in a storage tank prior to being sent off site. Parameters that will be monitored through the use of grab samples and in-line monitors include: pH, conductivity, chloride concentration, etc. In addition, discharge volumetric flow will be continuously monitored.

Table 5.2.2.-1 Supply and Wastewater Chemistry Limits[4]

Parameter	Wastewater Return (mg/l)[5,6,7]		Water Supply (mg/l)		Remarks
	3.5 Cycles	5 Cycles	Groundwater	Reclaimed	
pH	adjusted	adjusted	8.1	8.02	
Total Suspended Solids	<5.0	<5.0	<5.0	<5.0	
Total Dissolved Solids	617	880	124.5	330	
Total Hardness (as $CaCO_3$)	322	457	74	156	Note 1
Calcium	247	350	68	81	
Magnesium	98	139	29	25	
Sodium	128	182	4	150	
Potassium	33	47	9.4	9.4	
Alkalinity (as $CaCO_3$)	120	150	90	96	Note 2
Sulfate	40	56	3	40	
Chloride (as $CaCO_3$)	89	126	5	96	
Total Nitrogen	7	10	<0.5	<5	Note 3
Silica (as SiO_2)	58	83	17	16	
Iron (Fe^{2+} and Fe^{3+})	<1.0	<0.1	<0.1	<0.08	
Lead	<0.083	<0.083	<0.01	<0.1	
Barium	40	40	40	<0.1	
Strontium	<1	<1		0.07	
Arsenic	<0.15	<0.15	<0.01	<0.01	
Beryllium	0.0025	0.0025	0.0025		
Sulfur (SO_4)	27	12	–	44	
Boron	<0.05	<1	–	0.3	
Cadmium	0.018	0.018	0.018		
Chromium (hexavalent)				<0.01	
Total Chromium	3.3	3.3	3.3	<0.01	
Cobalt	0.48	0.48	0.48		
Copper	<0.05	<0.15	<0.01	<0.01	
Cyanide	0.073	0.073	0.073		
Fluoride	2.94	2.94	2.94		
Manganese	0.03	0.1	<0.01	<0.01	
Mercury	<0.0015	<0.0015	<0.0002	<0.0002	
Nickel	1.75	1.75	1.75	2	
Oils and Grease	100	100	100	50	
Phenolics				10	
Silver	0.005	0.005	0.005		
Zinc	0.035	0.07	<0.01	<0.01	
CBOD5	10	975	975	<2.0	
Total phosphorus	3.5	24	24	0.7	
Tetrachlorethylene	0.53	0.53	0.53		
Trichloroethylene	0.71	0.71	0.71		
Toluene	1.31	1.31	1.31		
Vinyl chloride	0.004	0.004	0.004		
CBOD5	<100	<100	<2.0	<2.0	
Phosphate (PO_4)	11	20	0.2	14	
Total phosphorus	2	3.5	0.2	0.7	
Conductivity	1,500	2,000	210	530	

[1] Sum of Calcium ($CaCO_3$), Magnesium ($CaCO_3$), and Sodium ($CaCO_3$)
[2] Methyl Orange ($CaCO_3$)
[3] Below laboratory detection limit (BLD) of 5 mg/l
[4] All figures are in mg/l, unless otherwise indicated.
[5] Calculations are based on the reclaimed water and groundwater supply concentrations shown.
[6] Variations in reclaimed water chemistry will affect discharge parameters.
[7] Wastewater concentrations are calculated based on preliminary figures and as a function of cycles of concentration.
Source: Nalco Chemical Company, November 1999; Calpine, Inc., 1999.

5.3 IMPACTS ON WATER SUPPLIES

5.3.1 SURFACE WATER

No surface water withdrawals are planned for the Project. The Project will receive reclaimed water from the Allred Wastewater Treatment Plant that would otherwise be applied to their sprayfield or, in some instances, Lake Lena Run. This use of reclaimed water from the City of Auburndale's Allred Wastewater Treatment Plant has no impact on water supplies of existing legal uses.

5.3.2 GROUNDWATER

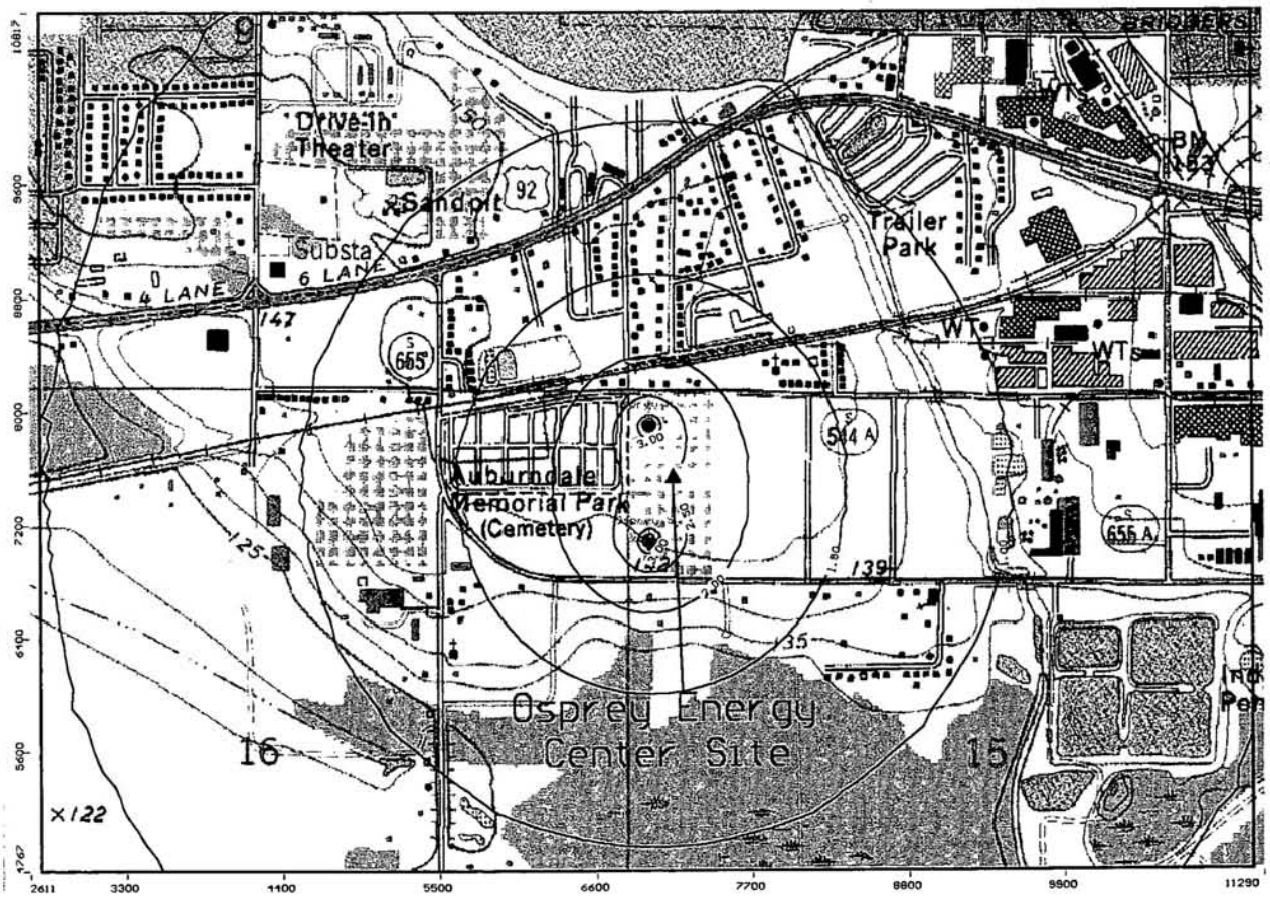
The Project proposes three on-site groundwater supply wells to supplement the reclaimed water supply. Only two wells will operate at any given time, the third well will serve exclusively as emergency backup. The maximum daily groundwater withdrawal is approximately 4 mgd.

The effects that groundwater withdrawal will have on the area surrounding the Osprey Energy Center were simulated using Visual MODFLOW. The analyses were performed with a conservative approach (i.e., no recharge from precipitation to the aquifers) as requested by SWFWMD and outlined in Part C (Water Use Design Aid) of the SWFWMD Water Use Permit Information Manual (July, 28 1999). The analyses were performed using the peak pumping period withdrawal rates in a leaky aquifer under steady-state conditions. Four distinctive layers were modeled: the surficial aquifer system (SAS) was modeled as the top layer followed by the intermediate aquifer system, a confining unit, and the Upper Floridan aquifer (UFA) as layers 2, 3, and 4, respectively. The results indicated that the maximum drawdown at the Site boundary will be approximately 2.8 feet in the UFA (see **Figure 5.3.2-1**). This 2.8-foot drawdown in the UFA is less than the 4.0-foot drawdown limit at the property boundary and beneath wetlands and water bodies allowed by SWFWMD, as stated in Part C of the Water Use Permit Information Manual (July 28, 1999). The maximum expected drawdown in the SAS (see **Figure 5.3.2.2**) at the property boundary is 0.36 foot. This 0.36-foot drawdown in the SAS is less than the 1.0-foot drawdown limit at the property boundary and beneath wetlands and water bodies allowed by SWFWMD, as stated in Part C of the Water Use Permit Information Manual (July 28, 1999). Drawdown contours produced in the intermediate aquifer system were identical to those in the SAS (see **Figure 5.3.2-2**). Therefore, the analysis demonstrates that

there are no adverse impacts from pumping on wetlands, surface waters, or existing legal uses. See Appendix 10.1.8 for a thorough discussion of groundwater modeling results.

IMAGE QUALITY

AS YOU REVIEW THE NEXT FEW PAGES, PLEASE NOTE THAT THE ORIGINAL DOCUMENT WAS OF POOR QUALITY.



Contour Interval: 0.5 feet

Scale: 1"=1320'

⊕ Withdrawal Well

N

Golder Associates

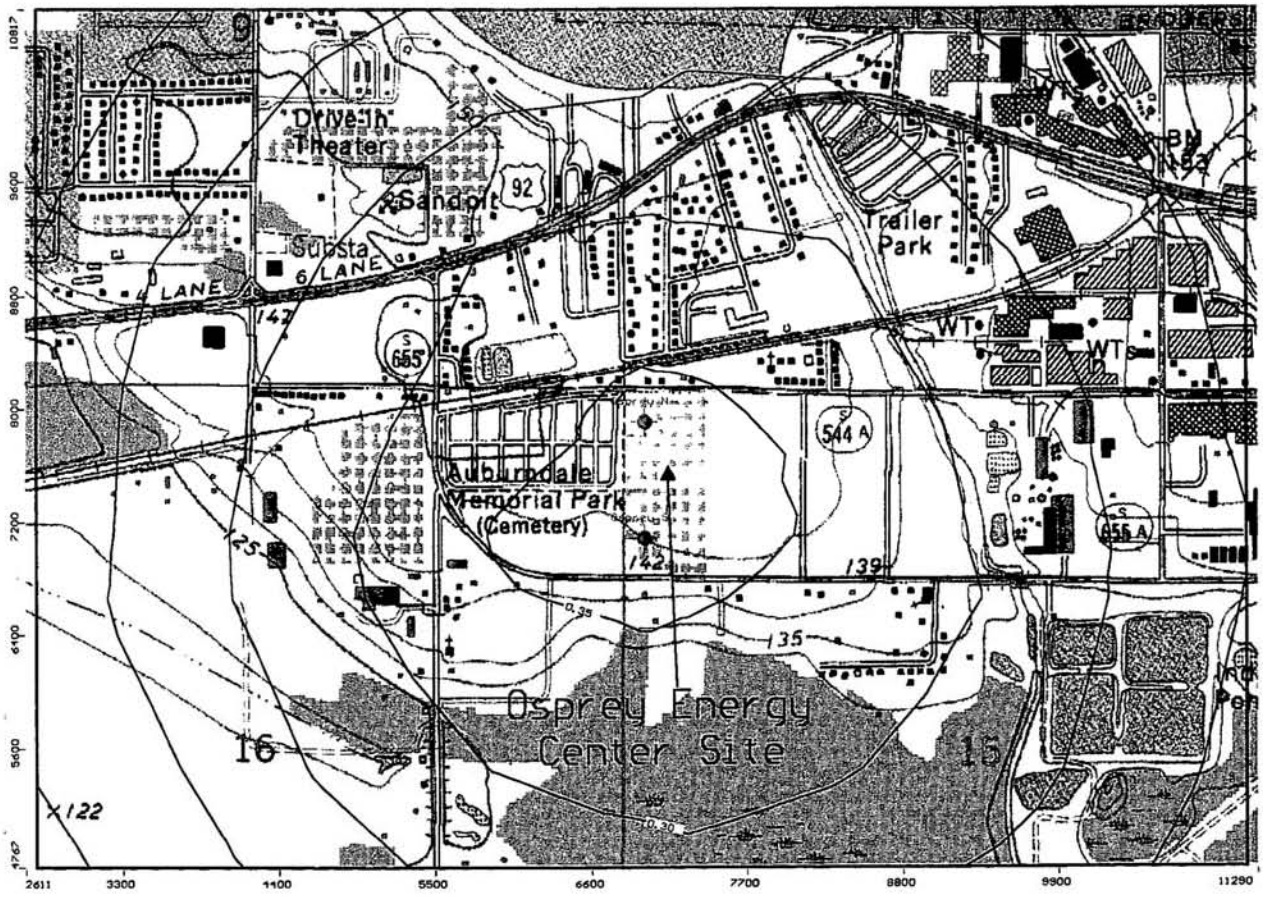
Tampa, Florida

Drawdown in the Upper Floridan Aquifer – Peak Withdrawal Rates, Steady State (OS1)

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	NTS	Job No.	993-9570
CHK BY:	RAZ	DATE:	03/04/00	FIGURE	5.3.2-1
REV BY:	–	FILE No.:	fig5_3_2-1.dwg		



Contour Interval: 0.05 feet

Scale: 1"=1320'

⊕ Withdrawal Well

N

Golder Associates

Tampa, Florida

Drawdown in the Surficial Aquifer System – Peak Withdrawal Rates, Steady State (OS1)

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	NTS	Job No.	993-9570
CHK BY:	RAZ	DATE:	03/04/00	FIGURE	5.3.2-2
REV BY:	–	FILE No.:	fig5_3_2-2.dwg		

The stormwater management system for the Site will include dry detention ponds. The quantity of water percolated through the bottom of the detention ponds will be an estimated 0.81 acre-foot. The impact on the surficial aquifer system at the Site (19.5 acres) resulting from the detention ponds is approximately 0.4 inches for the design storm event (25 year, 24 hour).

5.3.3 DRINKING WATER

Potable water for the facility will be provided from the City of Auburndale water supply system. The total potable water use for the facility is estimated to be approximately 3,000 gpd. The City water supply system currently has 3.6 mgd of available capacity. The plant's requirement for potable water is minimal. Therefore, the potable water required for the Project will not have a significant impact on the City's water supply system capacity of 3.6 mgd. Groundwater modeling of the aquifers, discussed in Section 5.3.2, underlying the Site indicates that the drawdown from the new wells on the Site will not impact the water supply wells of adjacent property owners.

5.3.4 LEACHATE AND RUNOFF

The Project does not require solid waste disposal facilities (e.g., coal ash landfills) that would generate leachate.

The Site stormwater management system will be designed to meet all applicable SWFWMD, FDEP, and City of Auburndale stormwater quantity and quality control requirements. Plant stormwater runoff will be discharged, after treatment by the detention ponds, to ditches along the northern right-of-way of Recker Highway and the southern right-of-way of Derby Avenue. The roadway flow patterns indicate that the swales eventually overflow into Lake Lena Run, approximately 4,000 feet east of the Site. Details regarding the Site stormwater system design are presented in Appendix 10.1.7.

Given the Project fuel is natural gas that will be delivered by pipeline, no storm water will be contaminated by the Project's fuel. Runoff from several "contact" areas, such as the transformer area, will be contained and inspected or sampled to verify that there is no oil

contamination after a rainstorm event. If no contamination is present, an isolation valve will be opened to send the stormwater to the detention ponds. If oil is found, then the transformer basin water will be managed by a qualified contractor. Discharge of treated stormwater will have no adverse impacts on downstream water quality.

5.3.5 MEASUREMENT PROGRAMS

There will be regular monitoring of the Project wastewater storage tank to ensure compliance with Publically Owned Treatment Works pretreatment and/or discharge requirements.

5.4 SOLID/HAZARDOUS WASTE DISPOSAL IMPACTS

5.4.1 SOLID WASTE

Because of the type of fuel to be utilized at the Osprey Energy Center (e.g., natural gas), only small quantities of solid wastes will be generated at the plant (see Section 3.7.1). Solid wastes will be limited to municipal solid waste (office and breakroom waste) and infrequent replacement of demineralizer resins. Sanitary wastes (approximately 1.5 to 2.0 gpm) will be transferred by existing pipeline adjacent to the Site to the City of Auburndale's wastewater treatment facilities.

Other solid wastes will be managed by a contractor (franchised collector by the City of Auburndale or retained directly by the Project). For disposal, the nearest available sanitary landfill is the North Central Landfill near Lakeland. There will be no on-site disposal of solid wastes. Because of the small quantities of wastes generated, there will be no significant impacts to existing landfill space or resource recovery capacity.

5.4.2 HAZARDOUS WASTE

No significant on- or off-site impacts will result from the wastes generated by the operation of the facility. The potentially hazardous wastes generated by the operation of the Osprey Energy Center are produced during the regeneration of the demineralizers and the replacement of the SCR catalyst. The demineralized waste streams will be neutralized in an off-site tank. The SCR catalyst will be replaced periodically (typically every 3 to 7 years). Catalyst replacement will be performed by a qualified contractor who would remove the spent catalyst block from the Site. These blocks may be recycled using a regeneration process (in the contractors off-site shop). After a number of such cycles, no further regeneration is possible. The spent catalyst block will be disposed of by the contractor in a permitted hazardous waste landfill.

Chemical cleaning wastes (see Section 3.6) will be managed off-site at a licensed facility in a neutralization unit prior to routing the wastewater to the City of Auburndale.

5.5 SANITARY AND OTHER WASTE DISCHARGES

As previously discussed in Sections 3.6.3 and 5.2.1, sanitary wastewaters will be discharged to the City of Auburndale wastewater treatment and disposal system (Allred Treatment Plant). Sanitary wastewater will be treated in the City's sewage treatment plant.

Discharge of process wastewater is discussed in Section 5.3.

5.6 AIR QUALITY IMPACTS

5.6.1 IMPACT ASSESSMENT

5.6.1.1 Regulatory Applicability

Air quality impact analyses were performed to estimate the potential air quality impacts of pollutant emissions from the Osprey Energy Center. These analyses are discussed in detail in the PSD permit application contained in Appendix 10.1.5. The technical information and analysis required by the federal and state PSD regulations are contained in this PSD application. Although this document is an appendix to the SCA, it has been prepared as a stand-alone PSD application to allow FDEP, EPA, and other involved agencies to readily review the Project's emissions and impacts. The following sections present a summary of the air modeling approach used and air quality impacts obtained. These results demonstrate that the Project will comply with all AAQS and PSD Class II and I increments.

The Osprey Energy Center will be a new air pollution source that will result in increases in air emissions in Polk County. The EPA has implemented regulations requiring a PSD review for new or modified sources that increase air emissions above certain threshold amounts. PSD regulations are codified in 40 Code of Federal Regulations (CFR) Part 52.21 and implemented through delegation to the FDEP. Florida's PSD regulations are codified in Rule 62-212.400, F.A.C.

Under Federal and State of Florida PSD review requirements, all major new or modified sources of air pollutants regulated under the Clean Air Act (CAA) must be reviewed and a pre-construction permit issued. EPA has approved Florida's State Implementation Plan (SIP), which contains Florida's PSD regulations; therefore, PSD approval authority has been granted to DEP.

A "major facility" is defined as any one of 28 named source categories that have the potential to emit 100 tons per year (TPY) or more or any other stationary facility that has the potential to emit 250 TPY or more of any pollutant regulated under CAA. "Potential to emit" means the capability, at maximum design capacity, to emit a pollutant after the application of control equipment. Once a new source is determined to be a "major facility" for a particular

pollutant, any pollutant emitted in amounts greater than the PSD significant emission rates is subject to PSD review.

Because the Project is classified as one of the named source categories and will have the potential to emit more than 100 TPY of at least one regulated pollutant, the Project is subject to PSD review. In addition, more than one regulated pollutant will be emitted in amounts greater than 100 TPY as well as amounts greater than the PSD significant emission rates.

The Project's proposed annual emissions are presented in **Table 5.6.1-1** and compared to the significant emission rate thresholds. Based on the proposed emissions for the Project, a PSD review is required for each of the following regulated pollutants:

- Particulate matter (PM) as total suspended particulate matter (TSP),
- Particulate matter with aerodynamic diameter of 10 microns or less (PM_{10}),
- Sulfur dioxide (SO_2),
- Nitrogen dioxide (NO_2),
- Carbon monoxide (CO),
- Volatile organic compounds (VOC), and
- Sulfuric acid mist.

Polk County has been designated as an attainment area for all criteria pollutants [i.e., ozone (O_3), PM_{10}, SO_2, CO, and NO_2] and is classified as a PSD Class II area for PM_{10}, SO_2, and NO_2; therefore, the PSD review will follow regulations pertaining to such designations.

PSD review is used to determine whether significant air quality deterioration will result from the new or modified facility. Major facilities are required to undergo the following analysis related to PSD for each pollutant emitted in significant amounts:

- Control technology review,
- Source impact analysis,

Table 5.6.1-1 Proposed Emissions Due to the Osprey Energy Compared to the PSD Significant Emission Rates

Pollutant	Emissions (TPY)		PSD Review Required?
	Potential Emissions from Proposed Project[a]	Significant Emission Rate	
Sulfur Dioxide	95	40	Yes
Particulate Matter [PM(TSP)]	199	25	Yes
Particulate Matter (PM_{10})	194	15	Yes
Nitrogen Dioxide	258	40	Yes
Carbon Monoxide	797	100	Yes
Volatile Organic Compounds	70	40	Yes
Lead	NEG	0.6	No
Sulfuric Acid Mist	15	7	Yes
Total Fluorides	NEG	3	No
Total Reduced Sulfur	NEG	10	No
Reduced Sulfur Compounds	NEG	10	No
Hydrogen Sulfide	NEG	10	No
Mercury	0.000014	0.1	No
MWC Organics (as 2,3,7,8-TCDD)	NEG	3.5 x 10-6	No
MWC Metals (as Be, Cd)	NEG	15	No
MWC Acid Gases (as HCl)	NEG	40	No
MSW Landfill Gases (NMOC)	NEG	50	No

Note: NEG= Negligible.
MWC= municipal waste combustor
MSW = municipal solid waste
TCDD= tetra- through octa-chlorinated dibenzo-p-dioxins and dibenzofurans
Be= beryllium
Cd= cadmium
HCl= hydrogen chloride
NMOC= non-methane organic compounds

[a] Based on Project operating in combined cycle mode with two CTs at baseload conditions firing natural gas for 5,880 hours at 59°F ambient temperature and power augmentation with duct firing at a maximum heat input rate of 250 mmBtu/hr for 2,880 hours at 95°F ambient temperature. Includes emissions from cooling tower, emergency generator and fire pump. For CO emissions, the two CTs are assumed to operate at 60-percent load for 1,500 hours displacing those hours at baseload operations.

Air quality analysis (monitoring),

- Source information, and
- Additional impact analyses.

The control technology review requirements of the federal and state PSD regulations require that all applicable federal and state emission-limiting standards be met, and that Best Available Control Technology (BACT) be applied to control emissions from the source. The BACT requirements are intended to ensure that the control systems incorporated in the design of a proposed facility reflect the latest in control technologies used in a particular industry and take into consideration existing and future air quality in the vicinity of the proposed facility. BACT must, as a minimum, demonstrate compliance with new source performance standards (NSPS) for a source (if applicable). An evaluation of the air pollution control techniques and systems, including a cost-benefit analysis of alternative control technologies capable of achieving a higher degree of emission reduction than the proposed control technology, is required. The cost-benefit analysis requires the documentation of the materials, energy, and economic penalties associated with the proposed and alternative control systems, as well as the environmental benefits derived from these systems. A decision on BACT is to be based on sound judgment, balancing environmental benefits with energy, economic, and other impacts.

A source impact analysis must be performed for criteria pollutants to address compliance with AAQS and PSD Class II and I increments. These analyses may be limited to the new source if the net increases in impacts as a result of the new source are below significant impact levels. The significant impact levels are threshold levels that are used to determine the level of air impact analyses needed for the Project. If the new source's impacts are predicted to be less than significant, then the source's impacts are assumed not to have a significant adverse affect on air quality and additional modeling with other sources is not required. However, if the source's impacts are predicted to be greater than the significant impact levels, additional modeling with other sources is required to demonstrate compliance with ambient air quality standards.

An air quality monitoring analysis must be performed that contains an analysis of continuous ambient air quality data in the area affected by the proposed major stationary facility. Existing data from the vicinity of the proposed source may be used if the data meet certain quality assurance requirements; otherwise, additional data may need to be gathered. The regulations also include an exemption that excludes or limits the pollutants for which an air quality analysis must be conducted if the air quality impacts for the proposed source are predicted to be less than the *de minimis* levels. Source information must be provided to adequately describe the proposed Project. The general type of information required for this Project is presented in Section 2.0.

Additional analyses of the proposed source's impacts on soils, vegetation, and visibility, especially as they affect PSD Class I areas, must be performed. Air quality impacts as a result of general commercial, residential, industrial, and other growth associated with the source also must be addressed.

The proposed methods and assumptions used in the air quality modeling analyses to support the air permit application were submitted in a separate protocol document to FDEP (Golder Associates, February 2000). The objective of developing and submitting a technical protocol document was to obtain concurrence with the proposed methodologies from FDEP and appropriate regulatory agencies prior to performing the detailed analyses. FDEP did not object to, or otherwise comment, on the proposed protocol for the Project.

The following sections describe the methods and assumptions used to determine the air quality impacts due to the Osprey Energy Center and provide a summary of the maximum air quality impacts associated with the proposed Project.

5.6.1.2 Analysis Approach and Assumptions

General Modeling Approach

The air quality modeling approach followed EPA and FDEP modeling guidelines for determining compliance with AAQS and PSD increments.

To develop the maximum concentrations for the Project, the general modeling approach was divided into screening and refined phases. The basic difference between the two phases is that the receptor grid used to predict concentrations in the refined phase is denser (i.e., 100-m spacing) than that used in the screening phase.

After final lists of highest annual and short-term concentrations were developed, the refined phase of the analysis was conducted as necessary by predicting concentrations for a refined receptor grid centered on the receptor at which the highest annual or short-term concentration from the screening phase was produced. The air dispersion model was executed for the entire year with the refined receptor grid. This approach was used to ensure that valid highest concentrations were obtained. Descriptions of the emission inventory and receptor grids used in the screening and refined phases of the analysis are presented in the following sections with detailed discussions given in the PSD Permit Application, Appendix 10.1.5.

Air Quality Models

The selection of an air quality model to calculate air quality impacts for this Project was based on its ability to simulate impacts in areas surrounding the Site as well as at the PSD Class I area of the Chassahowitzka NWA, located about 102 km from the Site. Two air quality dispersion models were selected and used in these analyses to address air quality impacts for the Project. These models were:

- Industrial Source Complex Short Term (ISCST3) dispersion model, and
- California Puff model (CALPUFF).

The ISCST3, Version 99155, dispersion model (EPA, 1999) was used to evaluate the maximum pollutant impacts due to the Project in nearby areas surrounding the Site. The ISCST3 model is applicable for estimating the air quality impacts in areas that are within 50 km from a source. This model is maintained by the EPA on its Internet website, Support Center for Regulatory Air Models (SCRAM), within the Technical Transfer Network (TTN).

The ISCST3 model is designed to calculate hourly concentrations based on hourly meteorological data (i.e., wind direction, wind speed, atmospheric stability, ambient temperature, and mixing heights). The ISCST3 model is applicable to sources located in either flat or rolling terrain where terrain heights do not exceed stack heights. These areas are referred to as simple terrain. The model can also be applied in areas where the terrain exceeds the stack heights. These areas are referred to as complex terrain.

The Site is no more than 148 feet above mean sea level (USC&GS, 1929). Around the immediate vicinity of the Site, the terrain is flat to gently rolling with elevations that range within 10 to 20 feet of the Site elevation. Due to the minimal amount of terrain elevation differences in the Project's vicinity, receptor elevations were not included in the analysis. As a result, the simple terrain option was used for the air modeling analysis which assumes that all receptors are at the same elevation as the stack base elevations for the HRSG and cooling tower.

At distances beyond 50 km from a source, the CALPUFF model, Version 5.0 (EPA, 1998), is recommended for use by the EPA and FDEP. The CALPUFF model is a long-range transport model applicable for estimating the air quality impacts in areas that are more than 50 km from a source. The methods and assumptions used in the CALPUFF model were based on the latest recommendations for modeling analysis as presented in the *Interagency Workgroup on Air Quality Models (IWAQM), Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts* (EPA, 1998). This model is also maintained by the EPA on the SCRAM website.

As a result, the CALPUFF model was used to perform the significant impact analysis at the Chassahowitzka NWA for the Project.

For modeling analyses that will undergo regulatory review, such as PSD permit applications, the following model features are recommended by EPA (1998) for rural mode and are referred to as the regulatory default options in the ISCST3 model and, where applicable, the CALPUFF model:

- Final plume rise at all receptor locations,
- Stack-tip downwash,
- Buoyancy-induced dispersion,
- Default wind speed profile coefficients for rural mode,
- Default vertical potential temperature gradients, and
- Calm wind processing.

In this analysis, the EPA regulatory default options were used to address maximum impacts.

Meteorological Data

Meteorological data used in the ISCST3 model to determine air quality impacts consisted of a concurrent five-year period of hourly surface weather observations and twice-daily upper air soundings from the National Weather Service (NWS) stations at Tampa International Airport and Ruskin, Florida, respectively. The five-year period of meteorological data were from 1987 through 1991, which are the latest readily available data for these stations that are acceptable to the FDEP. The NWS station at Tampa is located approximately 42 miles west of the proposed Site while the NWS station at Ruskin is located approximately 45 miles southwest of the proposed Site.

These meteorological data are the most complete and representative of the region around the Site because both the Site and the weather stations are located in areas that experience similar weather conditions, such as frontal passages. In addition, these data have been approved for use by the FDEP in previous air permit applications to address air quality impacts for other proposed sources locating in Polk County and adjacent counties.

Emission Inventory

Stack and operating parameters and emission rates of criteria pollutants for the CTs, duct burners, and cooling tower were developed from design data supplied by equipment vendors for the Project. The design data were developed for the turbines firing natural gas and operating at 60-, 75-, and 100-percent of maximum capacity in combined cycle model. Because the inlet ambient air temperature directly affects turbine combustion and operation,

design data were also provided for three ambient air temperatures that cover the range of temperatures for the Project Site location: 32, 59, and 95°F. Air dispersion modeling was performed for the three operating loads and three ambient temperatures to provide a range of operating conditions that will produce maximum ground-level impacts. These modeling scenarios encompass the operating conditions that will produce the maximum emissions on a short-term basis (i.e., 100-percent load at 32°F) and the minimum plume rise (i.e., 60-percent load at 95°F). In addition, air dispersion modeling was performed when duct firing and power augmentation are used in the HRSG.

The stack, operating, and emission data used in the air dispersion modeling are presented in **Tables 2-1 through 2-3** and Attachment A of Appendix 10.1.5.

Receptor Locations

For predicting maximum concentrations in the vicinity of the Project, a polar receptor grid was used which consisted of 729 receptors. These receptors included 36 receptors located on radials extending out from the proposed stack location for HRSG No. 1. Along each radial, receptors were located beginning at the fenced plant property and extending to distances of 100; 200; 300; 400; 500; 700; 1,000; 1,500; 2,000; 2,500; 3,000; 4,000; 5,000; 7,000, 10,000; 12,000; 15,000; 20,000; 25,000; and 30,000 m. However, concentrations were predicted only at receptors located off plant property that would be considered ambient air locations. As a result, because the proposed plant property extends out from a minimum distance of about 60 m in several directions to about 330 m for other directions, there were directions for which receptors were not modeled at certain distances (e.g., 200 m) which would not be considered ambient air locations.

For each pollutant and averaging time, modeling refinements were performed, as needed, by employing a Cartesian receptor grid with a maximum spacing of 100 m centered on the receptor and for the year during which the maximum impact from the Project was predicted.

For the PSD Class I analysis, the maximum concentrations were predicted at 13 receptors surrounding the PSD Class I area of the Chassahowitzka NWA. These receptors have been provided by the FDEP for use on previous applications.

5.6.1.3 Model Results

A summary of the maximum pollutant concentrations predicted due to the proposed emissions from the Osprey Energy Center is presented in **Table 5.6.1-2**. As shown in this table, the maximum predicted PM_{10}, SO_2, NO_2, and CO impacts due to the Project are all below the significant impact levels. Because the Project will not have a significant impact upon the air quality in the vicinity of the Site, more detailed modeling analyses for determining compliance with the AAQS and PSD Class II increments are not required.

The maximum predicted PM_{10}, SO_2, NO_2, and CO impacts due to the Project are also below the *de minimis* monitoring levels. Because the proposed source will not have predicted impacts greater than *de minimis* levels, preconstruction monitoring data are not required to be submitted as part of the PSD review.

A summary of the maximum pollutant concentrations predicted at the PSD Class I area of the Chassahowitzka NWA due to the proposed emissions from the Osprey Energy Center is presented in **Table 5.6.1-3**. As shown in this table, the maximum predicted PM_{10}, SO_2, and NO_2 impacts due to the Project are all below the PSD Class I significant impact levels. Because the Project will not have a significant impact upon the air quality in the PSD Class I area, more detailed modeling analyses for determining compliance with the AAQS and PSD Class II increments are not required.

Based on these results, the maximum impacts predicted for the Osprey Energy Center will not cause or contribute to a violation of any applicable AAQS, or any PSD Class II or Class I increments.

5.6.1.4 Additional Impact Analysis

Impacts Due To Direct Growth

The Osprey Energy Center is being constructed to meet current and projected electric demands. Additional growth as a direct result of the additional electric power provided by the Project is not expected.

Table 5.6.1-2 Summary of Maximum Pollutant Concentrations Predicted for Two Combustion Turbines and Cooling Tower Compared to the EPA Class II Significant Impact Levels

Pollutant	Averaging Time	Maximum Predicted Concentration (ug/m^3)	EPA Class II Significant Impact Levels (ug/m^3)	PSD Class II Increments (ug/m^3)	AAQS (ug/m^3)
WITHOUT DUCT FIRING					
Combustion Turbines Only					
SO_2	Annual	0.051	1	25	60
	24-Hour	1.35	5	91	260
	3-Hour	7.07	25	512	1,300
PM10	Annual	0.11	1	17	50
	24-Hour	2.98	5	30	150
NO_2	Annual	0.14	1	25	100
CO	8-Hour	79	500	NA	10,000
	1-Hour	427	2,000	NA	40,000
Combustion Turbines and Cooling Tower					
PM10	Annual	0.26	1	17	50
	24-Hour	4.5	5	30	150
WITH POWER AUGMENTATION & DUCT FIRING					
Combustion Turbines Only					
SO_2	Annual	0.036	1	25	60
	24-Hour	1.21	5	91	260
	3-Hour	7.38	25	512	1,300
PM10	Annual	0.07	1	17	50
	24-Hour	2.3	5	30	150
NO_2	Annual	0.09	1	25	100
CO	8-Hour	48	500	NA	10,000
	1-Hour	251	2,000	NA	40,000
Combustion Turbines and Cooling Tower					
PM10	Annual	0.23	1	17	50
	24-Hour	3.9	5	30	150

NA = not applicable

Table 5.6.1-3. Summary of Maximum Pollutant Concentrations Predicted for Two Combustion Turbines and Cooling Tower Compared to the EPA Class I Significant Impact Levels and PSD Class I Increments

Pollutant	Averaging Time	Maximum Predicted Concentration (ug/m^3) ISCST3 Model	Maximum Predicted Concentration (ug/m^3) CALPUFF Model	EPA Class I Significant Impact Levels (ug/m^3)	PSD Class I Increments (ug/m^3)
WITHOUT DUCT FIRING					
Combustion Turbines Only					
SO_2	Annual	0.0027	NM	0.1	2
	24-Hour	0.056	NM	0.2	5
	3-Hour	0.23	NM	1.0	25
PM10	Annual	0.0055	NM	0.2	4
	24-Hour	0.114	NM	0.3	8
NO_2	Annual	0.0072	NM	0.1	2.5
Combustion Turbines and Cooling Tower					
PM10	Annual	0.0057	NM	0.2	4
	24-Hour	0.12	NM	0.3	8
WITH POWER AUGMENTATION & DUCT FIRING					
Combustion Turbines Only					
SO_2	Annual	0.0030	0.0014	0.1	2
	24-Hour	0.062	0.024	0.2	5
	3-Hour	0.25	0.072	1.0	25
PM10	Annual	0.0057	NM	0.2	4
	24-Hour	0.118	NM	0.3	8
NO_2	Annual	0.0079	0.0014	0.1	2.5
Combustion Turbines and Cooling Tower					
PM10	Annual	0.0059	0.0034	0.2	4
	24-Hour	0.12	0.052	0.3	8

Note: NM= not modeled

Construction of the Project will occur over a 22-month period requiring an average of approximately 162 workers during that time. It is anticipated that many of these construction personnel will be drawn from outside the Project area and will commute to the job site.

The Osprey Energy Center will employ a total of approximately 25 operational employees at project build-out. In addition, annual contracted maintenance workers will be hired for periodic routine services. It is expected that most of these workers will be contracted from outside the region. The workforce needed to operate the Project represents a small fraction of the population already present in the immediate area. Therefore, while there would be a small increase in vehicular traffic in the area, the effect on air quality levels would be minimal.

There are also expected to be no air quality impacts due to associated industrial/commercial growth given the Site's location relative to the City of Auburndale. The existing community infrastructure should be more than adequate to provide any support services that the Project might require.

Impacts On Soils, Vegetation, Wildlife, And Visibility

The additional impact analyses on the potential effects of the Osprey Energy Center to soils, vegetation, wildlife, and visibility in the vicinity of the Site and at the PSD Class I area of the Chassahowitzka NWA are also not expected to be significant. Certain air pollutants in acute concentrations or chronic exposures can impact soils, vegetation, and wildlife. Based on available literature, soils impacts can result from SO_2 and NO_2 deposition creating an acidic reaction or lowering of soil pH. Vegetation is sometimes affected by acute exposures to high concentrations of pollutants often resulting in foliar damage. Lower dose exposure over longer periods of time or chronic exposure can often affect physiological processes within plants causing internal and external damage.

Based on an evaluation of the literature for effects from SO_2, acid rain (sulfuric acid mist), NO_2, CO, and combinations of these pollutants, emissions from the Project will not result in

impacts that cause harm to soils and vegetation. Maximum concentrations of SO_2, PM_{10}, NO_2, and CO predicted in the vicinity of the Site are at least an order of magnitude lower than the EPA Class II significant impact levels, therefore no significant impacts associated with facility operations are expected. These maximum concentrations are less than 1-percent of the AAQS. Since the AAQS are designed to protect the public welfare, including effects on soils and vegetation, no detrimental effects on soils or vegetation are expected to occur in this area. Similarly, maximum concentrations of SO_2, PM_{10}, and NO_2 predicted at the PSD Class I area of the Chassahowitzka NWA are lower than the EPA Class I significant impact levels, indicating that Project's impacts will not cause harm to soils and vegetation in the Class I area.

The major air quality risk to wildlife in the United States is from continuous exposure to pollutants above the National AAQS. This occurs in non-attainment areas, none of which are located in Florida. Risks to wildlife also may occur for wildlife living in the vicinity of an emission source that experiences frequent upsets or episodic conditions resulting from malfunctioning equipment, unique meteorological conditions, or startup operations. Under these conditions, chronic effects (e.g., particulate contamination) and acute effects (e.g., injury to health) have been observed. For impacts on wildlife, the lowest threshold values of SO_2, NO_2, and particulates which are reported to cause physiological changes are up to three or more orders of magnitude larger than maximum predicted concentrations for the Project. As a result, no effects on wildlife due to SO_2, NO_2, and particulate emissions from the Project are expected.

No visibility impairment is expected from the Project in the immediate vicinity of the Site or at the PSD Class I area at the Chassahowitzka NWA due to the type and quantities of emissions from the Osprey Energy Center. The opacity from the combustion exhausts from the Project will be very low and are typically at or approaching zero. Emissions of PM_{10} and SO_2 will also be low due to the use of low-sulfur content natural gas, the cleanest fuel commercially available. While the Project will emit NO_x and VOC, the potential to impair visibility at the local level as well as regional haze at the PSD Class I area are expected to be relatively low, given the very low expected exhaust opacity. Also, the aesthetic character of the property adjacent to the Osprey Energy Center is largely influenced by the Auburndale

Power Project, which is located adjacent to the Site, as well as the other industries located within several kilometers of the Site. As a result, the Project will not adversely affect aesthetic or visual qualities in the area.

5.6.2 MONITORING PROGRAMS

5.6.2.1 Ambient Air Quality Monitoring

Pre- and post-construction ambient air quality monitoring is not anticipated to be required for the Osprey Energy Center because the air quality analyses demonstrate that the Project's impacts are less than the *de minimis* monitoring thresholds and will comply with all applicable ambient standards.

5.6.2.2 Air Emissions Monitoring

The Osprey Energy Center will be subject to the applicable NSPS for the combustion turbines (CTs) (40 CFR Part 60, Subpart GG) and the duct burners (40 CFR Part 60, Subpart Db) and the acid rain program (40 CFR 75). Continuous monitoring of fuel consumption will be conducted for the CTs as required by Subpart GG. Monitoring of fuel sulfur and nitrogen content will also be performed pursuant to Subpart GG, 60.334(b). Initial performance testing of the CTs for SO_2 and NO_x emissions will be conducted as required by Subpart GG, 60.335.

Continuous emission monitoring (CEM) for SO_2 and NO_x is required for gas-fired affected units in accordance with the provisions of 40 CFR 75. SO_2 emissions for natural gas may be determined using procedures established in Appendix D, 40 CFR Part 75. CO_2 emissions must also be determined either through a CEM (e.g., as a diluent for NO_x monitoring) or calculation. Alternate procedures, test methods, and quality assurance/quality control (QA/QC) procedures for CEM are specified in Part 75 Appendices A through I. The CEM requirements including QA/QC procedures are, in general, more stringent than those specified in the NSPS for Subpart GG. New units are required to meet the requirements by the later of January 1, 1995, or not later than 90 days after the unit commences commercial operation. The Project will be required to either install CEMs for NO_x or PEMs (Predictive Emission Monitor) to meet the Part 75 requirements.

Initial and periodic compliance testing of pollutants emitted by the Osprey Energy Center will be conducted pursuant to the FDEP requirements as specified in the SCA Order or PSD permit. Florida DEP test methods are specified in Section 62-297.401, F.A.C.

5.7 NOISE IMPACTS

5.7.1 IMPACTS TO ADJACENT PROPERTIES

Noise monitoring data were collected during the on-site field sampling efforts to determine the noise impact of the Project at the Site boundaries. Ambient noise data were collected on two occasions and are shown on **Table 2.3.8-1.**

Based on monitoring results, current background noise levels do not meet the existing City of Auburndale's noise standards. Industrial noise standards at the 2,000 and 4,000 Hz octave bands are exceeded under existing baseline conditions. A comparison of background levels to the octave band standards as established by the City of Auburndale is presented in **Table 5.7.1-4.**

Interviews with Auburndale Power Plant Manager and the Auburndale City Manager did not disclose any noise-related complaints by residents or businesses in the area. A comparison of the industrial standards with noise standards permitted in non-industrial users (see **Table 5.7.1-1**) reveals that the City's noise ordinance allows more noise in non-industrial areas (e.g. residential areas) than industrial areas. For example, the average noise standard for industrial districts of 81.2 dB is lower than standards for other districts for either short-term (115 dB for 15 minutes or less) or long-term (90 dB for 8 hours) averaging time. The City has recognized this inconsistency and is in the process of revising the noise ordinance.

The noise impact evaluation of the operation of the facility was performed using noise-propagation computer programs to estimate noise levels (i.e., NOISECALC and Environmental Noise Model). Noise source levels were entered as octave band frequency levels. All noise sources were assumed to be point sources. The sound propagation model accounted for hemispherical spreading and atmospheric attenuation. Atmospheric attenuation was calculated based on data specified by the American National Standard Institute Method for the Calculation of the Absorption of Sound by the Atmosphere (ANSI S1.26R-1989). Path specific attenuation was not specified to account for the effects of vegetation, foliage and wind shadow thereby providing conservative results. Direction source characteristics were simulated using path-specific attenuation. Total and A-weighted (filtered to approximate human hearing) sound pressure levels (SPLs) were calculated. Background noise levels were incorporated into the model to calculate overall SPLs.

Neither the federal government nor the State of Florida has a noise standard applicable to the lands adjacent to the Site. Polk County has a nuisance noise ordinance without a numerical standard. This nuisance ordinance governs the northern, southern and eastern property boundaries of the Project.

The City of Auburndale has adopted, in its Land Development Regulations, noise standards and criteria for both industrial and other-than-industrial districts (e.g., residential). The numerical standards for industrial districts and non-industrial districts are summarized in **Table 5.7.1-1**. The City's industrial noise standards apply to land uses at or beyond the industrial district. The western property boundary, which is adjacent to the Auburndale Memorial Park Cemetery and within the limits of the City of Auburndale, is the closest non-industrial use district.

Table 5.7.1-2 presents the proposed facility's noise source data for the major noise-producing equipment, based upon preliminary engineering design information, which was used in the computer program. Noise impacts were predicted at each of the receiver sites depicted in **Figure 5.7.1-1**. The program calculated noise impacts due to the proposed facility alone and the total impact, utilizing the on-site background L_{eq} noise levels, as provided in Section 2.3.8. **Figure 5.7.1-2 and Table 5.7.1-3** present the maximum predicted noise impacts of the Osprey Energy Center at each receptor for each octave band compared to the City noise ordinance. The predicted impacts are above the City ordinance for industrial districts at several noise frequencies. When the total noise is considered, the noise from the Project is within the sound (dB) level described by the City ordinance for non-industrial districts.

5.7.2 IMPACT TO BIOTA

The projected noise from plant operations will not have any effect on surrounding biota. Wildlife species in the area few are limited in numbers due to lack of habitat. They also have been exposed to similar noise conditions from traffic, operations of the adjacent power plant, and other industrial and commercial activities in this region for many years and have either acclimated to the urban/industrial-type conditions or relocated.

Table 5.7.1-1 City of Auburndale Maximum Permitted Sound Pressure Levels (in decibels) Industrial Districts

Octave Band (cycles/second)	Sound Pressure Levels[a], decibels
18.75 - 37.49	79
37.50 – 149	74
150 – 299	66
300 – 599	59
600 – 1199	53
1200 – 2399	47
2400 – 4799	41
4800 and over	39
Combined Noise Levels	Overall = 81.3 dB
	A-weighted = 62.8 dBA

[a] *Maximums at or beyond the industrial district boundary shall be reduced 7 dB for hours between 8:00 a.m. and 6:00 p.m. and 10 dB between 6:00 p.m. and 8:00 a.m.*

All Districts Other Than Industrial

Duration/day, hours	Sound level (dB), A-weighing, SLOW response
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
.5	110
.25 or less	115

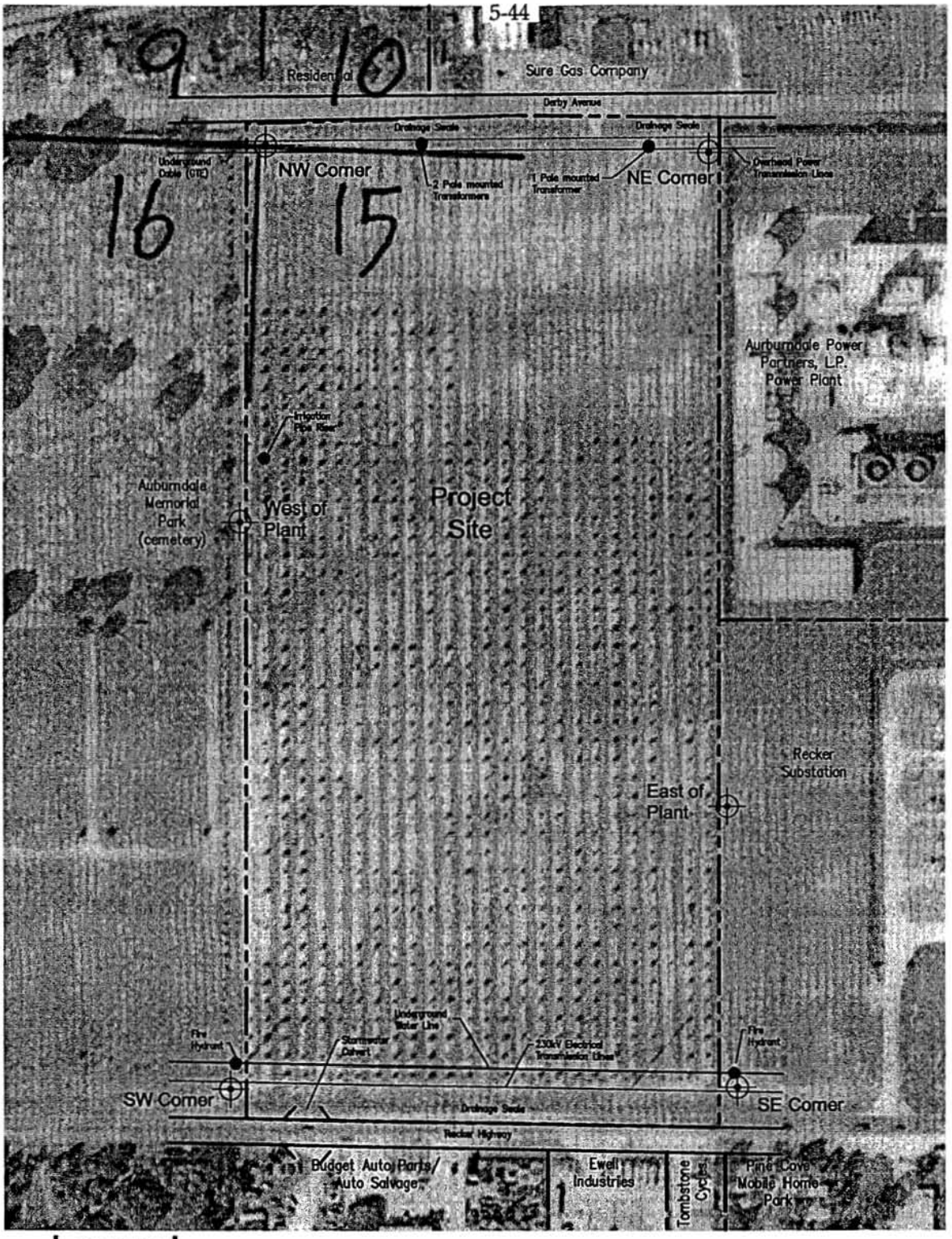
Source: City of Auburndale Land Development Regulations, Section 5.3.3.4 and 5.3.3.6

Table 5.7.1-2. Summary of Noise Source Data (Sound Pressure Levels) Used in Operational Impact Analysis for Osprey Energy Center

Noise Source[a]	Sound Power Level (dB) fo Octave Ban Center Frequency (Hz)									Overall Sound Power Level	
	31.5	63	125	250	500	1,000	2,000	4,000	8,000	dB	dBA
CT Inlet - 1	124.0	118.0	113.0	101.0	97.0	101.0	93.0	96.0	91.0	125.3	105.1
CT Inlet - 2	124.0	118.0	113.0	101.0	97.0	101.0	93.0	96.0	91.0	125.3	105.1
HRSG - 1 Wall (South)	120.0	116.0	112.0	107.0	100.0	89.0	84.0	70.0	55.0	122.1	102.5
HRSG - 2 Wall (North)	120.0	116.0	112.0	107.0	100.0	89.0	84.0	70.0	55.0	122.1	102.5
HRSG - 1 Stack	95.0	97.0	98.0	97.0	86.0	78.0	64.0	37.0	10.0	103.0	90.5
HRSG - 2 Stack	95.0	97.0	98.0	97.0	86.0	78.0	64.0	37.0	10.0	103.0	90.5
CT 1 Transformer	84.0	88.0	84.0	86.0	79.0	73.0	66.0	60.0	51.0	92.1	81.1
CT 2 Transformer	84.0	88.0	84.0	86.0	79.0	73.0	66.0	60.0	51.0	92.1	81.1
ST Transformer	84.0	88.0	84.0	86.0	79.0	73.0	66.0	60.0	51.0	92.1	81.1
Cooling Tower Cell 1-N	79.5	93.7	97.3	97.4	99.6	102.6	101.2	105.6	101.1	110.1	109.9
Cooling Tower Cell 2-N	79.5	93.7	97.3	97.4	99.6	102.6	101.2	105.6	101.1	110.1	109.9
Cooling Tower Cell 3-N	79.5	93.7	97.3	97.4	99.6	102.6	101.2	105.6	101.1	110.1	109.9
Cooling Tower Cell 4-N	79.5	93.7	97.3	97.4	99.6	102.6	101.2	105.6	101.1	110.1	109.9
Cooling Tower Cell 5-N	79.5	93.7	97.3	97.4	99.6	102.6	101.2	105.6	101.1	110.1	109.9
Cooling Tower Cell 6-S	79.5	93.7	97.3	97.4	99.6	102.6	101.2	105.6	101.1	110.1	109.9
Cooling Tower Cell 7-S	79.5	93.7	97.3	97.4	99.6	102.6	101.2	105.6	101.1	110.1	109.9
Cooling Tower Cell 8-S	79.5	93.7	97.3	97.4	99.6	102.6	101.2	105.6	101.1	110.1	109.9
Cooling Tower Cell 9-S	79.5	93.7	97.3	97.4	99.6	102.6	101.2	105.6	101.1	110.1	109.9
Cooling Tower Cell 10-S	79.5	93.7	97.3	97.4	99.6	102.6	101.2	105.6	101.1	110.1	109.9

[a] CT = combustion turbine; HRSG = heat recovery steam turbine; ST = steam turbine; N = north bank of cells; S - south bank of cells.

Sources: Siemens Westinghouse, 2000; Golder, 2000.



Legend

⊕ Noise Impact Receptor

0 50' 100' 200'
SCALE

Golder Associates — Tampa, Florida		Noise Impact Receptors	
Client / Project: Calpine Construction Finance Company, L.P. Osprey Energy Center	CAD BY: CDT	SCALE: 1"=200'	Job No. 993-9570
	CHK BY: RAZ	DATE: 03/04/00	FIGURE 5.7.1-1
	REV BY: –	FILE No.: fig5.7.1-1.dwg	

Figure 5.7.1-2 Predicted Operations Noise Impacts for the Osprey Energy Center Project

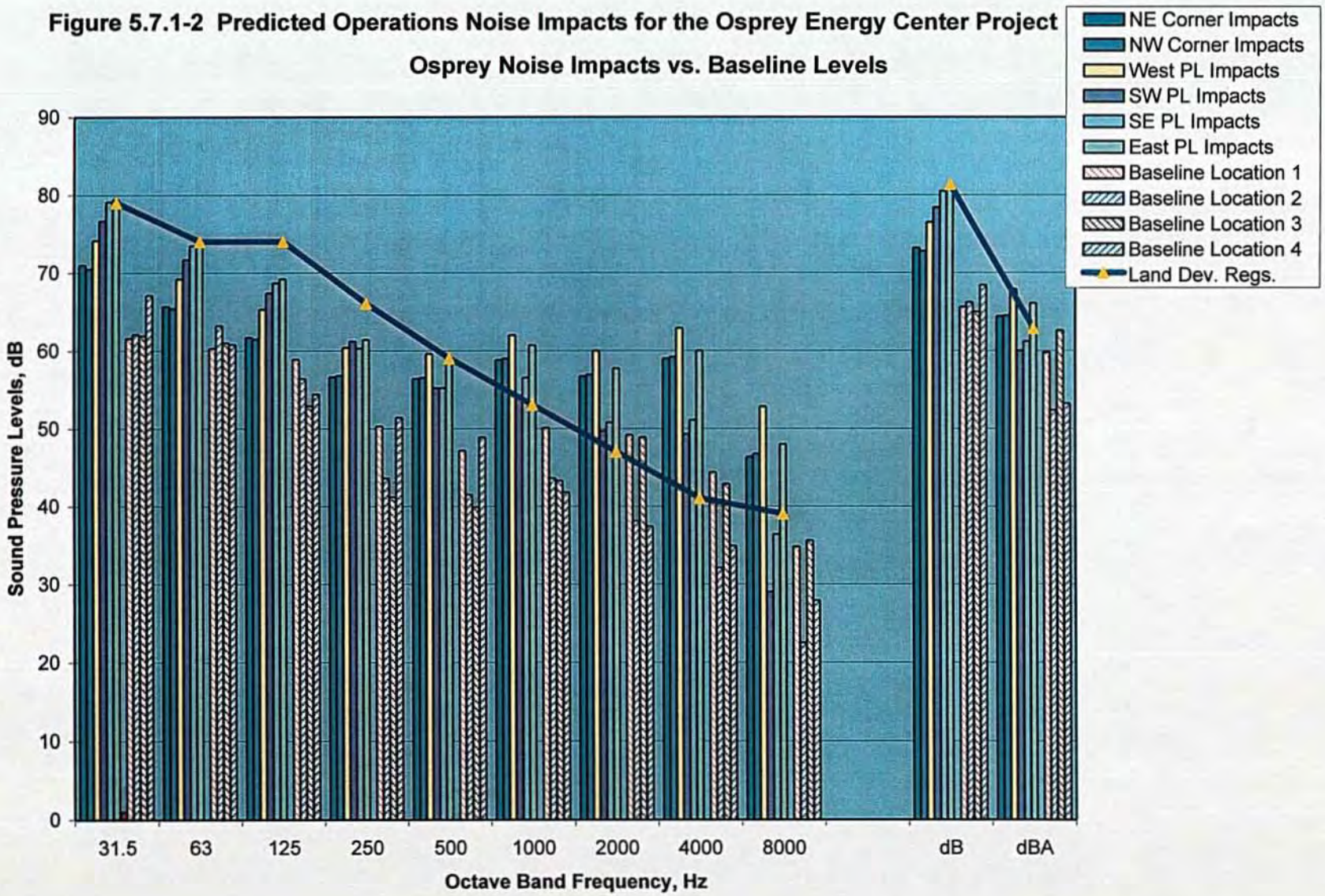


Table 5.7.1-3. Predicted Noise Impacts for the Osprey Energy Center

Octave Band (Hz.)[a]	Noise Impact Locations[b] (in dB)						Auburndale Noise Standards[c]	
	NW Corner	NE Corner	West of Plant	East of Plant	SW Corner	SE Corner	Industrial Districts	All Other Districts
31.5	70.5	71	74.2	79.4	76.7	79.1	79	
63	65.4	65.7	69.2	73.8	71.7	73.5	74	
125	61.5	61.7	65.3	69.2	67.4	68.7	74	
250	56.8	56.6	60.4	61.4	61.2	60.3	66	
500	56.5	56.4	59.6	58.6	55.2	55.2	59	
1000	59	58.8	62	60.7	54.1	56.5	53	
2000	56.9	56.7	60	57.7	49.7	50.8	47	
4000	59.2	59	62.9	60	49.3	51.1	41	
8000	46.8	46.4	52.8	48	29	36.4	39	
Project Impact without Background:								
dB	72.8	73.2	76.5	81.0	78.4	80.5	81.3	90
dBA	64.5	64.4	67.9	66.1	60	61.2	62.8	
Background:								
dB	71.7	71.4	60.3	68.4	73.3	73.3	81.3	90
dBA	60.5	60.5	52.4	53.2	62.6	62.6	62.8	
Total Noise Impact with Background:								
dB	75.3	75.4	76.6	81.2	79.6	81.3	84.3	90
dBA	66.0	65.9	68.0	66.3	64.5	65.0	65.8	

Shaded areas show values above Auburndale Noise Ordinance.

[a] Mid point of octave bands in the Auburndale noise standards.

[b] Locations shown on Figure 5.7.1-1.

[c] Only octave band noise standards apply to Industrial Districts; Noise standard for other districts is an 8-hour average; the maximum noise level is 115 dB for a 15 minute average.

Souces: Auburndale Land Development Regulations; Golder, 2000.

Table 5.7.1-4. Background Noise Monitoring Data Compared to Auburndale Land Development Regulations

	Octave Band Data, Hz									Sound Levels	
	31.5	63	125	250	500	1000	2000	4000	8000	dB	dBA
Auburndale Noise Standards (dB):	79	74	74	66	59	53	47	41	39	81.3	62.8
Background Noise Monitoring (dB)[a]:											
Site No. 1 (NW Corner)	61.6	60.3	58.9	50.3	47.2	50.1	49.2	44.4	34.8	65.6	59.8
Site No. 2 (West of Plant)	62.1	63.2	56.4	43.6	41.5	43.6	38.1	32.1	22.5	66.2	52.4
Site No. 3 (SE Corner)	61.9	61.0	52.9	41.2	39.9	43.3	48.9	42.9	35.6	65.0	62.6
Site No. 4 (East of Plant)	67.1	60.8	54.4	51.4	48.9	41.8	37.4	34.9	27.9	68.4	53.2
Site No. 1[b] 24 hour - Leq	65.8	67.4	64.6	58.2	52.5	54.2	56.5	44.9	36.2	71.7	60.5
Site No. 1 24 hour - Max	76.2	76.9	81.9	85.6	74.9	72.8	72.8	66.6	60.3	93.2	81.4

Shaded areas show values above Auburndale Noise Ordinance.

[a] Monitoring conducted on October 11, 1999.

[b] Monitoring conducted on November 22, 1999.

5.8 CHANGES IN NON-AQUATIC SPECIES POPULATIONS

5.8.1 IMPACTS

Impacts to on site and regional non-aquatic species due to plant operations will be limited. The most significant potential for impact concerns bird movement through the stack exhausts and the stacks themselves as an obstacle. Since the proposed Site is situated in an area of pre-existing industrial activities, the likelihood of migratory birds utilizing the Site as a corridor or thoroughfare is limited.

5.8.2 MONITORING

Due to the absence of anticipated impacts to non-aquatic species populations, no biological monitoring is proposed.

5.9 OTHER PLANT OPERATION EFFECTS

5.9.1 TRANSPORTATION IMPACTS

The construction activities associated with the Osprey Energy Center Site are expected to be completed in April 2003, and the commencement of the plant operation activities will take place immediately thereafter. The analysis of transportation impacts on the surrounding roadway network was conducted to reflect 2003 conditions.

A review was undertaken to determine the traffic impact likely to result while the facility is in normal full operation. The facility will have employees on site 24 hours per day with approximately 15 persons being employed during the 7:00 a.m. to 3:00 p.m. shift. The afternoon shift would include three employees, as would the late night shift. The weekend shift would include four employees. Some deliveries to the Site would also take place during the day. The peak traffic period occurs at the 3:00 p.m. shift change with 15 people leaving the Site and three entering. All employees are expected to leave and arrive in single-occupancy vehicles. For the purpose of this analysis, the 3:00 p.m. shift change has been assumed to correspond with the peak-season, peak-hour traffic on the adjacent roadways.

The distribution of operational Project traffic to the highway network was assumed to be the same as for the construction impact analysis (see **Figure 4.6.3-1**). This traffic assignment is summarized in **Table 5.9.1-1.**

Table 5.9.1-1 Osprey Energy Center Traffic Impacts – Operations Phase

Road	Limits	Exist. Road	Classification	LOS Std.	Direction	Existing Peak Hour*	Project Traffic	Total Traffic	LOS
CR 544A	SR 655 to Project Ent.	2LU	Major	E	EB	208	1	209	C
			Collector	E	WB	228	6	234	C
CR 544A	Project Ent. To SR 544	2LU	Major	E	EB	208	9	217	C
			Collector	E	WB	228	2	230	C
SR 655	US 92 to SR 544A	2LU	Major	E	NB	564	5	569	B
			Arterial	E	SB	684	1	685	B
SR 655	SR 544A to South	2LU	Major	E	NB	564	0	564	B
			Arterial	E	SB	684	2	686	B
US 92	SR 655 to West	4LD	Principal	D	EB	1609	1	1610	C
			Arterial	D	WB	1326	3	1329	C
US 92	SR 655 to SR 544	6LD	Principal	D	EB	1500	2	1502	B
			Arterial	D	WB	1242	0	1242	B
SR 544	US 92 to CR 544A	6LD	Major	E	EB	812	1	813	C
			Arterial	E	WB	986	5	991	C
SR 544	CR 544A to South	6LD	Major	E	EB	812	3	815	C
			Arterial	E	WB	986	1	987	C

*Peak Season Peak Hour Directional Traffic Volume

Sources: Polk County Planning Department, RS&H, 1999

Several adjacent highways would be minimally affected by Project traffic during operation. The affected roadways would operate at acceptable levels of service (Level of Service C or greater), even with the Project's traffic. The adjacent road network can accommodate the vehicle traffic from the Osprey Energy Center.

5.9.2 POTENTIAL NITROGEN DEPOSITION IN TAMPA BAY

An air quality modeling analysis was used to predict the maximum nitrogen (N) deposition rates on an annual basis that would occur over the Tampa Bay basin due to potential NO_x emissions from the Osprey Energy Center. The modeling analysis was performed using the long-range transport model, CALPUFF model, with one year of meteorological data. Descriptions of the CALPUFF model and meteorological data used in the analysis, including model assumptions and methods, are presented in Section 5.6 and Appendix 10.1.5.

Nitrogen deposition mainly occurs from the conversion of NO_x emissions to nitric acid (HNO_3) and particulate nitrate (NH_4NO_3) which can be deposited in dry and wet forms. The analysis estimated the total N deposition, in grams per hectare per year (g/ha/yr), as the sum of both the dry and wet deposition fluxes from HNO_3 and NH_4NO_3. For N compounds, the CALPUFF model predicts deposition rates for HNO_3 and nitrate (NO_3) in units of grams per square meter per second ($g/m^2/s$). Based on the recommendations by the IWAQM, it is assumed that 100-percent of NO_3 is converted to NH_4NO_3 (HNO_3 is assumed not be involved in forming NH_4NO_3). For both HNO_3 and NH_4NO_3, it is further assumed that 100-percent of the available N is deposited.

Nitrogen deposition is determined by multiplying the N deposition flux predicted for each compound by the ratio of the molecular weight of the compound to the molecular weight of N times the hours in the averaging period (HR) times a unit conversion factor. The unit conversion factor is 36,000 that converts the model output in $g/m^2/s$ to kg/ha/hr (i.e., 10^{-3} kg/g x 10^4 m^2/ha x 3,600 sec/hr). The molecular weight of N, NO_3, HNO_3 and NH_4NO_3 are assumed to be 14, 62, 63, and 80, respectively. Because there are two molecules of N in NH_4NO_3, a molecular weight of 28 is used when N deposition is estimated from NH_4NO_3. Because of the meteorological data used in the CALPUFF model (see Appendix 10.1.4), the number of available

hours to estimate deposition fluxes is 8,616. However, to provide a conservative estimate, HR is set equal to 8,760 that corresponds to the total hours in a year.

Based on these assumptions, the following equations show the methods used to predict N deposition from the HNO_3 and NH_4NO_3 predicted by the CALPUFF model.

(1) N Deposition from HNO_3 (kg/ha/yr) = HNO_3 Deposition flux ($g/m^2/s$) x 14/63 (molecular weights of N/ HNO_3) x 36,000 (unit conversion factor) x 8,760 hours (HR)

N Deposition from HNO_3 (kg/ha/yr) = HNO_3 Deposition flux ($g/m^2/s$) x 31,536,000

(2) N Deposition from NH_4NO_3 (kg/ha/yr) = NO_3 Deposition flux ($g/m^2/s$) x 80/62 (molecular weights of NH_4NO_3/NO_3) x 28/80 (molecular weights of N_2/NH_4NO_3) x 36,000 (unit conversion factor) x 8,760 hours (HR)

N Deposition from NH_4NO_3 (kg/ha/yr) = NO_3 Deposition flux ($g/m^2/s$) x 142,420,080

Based on the results from the CALPUFF model, the following deposition fluxes were estimated:

Species	Deposition Form	Maximum Predicted Deposition Flux (kg/ha/yr) for Project
HNO_3	Wet deposition	0.000126
	Dry deposition	0.000620
NH_4NO_3	Wet deposition	0.000522
	Dry deposition	0.0000144
Total		0.00128

These results indicate that the maximum N deposition from the Osprey Energy Center Project is predicted to be 0.00128 kg/ha/yr. Although there are no current measurements of N deposition in the Tampa Bay area, N measurements (in the form of wet deposition of nitrates) were made for several years by the Florida Electric Coordinating Group (FCG, 1987) in Zephyrhills, about 25 km from Tampa Bay. For 1987, those measurements indicated that the wet N deposition rate was approximately 2 kg/ha/yr. If wet deposition is assumed to be equal to dry deposition, then total N deposition from existing sources would be equal to about 4 kg/ha/yr. Thus, the Project's

impact on N deposition in the Tampa Bay watershed from atmospheric processes would only be a small fraction (less than 0.05-percent) of the N deposition that is occurring already in the Tampa Bay area, and if the N loading from all sources, such as runoff from fertilizers into rivers and streams, were included in determining the N loading into Tampa Bay, the Project's contribution would be even lower.

5.10 ARCHEOLOGICAL SITES

There are no known significant archaeological sites on or in the vicinity of the Osprey Energy Center. The five-mile radius indicated two National Register of Historic Places archaeological sites as described in Section 2.2.6. The general area surrounding the Osprey Energy Center appear to be one with infrequent archaeological sites, containing a sparse amount of cultural materials.

The Division of Historical Resources (DHR) was contacted prior to submittal of this SCA for the Osprey Energy Center. No significant archaeological and historical sites are considered likely to be present at the Site, and the Project is not expected to affect any significant archaeological and historical sites. The Project will have no effect on any sites listed, or eligible for listing, in the National Register of Historic Places, or otherwise of national, state, or local significance (see Appendix 10.8). Air emissions and other proposed activities, as discussed in Section 5.6.1, will not adversely impact any areas listed with the National Register of Historical Places due to the fact the Osprey Energy Center will only burn clean natural gas.

5.11 RESOURCES COMMITTED

The major irreversible and irretrievable commitments of national, state, and local resources due to operation of Osprey Energy Center are the use of land and the consumption of water and natural gas.

The land areas to be used by the Osprey Energy Center include a non-producing orange grove. No long-term loss of agricultural land for food will occur because the grove has been in decline.

Some groundwater and reclaimed water will be consumed (i.e., evaporated) in the operation of the cooling towers (see Section 5.3). No short- or long-term impacts to local surface water or

groundwater resources, or water users are anticipated from the proposed water use by the Osprey Energy Center.

Natural gas will be consumed as fuel. The amounts are described in Chapter 3.0. This is an irreversible and irretrievable commitment of national energy resources for the production of electricity for the State of Florida.

5.12 VARIANCES

A variance from the noise standards for industrial uses in Auburndale's Land Development Regulations will be required for the Osprey Energy Center. The variance is necessary due to the abnormally low noise levels that are required by the City Code. As noted in Section 5.7.1, the Project will comply with the City's noise standards for residential areas, but the standards for industrial areas are more stringent. Accordingly, a variance will be requested from the City.

6.0 TRANSMISSION LINES AND OTHER LINEAR FACILITIES

6.1 TRANSMISSION LINES

No new transmission line corridor will be required for the Project. The Osprey Energy Center will have a direct interconnect to the Tampa Electric Company's Recker Substation transmission system. This substation is located immediately to the east of, and adjacent to, the southern half of the Project Site (see **Figure 6.1.0-1**). Improvements to the substation will be made by Tampa Electric Company at the Recker Substation to accommodate the interconnection with the Project.

6.2 NATURAL GAS SUPPLY PIPELINE

The ANR/Coastal Pipeline Company will provide natural gas for the Project through its proposed Gulfstream Natural Gas Transmission System. Gulfstream's application to the Federal Energy Resource Commission (FERC) shows that a 16 inch gas pipeline will extend along the north side of Recker Highway to a terminus at the southeast corner of Tampa Electric Company's Recker Substation. This terminus is approximately 660 feet to the east of the southeast corner of the Project Site.

To supply natural gas for the Project, a new 660 ft pipeline will be built along the north Recker Highway right-of-way, from the original terminus to the southeast corner of the Project Site. At the southeast corner of the Project Site, the gas pipeline would connect by a flange at the Project fence line for delivery of the fuel to a metering station, which would be constructed on site at this location (see **Figure 6.2.0-1**).

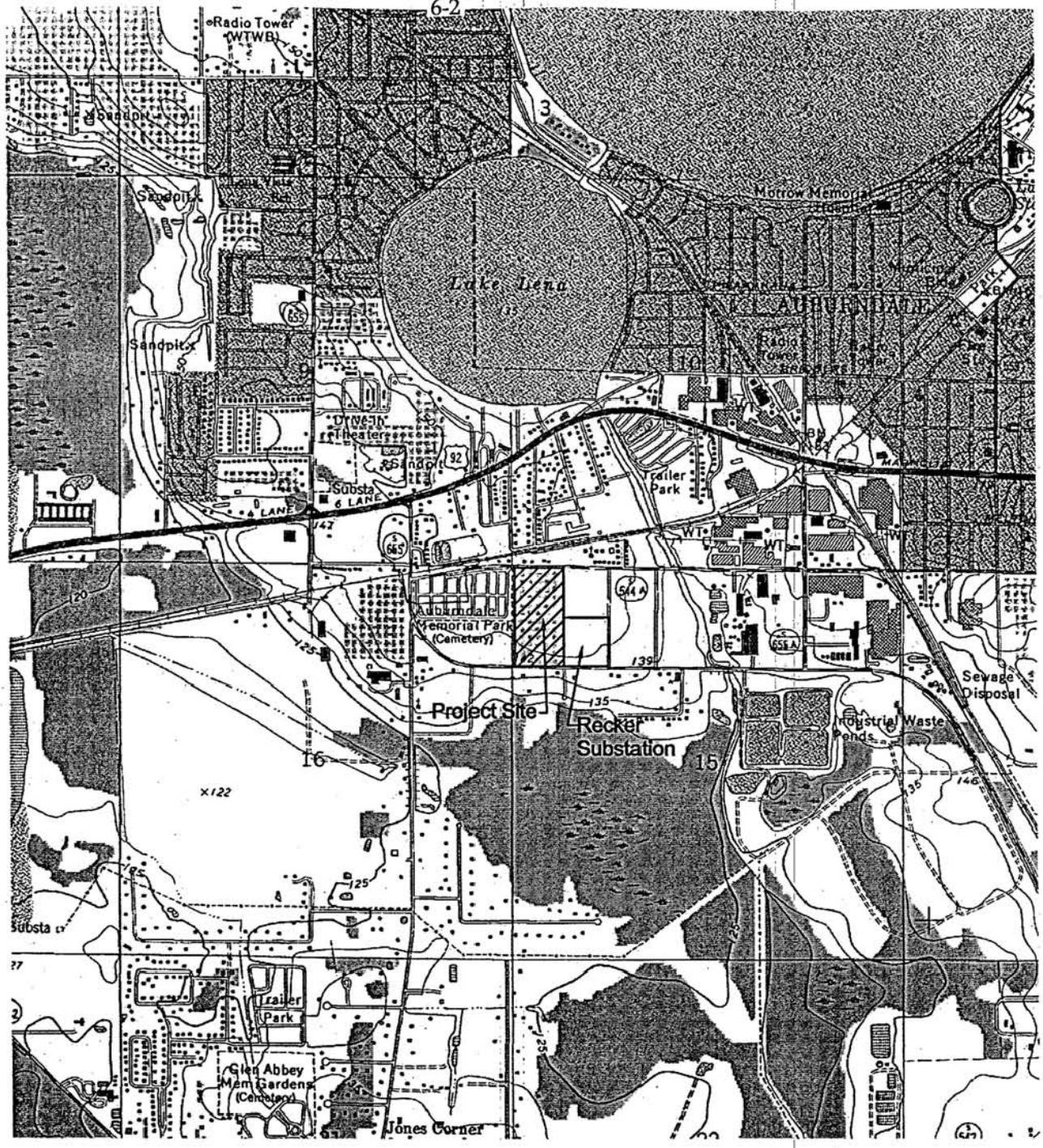
This 660 feet off-site fuel pipeline will be designed, permitted, constructed, owned, operated, and maintained by ANR/Coastal Pipeline Company. The gas pipeline lateral is, therefore, not included for certification in this Application.

6.3 WATER SUPPLY AND DISCHARGE PIPELINES

Off-site linear facilities serving the Project include three pipelines: 1) a reclaimed water supply pipeline from the Auburndale Allred Wastewater Treatment Plant, 2) an industrial

IMAGE QUALITY

AS YOU REVIEW THE NEXT FEW PAGES, PLEASE NOTE THAT THE ORIGINAL DOCUMENT WAS OF POOR QUALITY.



LEGEND

PROJECT SITE

REFERENCE

USGS 7.5 Minute Topographical Quadrangle, Auburndale, Florida, 1975

Golder Associates

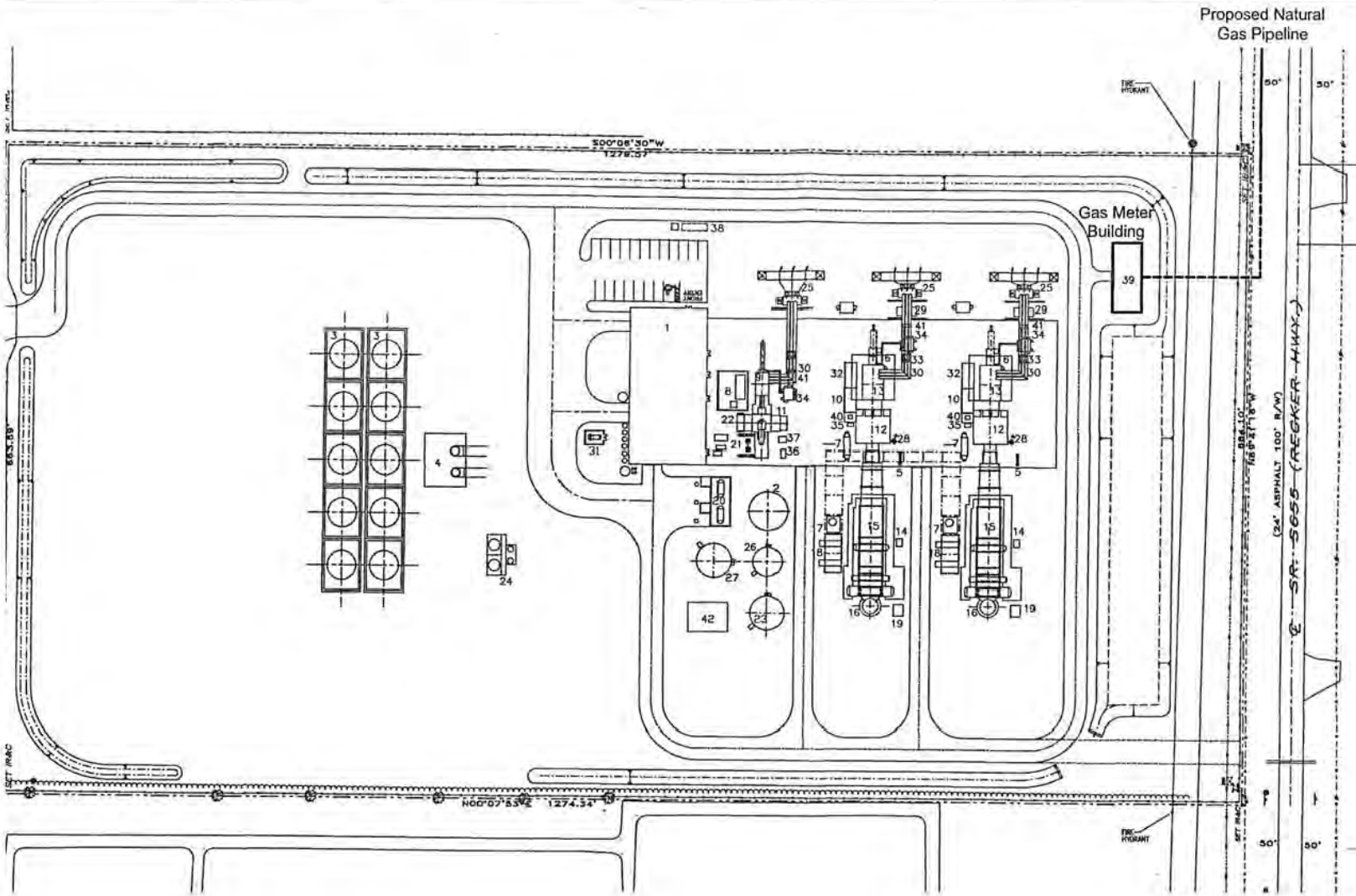
Tampa, Florida

Project Site / Substation Interface

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: 1"=2000'	Job No. 993-9570
CHK BY: RZ	DATE: 02/04/00	FIGURE 6.1.0-1
REV BY: –	FILE No.: fig6_1_0-1.dwg	



Legend

1. ADMINISTRATION AND MAINTEN
2. SERVICE WATER TANK
3. COOLING TOWER
4. CIRCULATING WATER PUMPS
5. FUEL GAS HEATER
6. COMBUSTION TURBINE AIR INLE
7. KETTLE BOILER
8. LUBE OIL SKID
9. ST GENERATOR
10. CT MECHANICAL PACKAGE
11. STEAM TURBINE
12. COMBUSTION TURBINE
13. CT GENERATOR
14. AMMONIA INJECTION SKID
15. HEAT RECOVERY STEAM GENEF
16. HRSG STACK
17. HRSG BLOWDOWN TANK
18. BOILER FEED PUMP HOUSE
19. CEMS
20. AMMONIA STORAGE TANKS
21. CONDENSATE PUMPS
22. CONDENSER
23. DEMINERALIZED WATER STORAC
24. WET SURFACE AIR COOLER
25. GENERATOR STEP-UP TRANSFI
26. WASTEWATER TANK
27. RAW WATER STORAGE TANK
28. FUEL GAS SCRUBBER
29. UNIT AUX. TRANSFORMER
30. ISO-PHASE BUS DUCT
31. STANDBY GENERATOR (OPTION
32. ELECTRICAL EQUIPMENT PACKA
33. GENERATOR VT & SURGE CUBI
34. GENERATOR EXCITATION SKID
35. COMPRESSOR WATER WASH SK
36. STEAM JET AIR EJECTORS
37. GLAND STEAM CONDENSER
38. OIL/WATER SEPARATOR
39. **GAS METER BUILDING**
40. HYDRAULIC SKID
41. EXCITATION TRANSFORMER
42. CENTRAL PUMP HOUSE

N

120' 0 120

scale feet

Golder Associates — Tampa, Florida

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

Natural Gas Pipeline Interconr

CAD BY:	CDT	SCALE: 1"=120'	Job
CHK BY:	RAZ	DATE: 03/08/00	FIGU
REV BY:	–	FILE No.: fig6_2_0-1.dwg	

wastewater discharge pipeline returning to Auburndale's Allred Wastewater Treatment Plant, and 3) an industrial wastewater discharge pipeline to Auburndale's Regional Wastewater Treatment Plant. However, these off-site underground pipelines will be permitted owned and operated separately by the City of Auburndale. Reclaimed water will provide cooling and process supply water to the Osprey Energy Center (see **Section 3.5**). Paralleling the reclaimed water supply line from the City of Auburndale's Allred Wastewater Treatment Plant will be a wastewater pipeline returning the Project's industrial wastewater effluent back to that facility for subsequent treatment and disposal.

The Auburndale reclaimed water supply pipeline will be approximately 10 to 12 inches in diameter and built within the north portion of Recker Highway right-of-way to the east of the Project Site. The Auburndale Allred Wastewater Treatment Plant is less than one mile east of the Project Site.

The potable water supply line for the Project will connect with an existing 12-inch water pipeline presently paralleling the southern boundary of the Site on the north side of Recker Highway. This existing pipeline is located inside an easement approximately 10 to 15 feet from the Project property boundary.

The sanitary sewer pipeline from the Project will tie into a force main located adjacent to and south of the south boundary of the Site.

7.0 ECONOMIC AND SOCIAL EFFECTS OF PLANT CONSTRUCTION AND OPERATION

7.1 SOCIO-ECONOMIC BENEFITS

The purpose of this chapter is to:

- Identify the economic and social effects of construction and operation of the Osprey Energy Center.
- Quantify the Project benefits and costs to the groups affected in the area surrounding the Osprey Energy Center as well as other people and businesses in Polk County, the Central Florida Region, and the State.

Socio-economic effects can be classified as either direct or indirect effects. Direct effects are those that are the direct result of the construction or operation of the Project. Indirect costs and benefits affect people and business interests in the vicinity of the Project who, because of their proximity to the Site, may experience changes in their local environment, such as increased spending by Project construction and operation personnel. Many of these effects are difficult to measure, and qualitative assumptions must be made to assess the relative values of expected costs and benefits.

This chapter is divided into two parts. Section 7.1 deals with socio-economic benefits and consists of an analysis of the plant construction and operational expenditures. Section 7.2 addresses temporary and long-term indirect costs involving the construction and operational personnel's use of private and public services in the vicinity of the Site. All cost and benefit values are based on present (2000) dollar values.

7.1.1 DIRECT SOCIO-ECONOMIC BENEFITS

For purposes of the economic analysis, a 20-year timeframe for the 527-MW (average ambient) combined-cycle power plant was used. The actual operating life of the Plant is significantly longer and, therefore, the long-term economic benefits will be greater than those expressed herein.

7.1.1.1 Tax Revenues

Both direct and indirect ad valorem and sales tax benefits will accrue as a result of the construction and operation of the Osprey Energy Center. Local revenues will be derived from property taxes paid on the property and the on-site facilities. State sales taxes will be paid on the equipment and supplies purchased for the construction and operation of the Project.

An estimated range of annual and five-year tax revenues from the Osprey Energy Center for Polk County government, the School Board, Water Management District, and the City of Auburndale are shown in **Table 7.1.1-1**. Based on a 20-year analysis of economic benefits, it is estimated that during that time period approximately:

- $16.0 to $23.1 million (nominal dollars) in ad valorem property taxes will be paid to Polk County. These taxes will be placed in Polk County's general fund and will be available for any use deemed appropriate by the County,
- $18.1 to $26.3 million will be collected for the Polk County School District and will be available to fund the County's school system,
- $1.2 to $1.8 million will be collected for the Southwest Florida Water Management District and will be available for environmental purposes, and
- $9.0 to $13.1 million will be collected for the City of Auburndale.

These figures are based on current millage rates for each taxing authority, as supplied by the Polk County Property Appraiser's office, and an estimated property and Facility value of $100 to $145 million.

7.1.1.2 Other Direct Benefits

Direct benefits of plant construction will result from the purchase of materials and equipment. Construction of the plant will cost approximately $183 million. Approximately 70-percent, or about $112 million, will be for materials and equipment purchased within the state. These purchases of construction materials and equipment will generate approximately $8.8 million in state sales taxes.

7.1.1.3 Employment

Among the primary direct benefits of the Project will be the increase in skilled job opportunities within the region associated with both plant construction and operation. As noted on **Table 2.2.7-1**, the unemployment rate for Polk County and the Central Florida Region are higher than that of the State of Florida.

An average of 162 workers will be employed over the approximate 24-month construction period required for this facility. Employment is expected to peak at approximately 325 workers. Assuming the hourly average rate is about $20 per hour ($28 to $35 with benefits and per diem), the total construction payroll for this facility is estimated at $13 million, which will be paid over an approximate two-year period.

Ongoing operation of the plant will employ approximately 25 people, who will work in three shifts. Assuming average wages of $40,000 annually per person, the annual payroll will be approximately $1 million.

Table 7.1.1-1 Osprey Energy Center -- Calculation of Estimated Taxes

Ad Valorem Tax Revenue	Range of Annual Revenue	Range of Estimated Five-Year Tax Revenue Total
County	$797,700 - $1,156,665	$3,988,500 - $5,783,325
School Board *	$907,200 - $1,315,440	$4,536,000 - $6,577,200
Water Management District **	$61,700 - $89,465	$308,500 - $447,325
City of Auburndale	$451,600 - $654,820	$2,258,500 - $3,274,100
Estimated Total	**$2,218,200- 3,216,390**	**$11,091,000-16,081,950**

Calculated Ad Valorem Tax Revenues (Present Millage Rates based on Property Appraiser's Office Information)

*School Board millage consists of State Law and Local Board components.
**Southwest Florida Water Management District millage consists of Peace Basin and District-wide Components.

Source: Fishkind and Associates, 2000; Golder, 2000

7.1.2 INDIRECT ECONOMIC BENEFITS

The construction wages paid by Calpine for the Project will be spent within Polk County and the surrounding region. These wages will create additional demands for goods and services. As this money is spent, it will create a multiplier effect within the area, thereby generating additional jobs and earnings. The Regional Input-Output Modeling System (RIMS II) has been used in this case to calculate the magnitude of this multiplier effect. Using the direct effect multipliers for the Central Florida Region, it is estimated that the 162 construction jobs (Full-time Equivalent) will give rise to additional employment resulting in an additional $13 million in total earnings over the two-year period. These earnings are indirect or secondary benefits of the Project, which will be enjoyed by other companies whose payroll will increase from the construction of the Project.

In addition to the 162 direct construction jobs, there will be an additional 170 indirect temporary jobs generated by companies indirectly providing goods and services. Regional economic output is estimated to increase by $42 million annually over the two-year construction period from these indirect jobs.

The ongoing plant operations will generate direct wages of approximately $1 million per year. These wages will in turn be spent mostly within the region. These dollars will increase the demand for goods and services and also provide an economic multiplier effect. Again, RIMS II was used to develop estimates of the magnitude of the multiplier effects. Based on the RIMS II analysis, it is estimated that the wages for the 25 operational employees will indirectly generate $2 million annually in additional earnings (wages and benefits) in the region. Approximately 55 additional long-term jobs will be created by plant operations, which will generate a total economic output of about $10 million annually. Therefore, total indirect benefits of the long-term operation of the Project is estimated at $12 million annually.

7.1.3 OTHER ECONOMIC BENEFITS

Calpine and the Osprey Energy Center also will provide other direct economic benefits to the City of Auburndale. First, Calpine will reimburse the City for the cost of improving the ultraviolet (UV) system used at the Allred Wastewater Treatment Plant to disinfect domestic wastewater. In this manner, Calpine will help the City comply with the DEP requirements in Chapter 62-610, F.A.C., for high level disinfection. This will make highly disinfected reclaimed water available for public access when the Plant is not operating due to maintenance. Second, Calpine will pay the City for various municipal services, and these payments will be approximately $100,000 per year. Third, Calpine will provide funds to the City for other infrastructure improvements between the Allred Wastewater Treatment Plant and the City's North Regional Wastewater Treatment Plant, which will reduce the City's discharge into Lake Lena Run.

7.1.4 ENHANCEMENT OF RECREATIONAL AND ENVIRONMENTAL VALUES

Calpine is assisting the City of Auburndale in the establishment of a combined active and passive recreational facility that also can serve as a refuge for wildlife and birds such as the Osprey. At the present time, Calpine and the City are considering enhancements to an existing 126 acre area that is known locally as Lake Myrtle Park. If the property is developed as an Urban District Park, as proposed, it would provide recreational opportunities for a service area that includes 50,000 people. This type of facility could contain a variety of features, such as a playground area, restroom facilities, and perhaps hiking and riding trails, a nature center, boating, swimming, picnic areas, and sports areas. Calpine anticipates that any proposed park facility would provide valuable wildlife habitat, recreational activities, and open space/passive recreation for the residents of Auburndale and Polk County.

7.1.5 ON-SITE ENHANCEMENTS

Landscaping and buffer zones will be created on the northern, western, and southern borders of the Site. These buffers will be well landscaped, as shown in the Landscape Plan, Appendix 10.1.2. These landscaped buffers will replace vacant land that currently is neglected and infrequently mowed, as described in Section 2.3.5, Vegetation/Land Use. The landscaped buffers will provide aesthetic benefits for the residents and commercial establishments that are

located north of Derby Avenue (northwest of the Site), and south of Recker Higher, as well as passing motorists.

Calpine wants to minimize the Project's impacts on the environment and the community. Accordingly, Calpine will place the major components of the Project (e.g., combustion turbines; HRSG) inside fully enclosed structures. The use of these environmental enclosures will provide several benefits for the community. Among other things, these enclosures will reduce ambient noise levels, reduce the potential for dust or fugitive airborne emissions from the facility, enhance the Project's appearance, and reduce potential aesthetic impacts. Although similar facilities in Florida typically are not enclosed, Calpine will expend approximately $7 million in this case for the proposed environmental enclosure to ensure that the Project is compatible with surrounding areas and is an asset to the community.

7.1.6 OTHER ENVIRONMENTAL BENEFITS

The Osprey Energy Center will provide a wide variety of environmental benefits for Polk County and the State of Florida. The Project makes beneficial use of a non-producing citrus grove. It minimizes the potential environmental impacts associated with the generation of needed electrical power through the use of existing facilities (i.e., access roads, substation and transmission lines, and water and sewer pipelines), the avoidance of wetlands or wildlife habitat, and incorporates the use reclaimed water from wastewater treatment facilities. Additionally, the Osprey Energy Center minimizes environmental impacts through good site planning and layout, and the selection of a clean, reliable cost-effective electric power generating technology.

Osprey Energy Center will fund improvements to the City of Auburndale's wastewater treatment facilities that will:

- Enhance the level of wastewater disinfection that is presently provided at the City's Allred Wastewater Treatment Plant;
- Enable the City to provide reclaimed water from the Allred Wastewater Treatment Plant to areas with unrestricted public access for use when reclaimed water is available (e.g., when the Project is shutdown for maintenance);

- Provide capital for infrastructure improvements between the Allred and Regional Wastewater Treatment Plants, which also will reduce the likelihood of discharges to Lake Lena Run; and
- Improve water quality via addition of UV treatment to allow for unrestricted public access.

The Osprey Energy Center will use less fuel to produce power than traditional power plants in Florida. The Project is estimated to save 13,700 billion cubic feet of gas and 6,422,000 barrels of oil each year by comparison to typical facilities that could potentially be displaced by the operation of the Osprey Energy Center.

If the Project displaces existing generating capacity, the Osprey Energy Center may potentially reduce the amount of air pollution associated with power generation in Florida. By comparison to existing power plants in Florida, the Osprey Energy Center:

- Will have lower emissions/MW, and
- May reduce total emissions by about 20,000 TPY, including approximately 10,600 TPY of NO_x compared to typical facilities that could be displaced by Osprey Energy Center assuming the displacement of the current mix of oil- and gas-fired plants.

7.1.7 SUMMARY OF BENEFITS

In summary, the Project's potential direct benefits include:

- Approximately $0.8 to $1.16 million annually in additional ad valorem tax revenue to Polk County,
- Approximately $0.9 to $1.3 million annually in additional ad valorem tax revenue to the Polk County School District,
- Approximately $60,000 to $90,000 annually to SWFWMD,
- Approximately 25 new jobs with an average salary of approximately $40,000, plus job benefits that average 30-percent. Total payroll is estimated at $1,000,000 annually,
- Construction wages of approximately $13 million over the two year construction period year, creating an average of approximately 162 temporary construction jobs (Full-time Equivalent) during the construction period,

- Overall direct construction investment of about $182 million to build the Project,
- Approximately $500,000 per year to the City of Auburndale for taxes and various municipal services,
- Potential financial support of a proposed recreational facility that may also serve as a refuge for wildlife, and
- Provision of a new clean, reliable and cost-effective energy source that could save up to 13,700 billion cubic feet of natural gas and 6,422,000 barrels of oil annually,
- Improvements to Auburndale's wastewater treatment facilities that increase the quality of the City's reclaimed water, increase the potential uses for the city's reclaimed water, and decrease the likelihood of discharge to Lake Lena Run.
- More economically productive use of reclaimed water that is currently used for irrigation.

7.2 SOCIO-ECONOMIC COSTS

7.2.1 TEMPORARY EXTERNAL COSTS

According to the Florida Department of Labor and Employment Security, approximately 10,314 construction workers reside within the Central Florida Region, with the majority of these in Polk County (1998 Florida Abstract). Since a more than adequate labor supply exists within commuting distance, and since a labor surplus exists within Polk County, it is anticipated that many workers will be hired from within the region, with minimal relocation required. Consequently, construction should have no adverse effect on permanent housing.

As is typical with longer construction projects, some workers commuting from longer distances may choose to live in transient accommodations (motels, hotels) on a weekly basis, returning to their permanent homes and families on weekends. Transient accommodations are plentiful in the area.

Since workers will mostly be commuting and not relocating permanently into the Central Florida Region, it is not anticipated that construction will create any new or unusual impacts or demands on public facilities or services.

Temporary external costs include the generation of construction traffic and noise from delivery trucks each day. Construction will last approximately two years with a peak period of about four months from the 12th to 16th month.

7.2.2 LONG-TERM EXTERNAL COSTS

The Project's external cost impacts will be minimal and localized. The Project is not located on or near any public or private facilities utilized for recreational purposes. Consequently, the Osprey Energy Center will not cause any impairment to recreational values, result in any deterioration of aesthetic and scenic values, restrict access to areas of scenic values. The Project also will not displace persons from the land, cause loss of income, or result in any significant costs to local government.

Since the operational workforce is expected to be approximately 25 employees, and most are assumed to be residing within commuting distance to the plant, the Project's impacts to local services (e.g., schools, police) are expected to be minimal.

8.0 SITE AND DESIGN ALTERNATIVES

This section is optional and is not being provided for the Osprey Energy Center Project Site Certification Application. It is not anticipated that an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA) will be required for the Project.

9.0 COORDINATION

The Applicant, Calpine Construction Finance Company, L.P., will file with the Florida Public Service Commission in the near future, a petition for a Determination of Need for the Osprey Energy Center's 527-MW (average ambient) capacity.

The Applicant and its representatives have met with the FDEP Office of Siting Coordination and the Bureau of Air Regulation regarding technical aspects of the project. In addition, the Applicant has met with representatives of the Southwest Florida Water Management District and City of Auburndale regarding water supply and discharge alternatives to support the project.

Other Agencies, contact persons, offices and/or technical disciplines with which the Applicant or its representatives have discussed the Project are listed below.

DATE	AGENCY	PURPOSE	CONTACT(S)
10/12/99	City of Auburndale City Manager	Seek comment on land use and zoning requirements	Robert Green
10/12/99	City of Auburndale City Managers	Seek comment on land use and zoning office	Robert Green
10/21/99	City of Auburndale	Obtain information on City's WWTP, capacity, etc.	John Dickson
10/21/99	SWFWMD	Obtain Water-Use Permits for Polk County area	Teri Rhodes
10/27/99	SWFWMD	Obtain hydrologic conditions report	Sindy Ortiz
10/27/99	US Geological Survey	Obtain Climatological data for Polk County	Janice Todd
10/29/99	SWFWMD	Obtain Potentiometric surface maps	Lela Clark
11/8/99 11/9/99 1/25/00 2/9/00	SWFWMD	Obtain Climatological data for Polk County	Joanne Gilroy
11/15/99	FNAI	Received element occurrence report	Jonathan Detting
11/17/99	City of Auburndale	Water Quality Sampling	John Dickson
11/17/99	City of Winter Haven	Obtaining Additional Information	Clyde Noel
11/23/99	SWFWMD	Review of Auburndale Power Partners water use permit	J. Frances Clark

DATE	AGENCY	PURPOSE	CONTACT(S)
11/23/99	SWFWMD	Obtain hydrologeologic parameter data for Polk County Area	Paul Kornowski
11/23/99	The 1999 Florida Statutes	Identify location of Areas of Critical State Concern	www.leg.state.fl.us
11/29/99	Polk County Public Schools Community Relations Department	Obtain list of public schools serving the Auburndale area	Beverly Hartley
11/29/99	Polk County School Board Office of Pupil Accounting & Records	Obtain school district boundaries for schools in NW Polk County	Nova
12/1/99	Florida Division of Forestry	Obtain Division of Forestry District Information	www.fl-dof.com/districts/index.html
12/1/99	Florida Division of Forestry	Obtain Florida's State Forests Map	www.fl-dof.com
12/1/99	Florida Division of Forestry	Obtain Lake Wales Ridge State Forest location and description	www.fl-dof.com/Fm/stforest/lakewalesridge/index.html
12/1/99	Florida Division of Forestry	Obtain State Forest Contacts	Whom it may concern
12/1/99	Florida Division of Forestry	Transmit State Forest Contacts	Janice M. Smith
12/1/99	SWFWMD	Discuss groundwater model setup and analysis	Mike Phillippi
12/2/99	Polk County School Board, Pupil Accounting Office	Transmit School districts/zones for Auburndale, FL	Brenda
12/2/99	Polk County School District: School Zones	Obtain school zone boundaries	www.pcsb.k12.fl.us
12/6/99	CUTR	Locate FLUCCS definition/maps	Steve Polzin
12/6/99	Florida Department of Transportation	Discussed FLUCCS Map & Definitions	Cathy Paxton
12/6/99	Florida Department of Transportation	Discuss FLUCCS map & definitions	Cathy Paxton
12/6/99	Gannett Fleming	Locate FLUCCS map and/or classification list	Melissa Bordewin
12/6/99	SWFWMD Bartow Office	Locate FLUCCS map	Dave Carpenter
12/7/99	Southwest Florida Water Management Distribution (SWFWMD)	Obtain FLUCCS maps/classification system	Charles Tornabene
12/7/99	Southwest Florida Water Management District	Download appropriate FLUCCS Quarter Quad	www.swfwmd.state.fl.us/gis/gisdata.htm

DATE	AGENCY	PURPOSE	CONTACT(S)
12/7/99	Southwest Florida Water Management District (SWFWMD)	Obtain FLUCCS Maps/Classification System	Charles Tornabene
12/8/99	City of Auburndale	Obtain Future Land Use map, zoning map and concurrency information	Rich Reade
12/8/99	City of Auburndale	Obtain Future Land Use map, zoning map, and concurrency information	Rich Reade
12/8/99	Federal Emergency Management Agency (FEMA)	Obtain 100 Year Flood Zone maps for Polk County and Auburndale	FEMA Map Service Center
12/8/99	Federal Emergency Management Agency (FEMA)	Obtain 100 Year Flood Zone maps for Polk County	FEMA Map Service Center
12/8/99	SWFWMD Mapping & GIS Section	Obtain FLUCCS map for Polk County	Phil, Diana Brudick
12/9/99	Polk County Airport Zoning Board	Obtain maps/lists of airports in Polk County	Davis Hyslop
12/9/99	Polk County Airport Zoning Board	Obtain maps/lists of airports in Polk County	Davis Hyslop
12/9/99	Polk County Development Services	Obtain Special Use Permit information for uses with tropical fish or ostrich farmers	Geri Irons
12/9/99	Polk County Fire Department	Obtain maps/lists of fire stations in Polk County	Wes Hayes
12/9/99	Polk County Fire Department	Obtain maps/lists of fire stations in Polk County	Wes Hayes
12/9/99	Polk County Parks & Recreation Department	Obtain maps/lists of parks, recreational and conservation areas	Sheila Starling
12/9/99	Polk County Recreational Trails	Obtain recreational trails map to include recreational and conservation areas, rivers, etc.	Ryan Kordak
12/9/99	Polk County, Recreational Trails	Obtain recreational trails map to include recreational and conservation areas, rivers, etc.	Ryan Kordak
12/10/99	City of Auburndale Parks & Recreation Department	Obtain maps/lists of parks and recreational areas in Auburndale	Chris Shelton
12/10/99	The Nature Conservancy	Locate protected lands	www.tnc.org
12/11/99	The Nature Conservancy	Obtain Information on the Disney Wilderness Preserve	www.tnc.org
12/13/99	Dept. of GIS Polk County Planning	Obtain Existing Land Use map & zoning map	Cathy Purcell
12/13/99	Polk County	Obtain Auburndale Aerials (5-mile radius)	Property Appraiser's Office
12/13/99	Polk County Engineering Department	Obtain Polk County map of major roads and railroads	Kristy

DATE	AGENCY	PURPOSE	CONTACT(S)
12/13/99	Polk County Engineering Department	Obtain Polk County map of major roads and RR's with Polk Parkway	Kristy
12/13/99	Polk Parkway	Obtain Polk Parkway transportation maps	Krista
12/13/99	Polk Parkway	Obtain Polk Parkway transportation maps	Krista
12/14/99	EMS 911 - Polk County	Obtain lists/locations of fire stations, police stations and hospitals	Alice
12/16/99	Hillsborough County 9-1-1	Obtain list of Police stations, fire stations, hospitals, etc.	Ira Pyles
1/11/00	FDOT District I	Obtain technical information on Recker Highway (SR 665)	Mark Schultz
1/11/00	Polk County 911 Office	Request GIS layers for police, fire stations, schools & hospitals	Sandy Mercer
1/11/00	Polk Transportation Planning Organization	Obtain Osprey site road information	Kathryn Creamer
1/12/00	911 Ambulance Div. Polk County	Inquiry about possible Columbia Hospital	Steven Powell
1/12/00	City of Auburndale	Request City of Auburndale map	Rich Reade
1/12/00	FDOT	Obtain technical data on Recker Highway (SR 665)	Gene O'Dell/Larry Davis
1/12/00	Heart of Florida Regional Medical Center	Inquiry about possible Columbia Hospital	Carol Negoshian
1/12/00	Polk County Engineering Department	Obtain technical details for Derby Avenue (CR 544-A)	Donna/Wade Allen
1/13/00	Polk County Solid Waste Department	Obtain details on landfill for Osprey site	Diane
1/16/00	City of Auburndale	Discuss City's wastewater Treatment capacity and sewer system	John Dickson
1/17/00	City of Auburndale	Inquire about number of copies Robert Green will need of Impact Statement	Rich Reade
1/17/00	City of Auburndale Utilities Department	Verify name of wastewater treatment plant	Staff
1/19/00	Polk County Planning & Zoning Department	Discussed zoning districts north of Site	Eric Peterson
1/19/00	Polk County Planning & Zoning Department	Discuss zoning districts north of Osprey site	Eric Peterson
1/23/00	City of City of Auburndale Public Library	Obtain confirmation of Auburndale Public Library location	Library Staff

DATE	AGENCY	PURPOSE	CONTACT(S)
1/23/00	City of Eagle Lake Public Library	Obtain confirmation of Eagle Lake Public Library location	Library Staff
1/23/00	Winter Haven Public Library	Obtain confirmation of Winter Haven Public Library location	Michelle
1/24/00	Auburndale, Florida Chamber-Mainstreet	Obtain general information on police, fire, hospitals, etc.	www.ci.auburndale.fl.us
1/24/00	City of Auburndale Fire Department	Determine Auburndale fire protection services	Jan Shockley
1/24/00	City of Auburndale Police Department	Determine Auburndale police protection services for site	Desk Staff
1/24/00	Polk County Fire Administration Office	Determine Polk County fire protection services for site	John Phillips
1/24/00	Polk County Fire Department – Jan-Phyl Station	Determine fire protection services provided by the Jan-Phyl Station	Matt Nichols
1/24/00	Polk County Fire Department – Rifle Range Station	Determine fire protection services provided by the Rifle Range Station	Desk Staff
1/24/00	Polk County Sheriff's Department	Determine Polk County K'ville Sheriff's protection services for site	Desk Staff
1/25/00	Polk Community College	Obtain information on campus locations, and energy generation courses	John, Advising Office
1/28/00	Winter Haven Hospital	Confirm size and location of hospitals in area Staff	Staff
2/1/00	Auburndale Planning Commission	Seek approval of Land Use Designation	Planning Commissions
2/3/00	Southwest Florida Water Management District (SWFWMD)	Present proposed project with surface water parameters, groundwater consumption, and reclaimed water	William Hartman, P.E. David Carpenter Michael Balser, P.G.
2/9/00	FEMA	Obtain information on Digital FEMA FIRM Maps	Map Services Staff
2/10/00	DEP Offices of Siting Coordinators	Reviewed Air Resource Modeling Protocol	Buck Oven Al Linero
2/11/00	dca.state.fl.us	Request coastal consistency review for Osprey Energy Center Site certification application	Jasmin Raffington
2/11/00	Polk County Developmental Services	Research on conditional use applications (Researching special use farming near Osprey)	Larry Rowland/Geri Irons/Jennifer Code Planning Dept.
2/11/00	Polk County Property Appraiser's Office	Investigate 18 digit ID # & Special Agricultural Uses	Dawn, Theresa Patterson
2/11/00	Polk County Property Appraiser's Office	Request "runs" for privately owned properties	Regina Young
2/11/00	SWFWMD GIS/Mapping Section	Obtain paper FLUCCS Maps (5-mile radius)	Lela Clark

DATE	AGENCY	PURPOSE	CONTACT(S)
2/11/00	US Fish & Wildlife Service	Request for concurrence of no significantly impacted species or habitat	Jane Tutton
2/14/00	SWFWMD	Reconciling geographic name conflict of Lake Lena Run and/or Lena Run Creek	Lela/Diana
2/14/00	USGS	Reconciling geographic name conflict of Lake Lena Run and/or Lena Run Creek	David McCulloch/ Lewis Fletcher
2/15/00	Florida Parks & Recreation	Identify State memorials and landmarks in Polk County	Jean Reese
2/15/00	Public Open House	Provide information on Project and opportunity for comment	General Public
2/15/00	SWFWMD	Further inquiry regarding FLUCCS Maps	Lela Clark
2/17/00	GIS/911 Polk County	Transmit GIS layers for Polk County's police, fire stations, schools & hospitals	David Capaz
2/17/00	Polk County 911 Office	Request GIS layers for Polk County's police, fire stations, schools & hospitals	Sandy Mercer
2/18/00	Polk County Property Appraiser's Office	Request for run of use codes 9742 (Environmental Endangered Land) & 9740 (Recreational Land - Private Owned)	Regina Young
2/21/00	City of Auburndale	Seek approval of Land Use Designation	City Commissioners
2/21/00	DEP, Industrial Wastewater Permitting Department	Discuss the IWW Permitting Requirements/ Exemption	
2/22/00	FDEP	Discuss ERP requirements for Project	Randy Cooper
3/2/00	Polk County Appraiser's Office	Obtain aerial maps	Regina Young
3/3/00	City of Auburndale Parks and Recreation	Obtain data on Lake Myrtle Park	
3/13/00	SWFWMD	Discuss final water balance and water modeling results	Said Abusada Michael Balser

REFERENCES

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Auburndale Land Development Regulations. November 4, 1991. City of Auburndale City Commissioners.

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Dive Certification Application

Volume II
Chapter 10—Appendices



CALPINE

OSPREY
ENERGY CENTER

Site Certification Application

Volume II
Chapter 10–Appendices

Submitted by

CALPINE
CONSTRUCTION FINANCE
COMPANY, L.P.

Prepared by

Golder Associates

March 2000

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- 10.1.2 NPDES Applications/Permits
- 10.1.3 Hazardous Waste Disposal Applications/Permits
- 10.1.4 Section 10 or 404 Applications/Permits
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10.1 Federal and State Permit Applications or Approvals

10.1.1 316 Demonstrations

Not Applicable

10.1.2 NPDES Applications/Permits

Not Applicable

10.1.3 Hazardous Waste Disposal Applications/Permits

Not Applicable

10.1.4 Section 10 or 404 Applications/Permits

Not Applicable

10.1.5 PSD Applications/Permits

AIR PERMIT APPLICATION AND PREVENTION OF SIGNIFICANT DETERIORATION ANALYSIS FOR THE OSPREY ENERGY CENTER, POLK COUNTY, FLORIDA

Submitted by:

Calpine Finance and Construction Company, L.P.
The Pilot House, 2nd Floor, Lewis Wharf
Boston, Massachusetts 02110

Prepared By:

Golder Associates Inc.
6241 NW 23rd Street, Suite 500
Gainesville, Florida 32653-1500

March 2000

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AIR PERMIT APPLICATION

Department of Environmental Protection

Division of Air Resources Management

APPLICATION FOR AIR PERMIT - TITLE V SOURCE

See Instructions for Form No. 62-210.900(1)

I. APPLICATION INFORMATION

Identification of Facility

1. Facility Owner/Company Name: **Calpine Finance and Construction Company, L.P.**	
2. Site Name: **Osprey Energy Center**	
3. Facility Identification Number:	[X] Unknown
4. Facility Location: Street Address or Other Locator: City: **Auburndale** County: **Polk** Zip Code:	
5. Relocatable Facility? [ ] Yes [X] No	6. Existing Permitted Facility? [ ] Yes [X] No

Application Contact

1. Name and Title of Application Contact: **Paul Barnett, Project Director**
2. Application Contact Mailing Address: Organization/Firm: **Calpine Finance and Construction Company, L.P.** Street Address: **The Pilot House, 2nd floor, Lewis Wharf** City: **Boston** State: **MA** Zip Code: **02110**
3. Application Contact Telephone Numbers: Telephone: **(617) 723 - 7200** Fax: **(617) 723 - 7635**

Application Processing Information (DEP Use)

1. Date of Receipt of Application:	
2. Permit Number:	
3. PSD Number (if applicable):	
4. Siting Number (if applicable):	

Purpose of Application

Air Operation Permit Application

This Application for Air Permit is submitted to obtain: (Check one)

[ ] Initial Title V air operation permit for an existing facility which is classified as a Title V source.

[ ] Initial Title V air operation permit for a facility which, upon start up of one or more newly constructed or modified emissions units addressed in this application, would become classified as a Title V source.

Current construction permit number:_____

[ ] Title V air operation permit revision to address one or more newly constructed or modified emissions units addressed in this application.

Current construction permit number:_____

Operation permit number to be revised:_____

[ ] Title V air operation permit revision or administrative correction to address one or more proposed new or modified emissions units and to be processed concurrently with the air construction permit application. (Also check Air Construction Permit Application below.)

Operation permit number to be revised/corrected:_____

[ ] Title V air operation permit revision for reasons other than construction or modification of an emissions unit. Give reason for the revision; e.g., to comply with a new applicable requirement or to request approval of an "Early Reductions" proposal.

Operation permit number to be revised:_____

Reason for revision:_____

Air Construction Permit Application

This Application for Air Permit is submitted to obtain: (Check one)

[X] Air construction permit to construct or modify one or more emissions units.

[ ] Air construction permit to make federally enforceable an assumed restriction on the potential emissions of one or more existing, permitted emissions units.

[ ] Air construction permit for one or more existing, but unpermitted, emissions units.

Owner/Authorized Representative or Responsible Official

1. Name and Title of Owner/Authorized Representative or Responsible Official:
   ROBERT K. ALFF – SENIOR VICE PRESIDENT
2. Owner/Authorized Representative or Responsible Official Mailing Address:
   Organization/Firm: **Calpine Finance and Construction Company, L.P.**
   Street Address: **The Pilot House, 2nd floor, Lewis Wharf**
   City: **Boston** State: **MA** Zip Code: **02110**
3. Owner/Authorized Representative or Responsible Official Telephone Numbers:
   Telephone: **(617) 723-7200** Fax: **(617) 723 - 7635**
4. Owner/Authorized Representative or Responsible Official Statement:

   I, the undersigned, am the owner or authorized representative(check here [ ], if so) or the responsible official (check here [x], if so) of the Title V source addressed in this application, whichever is applicable. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof. I understand that a permit, if granted by the Department, cannot be transferred without authorization from the Department, and I will promptly notify the Department upon sale or legal transfer of any permitted emissions unit.*

   Robert K. Alff — Signature

   MARCH 13, 2000 — Date

* Attach letter of authorization if not currently on file.

Professional Engineer Certification

1. Professional Engineer Name: **Kennard F. Kosky**
   Registration Number: **14996**
2. Professional Engineer Mailing Address:
   Organization/Firm: **Golder Associates Inc.**
   Street Address: **6241 NW 23rd Street, Suite 500**
   City: **Gainesville** State: **FL** Zip Code: **32653-1500**
3. Professional Engineer Telephone Numbers:
   Telephone: **(352) 336 - 5600** Fax: **(352) 336 - 6603**

4. Professional Engineer Statement:

I, the undersigned, hereby certify, except as particularly noted herein, that:*

(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this Application for Air Permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and

(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.

If the purpose of this application is to obtain a Title V source air operation permit (check here [ ], if so), I further certify that each emissions unit described in this Application for Air Permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance schedule is submitted with this application.

If the purpose of this application is to obtain an air construction permit for one or more proposed new or modified emissions units (check here [X], if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.

If the purpose of this application is to obtain an initial air operation permit or operation permit revision for one or more newly constructed or modified emissions units (check here [ ], if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.

Kenneth F. Kirby — Signature

March 10, 2000 — Date

(seal) 1999

* Attach any exception to certification statement.

Poor Original

Scope of Application

Emissions Unit ID	Description of Emissions Unit	Permit Type	Processing Fee
--	Siemens-Westinghouse 501FD CT with DB	AC1A	
--	Siemens-Westinghouse 501FD CT with DB	AC1A	
--	Fresh Water Cooling Tower	AC1A	

Application Processing Fee

Check one: [ ] Attached - Amount: $: _____ [X] Not Applicable

Construction/Modification Information

1. Description of Proposed Project or Alterations:

Construction of two 170-MW Westinghouse "F" Class combustion turbines (CTs) operating in combined-cycle mode with duct firing. See Attachment PSD-OEC.

2. Projected or Actual Date of Commencement of Construction: **APR 2001**

3. Projected Date of Completion of Construction: **APR 2003**

Application Comment

Permit application fee not required for facilities licensed under the Power Plant Siting Act. A separate fee is paid under this process. See Attachment PSD-OEC

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Location and Type

1. Facility UTM Coordinates: Zone: **17** East (km): **421.0** North (km): **3103.2**			
2. Facility Latitude/Longitude: Latitude (DD/MM/SS): Longitude (DD/MM/SS):			
3. Governmental Facility Code: **0**	4. Facility Status Code: **A**	5. Facility Major Group SIC Code: **49**	6. Facility SIC(s): **4911**
7. Facility Comment (limit to 500 characters): **Project consists of two 170-MW Westinghouse "F" Class combustion turbines (CTs) that will use dry low-nitrogen oxide combustion technology when firing natural gas and Selective Catalytic Reduction (SCR). Each CT will operate up to 8,760 hours per year including 1,560 hours of operation with power augmentation, and 2,880 hours of natural gas duct firing.**			

Facility Contact

1. Name and Title of Facility Contact: **Paul Barnett, Project Director**
2. Facility Contact Mailing Address: Organization/Firm: **Calpine Finance and Construction Company, L.P.** Street Address: **The Pilot House, 2nd floor, Lewis Wharf** City: **Boston** State: **MA** Zip Code: **02110**
3. Facility Contact Telephone Numbers: Telephone: **(617) 723 - 7200** Fax: **(617) 723 - 7635**

Facility Regulatory Classifications

Check all that apply:

1. [ ] Small Business Stationary Source? [ ] Unknown
2. [X] Major Source of Pollutants Other than Hazardous Air Pollutants (HAPs)?
3. [ ] Synthetic Minor Source of Pollutants Other than HAPs?
4. [ ] Major Source of Hazardous Air Pollutants (HAPs)?
5. [ ] Synthetic Minor Source of HAPs?
6. [X] One or More Emissions Units Subject to NSPS?
7. [ ] One or More Emission Units Subject to NESHAP?
8. [ ] Title V Source by EPA Designation?
9. Facility Regulatory Classifications Comment (limit to 200 characters): **CT is subject to NSPS Subpart GG, and the duct burner is subject to NSPS Subpart Da.**

List of Applicable Regulations

Not Applicable	

B. FACILITY POLLUTANTS

List of Pollutants Emitted

1. Pollutant Emitted	2. Pollutant Classif.	3. Requested Emissions Cap lb/hour	tons/year	4. Basis for Emissions Cap	5. Pollutant Comment
PM	A				Particulate Matter-Total
VOC	B				Volatile Organic Compounds
SO_2	B				Sulfur Dioxide
NO_x	A				Nitrogen Oxides
CO	A				Carbon Monoxides
PM_{10}	A				Particulate Matter-PM_{10}
H_2SO_4	B				Sulfuric Acid Mist

C. FACILITY SUPPLEMENTAL INFORMATION

Supplemental Requirements

1. Area Map Showing Facility Location: [X] Attached, Document ID: PSD-OEC [ ] Not Applicable [ ] Waiver Requested
2. Facility Plot Plan: [X] Attached, Document ID: PSD-OEC [ ] Not Applicable [ ] Waiver Requested
3. Process Flow Diagram(s): [X] Attached, Document ID: PSD-OEC [ ] Not Applicable [ ] Waiver Requested
4. Precautions to Prevent Emissions of Unconfined Particulate Matter: [ ] Attached, Document ID: _____ [X] Not Applicable [ ] Waiver Requested
5. Fugitive Emissions Identification: [ ] Attached, Document ID: _____ [X] Not Applicable [ ] Waiver Requested
6. Supplemental Information for Construction Permit Application: [X] Attached, Document ID: PSD-OEC [ ] Not Applicable
7. Supplemental Requirements Comment:

Additional Supplemental Requirements for Title V Air Operation Permit Applications

8. List of Proposed Insignificant Activities:
   [ ] Attached, Document ID:_____ [ ] Not Applicable

9. List of Equipment/Activities Regulated under Title VI:
   [ ] Attached, Document ID:_____
   [ ] Equipment/Activities On site but Not Required to be Individually Listed
   [ ] Not Applicable

10. Alternative Methods of Operation:
    [ ] Attached, Document ID:_____ [ ] Not Applicable

11. Alternative Modes of Operation (Emissions Trading):
    [ ] Attached, Document ID:_____ [ ] Not Applicable

12. Identification of Additional Applicable Requirements:
    [ ] Attached, Document ID:_____ [ ] Not Applicable

13. Risk Management Plan Verification:
    [ ] Plan previously submitted to Chemical Emergency Preparedness and Prevention Office (CEPPO). Verification of submittal attached (Document ID:_____) or previously submitted to DEP (Date and DEP Office:_____)
    [ ] Plan to be submitted to CEPPO (Date required:_____)
    [ ] Not Applicable

14. Compliance Report and Plan:
    [ ] Attached, Document ID:_____ [ ] Not Applicable

15. Compliance Certification (Hard-copy Required):
    [ ] Attached, Document ID:_____ [ ] Not Applicable

III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through J as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application.

A. GENERAL EMISSIONS UNIT INFORMATION
(All Emissions Units)

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in This Section: (Check one)

[X] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Regulated or Unregulated Emissions Unit? (Check one)

[X] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[ ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

3. Description of Emissions Unit Addressed in This Section (limit to 60 characters):

Siemens-Westinghouse 501FD Combustion Turbine with HRSG Duct Firing

4. Emissions Unit Identification Number: [ ] No ID
ID: [X] ID Unknown

5. Emissions Unit Status Code:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
C	April 2003	49	[X]

9. Emissions Unit Comment: (Limit to 500 Characters)

This emission unit is a Siemens-Westinghouse 501 FD combustion turbine operating in combined cycle mode, with duct firing. See Attachment PSD-OEC.

Emissions Unit Control Equipment

1. Control Equipment/Method Description (Limit to 200 characters per device or method):

   Dry Low NO_x combustion - Natural gas firing

2. Control Device or Method Code(s): **25**

Emissions Unit Details

1. Package Unit:
   Manufacturer: **Siemens-Westinghouse** Model Number: **501 FD**
2. Generator Nameplate Rating: **181** MW
3. Incinerator Information:
   Dwell Temperature: °F
   Dwell Time: seconds
   Incinerator Afterburner Temperature: °F

Emissions Unit Control Equipment

1. Control Equipment/Method Description (Limit to 200 characters per device or method):

   Selective Catalytic Reduction (SCR)

2. Control Device or Method Code(s): **65**

Emissions Unit Details

1. Package Unit:
   Manufacturer: **Siemens-Westinghouse** Model Number: **501 FD**
2. Generator Nameplate Rating: **181** MW
3. Incinerator Information:
   Dwell Temperature: °F
   Dwell Time: seconds
   Incinerator Afterburner Temperature: °F

B. EMISSIONS UNIT CAPACITY INFORMATION
(Regulated Emissions Units Only)

Emissions Unit Operating Capacity and Schedule

1. Maximum Heat Input Rate:		**1,669**	mmBtu/hr
2. Maximum Incineration Rate:	lb/hr		tons/day
3. Maximum Process or Throughput Rate:			
4. Maximum Production Rate:			
5. Requested Maximum Operating Schedule:			
	hours/day		days/week
	weeks/year	**8,760**	hours/year
6. Operating Capacity/Schedule Comment (limit to 200 characters):			

Maximum heat input at ISO conditions and natural gas firing (LHV); maximum heat input for duct burners is 250 mmBTU/hr (LHV).

C. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

List of Applicable Regulations

See Attachment OEC-EU1-D for operational requirements	
See Attachment PSD-OEC for permitting requirements	

ATTACHMENT OEC-EU1-D

Applicable Requirements Listing

EMISSION UNIT ID: EU1

FDEP Rules:

Air Pollution Control-General Provisions:

62-204.800(7)(b)3	NSPS Subpart Da
62-204.800(7)(b)39. (State Only)	NSPS Subpart GG
62-204.800(7)(c) (State Only)	NSPS authority
62-204.800(7)(d)(State Only)	NSPS General Provisions
62-204.800(14) (State Only)	Acid Rain Program
62-204.800(15) (State Only)	Allowances
62-204.800(16) (State Only)	Acid Rain Program Monitoring
62-204.800(18) (State Only)	Excess Emissions (Potentially applicable over term of permit)

Stationary Sources-General:

62-210.650	Circumvention; EUs with control device
62-210.700(1)	Excess Emissions;
62-210.700(4)	Excess Emissions; poor maintenance
62-210.700(6)	Excess Emissions; notification

Acid Rain:

62-214.300	All Acid Rain Units (Applicability)
62-214.320(1)(a),(2)	All Acid Rain Units (Application Shield)
62-214.330(1)(a)1.	Compliance Options (if 214.430)
62-214.340	Exemptions (new units, retired units)
62-214.350(2);(3);(6)	All Acid Rain Units (Certification)
62-214.370	All Acid Rain Units (Revisions; correction; potentially applicable if a need arises)
62-214.430	All Acid Rain Units (Compliance Options-if required)

Stationary Sources-Emission Standards:

62-296.320(4)(b)(State Only)	CTs/Diesel Units

Stationary Sources-Emission Monitoring (where stack test is required):

62-297.310(1)	All Units (Test Runs-Mass Emission)
62-297.310(2)(b)	All Units (Operating Rate; other than CTs;no CT)
62-297.310(3)	All Units (Calculation of Emission)
62-297.310(4)(a)	All Units (Applicable Test Procedures;Sampling time)
62-297.310(4)(b)	All Units (Sample Volume)
62-297.310(4)(c)	All Units (Required Flow Rate Range-PM/H2SO4/F)
62-297.310(4)(d)	All Units (Calibration)
62-297.310(4)(e)	All Units (EPA Method 5-only)

62-297.310(5)	All Units (Determination of Process Variables)
62-297.310(6)(a)	All Units (Permanent Test Facilities-general)
62-297.310(6)(c)	All Units (Sampling Ports)
62-297.310(6)(d)	All Units (Work Platforms)
62-297.310(6)(e)	All Units (Access)
62-297.310(6)(f)	All Units (Electrical Power)
62-297.310(6)(g)	All Units (Equipment Support)
62-297.310(7)(a)1.	Applies mainly to CTs/Diesels
62-297.310(7)(a)2.	FFSG excess emissions
62-297.310(7)(a)3.	Permit Renewal Test Required
62-297.310(7)(a)4.a	Annual Test
62-297.310(7)(a)5.	PM exemption if <400 hrs/yr
62-297.310(7)(a)6.	PM FFSG semi annual test required if >200 hrs/yr
62-297.310(7)(a)7.	PM quarterly monitoring if >100 hrs/yr
62-297.310(7)(a)9.	FDEP Notification - 15 days
62-297.310(7)(c)	Waiver of Compliance Tests (Fuel Sampling)
62-297.310(8)	Test Reports

Federal Rules:

NSPS Subpart GG:

40 CFR 60.332(a)(1)	NO_x for Electric Utility CTs
40 CFR 60.332(a)(3)	NO_x for Electric Utility CTs
40 CFR 60.333	SO_2 limits
40 CFR 60.334	Monitoring of Operations (Custom Monitoring for Gas)
40 CFR 60.335	Test Methods

NSPS General Requirements:

40 CFR 60.7(a)(1)	Notification of Construction
40 CFR 60.7(a)(2)	Notification of Initial Start-Up
40 CFR 60.7(a)(3)	Notification of Actual Start-Up
40 CFR 60.7(a)(4)	Notification and Recordkeeping (Physical/Operational Cycle)
40 CFR 60.7(a)(5)	Notification of CEM Demonstration
40 CFR 60.7(b)	Notification and Recordkeeping (startup/shutdown/malfunction)
40 CFR 60.7(c)	Notification and Recordkeeping (startup/shutdown/malfunction)
40 CFR 60.7(d)	Notification and Recordkeeping (startup/shutdown/malfunction)
40 CFR 60.7(f)	Notification and Recordkeeping (maintain records-2 yrs)
40 CFR 60.8(a)	Performance Test Requirements
40 CFR 60.8(b)	Performance Test Notification
40 CFR 60.8(c)	Performance Tests (representative conditions)
40 CFR 60.8(e)	Provide Stack Sampling Facilities
40 CFR 60.8(f)	Test Runs
40 CFR 60.11(a)	Compliance (ref. S. 60.8 or Subpart; other than opacity)
40 CFR 60.11(b)	Compliance (opacity determined EPA Method 9)
40 CFR 60.11(c)	Compliance (opacity; excludes startup/shutdown/malfunction)
40 CFR 60.11(d)	Compliance (maintain air pollution control equip.)
40 CFR 60.11(e)(2)	Compliance (opacity; ref. S. 60.8)

40 CFR 60.12	Circumvention
40 CFR 60.13(a)	Monitoring (Appendix B; Appendix F)
40 CFR 60.13(c)	Monitoring (Opacity COMS)
40 CFR 60.13(d)(1)	Monitoring (CEMS; span, drift, etc.)
40 CFR 60.13(d)(2)	Monitoring (COMS; span, system check)
40 CFR 60.13(e)	Monitoring (frequency of operation)
40 CFR 60.13(f)	Monitoring (frequency of operation)
40 CFR 60.13(h)	Monitoring (COMS; data requirements)
NSPS Subpart Da:	
40 CFR 60.40a	Applicability (duct firing)
40 CFR 60.44a	Standard for Nitrogen Oxides
Acid Rain-Permits:	
40 CFR 72.9(a)	Permit Requirements
40 CFR 72.9(b)	Monitoring Requirements
40 CFR 72.9(c)(1)	SO_2 Allowances-hold allowances
40 CFR 72.9(c)(2)	SO_2 Allowances-violation
40 CFR 72.9(c)(3)(iii)	SO_2 Allowances-Phase II Units (listed)
40 CFR 72.9(c)(4)	SO_2 Allowances-allowances held in ATS
40 CFR 72.9(c)(5)	SO_2 Allowances-no deduction for 72.9(c)(1)(i)
40 CFR 72.9(d)	NO_x Requirements
40 CFR 72.9(e)	Excess Emission Requirements
40 CFR 72.9(f)	Recordkeeping and Reporting
40 CFR 72.9(g)	Liability
40 CFR 72.20(a)	Designated Representative; required
40 CFR 72.20(b)	Designated Representative; legally binding
40 CFR 72.20(c)	Designated Representative; certification requirements
40 CFR 72.21	Submissions
40 CFR 72.22	Alternate Designated Representative
40 CFR 72.23	Changing representatives; owners
40 CFR 72.24	Certificate of representation
40 CFR 72.30(a)	Requirements to Apply (operate)
40 CFR 72.30(b)(2)	Requirements to Apply (Phase II-Complete)
40 CFR 72.30(c)	Requirements to Apply (reapply before expiration)
40 CFR 72.30(d)	Requirements to Apply (submittal requirements)
40 CFR 72.31	Information Requirements; Acid Rain Applications
40 CFR 72.32	Permit Application Shield
40 CFR 72.33(b)	Dispatch System ID;unit/system ID
40 CFR 72.33(c)	Dispatch System ID;ID requirements
40 CFR 72.33(d)	Dispatch System ID;ID change
40 CFR 72.40(a)	General; compliance plan
40 CFR 72.40(b)	General; multi-unit compliance options
40 CFR 72.40(c)	General; conditional approval
40 CFR 72.40(d)	General; termination of compliance options
40 CFR 72.51	Permit Shield
40 CFR 72.90	Annual Compliance Certification

Allowances:	
40 CFR 73.33(a),(c)	Authorized account representative
40 CFR 73.35(c)(1)	Compliance: ID of allowances by serial number
Monitoring Part 75:	
40 CFR 75.4	Compliance Dates;
40 CFR 75.5	Prohibitions
40 CFR 75.10(a)(1)	Primary Measurement; SO_2;
40 CFR 75.10(a)(2)	Primary Measurement; NO_x;
40 CFR 75.10(a)(3)(iii)	Primary Measurement; CO_2; O_2 monitor
40 CFR 75.10(b)	Primary Measurement; Performance Requirements
40 CFR 75.10(c)	Primary Measurement; Heat Input; Appendix F
40 CFR 75.10(e)	Primary Measurement; Optional Backup Monitor
40 CFR 75.10(f)	Primary Measurement; Minimum Measurement
40 CFR 75.10(g)	Primary Measurement; Minimum Recording
40 CFR 75.11(d)	SO_2 Monitoring; Gas- and Oil-fired units
40 CFR 75.11(e)	SO_2 Monitoring; Gaseous firing
40 CFR 75.12(a)	NO_x Monitoring; Coal; Non-peaking oil/gas units
40 CFR 75.12(b)	NO_x Monitoring; Determination of NO_x emission rate; Appendix F
40 CFR 75.13(b)	CO_2 Monitoring; Appendix G
40 CFR 75.13(c)	CO_2 Monitoring; Appendix F
40 CFR 75.14(c)	Opacity Monitoring; Gas units; exemption
40 CFR 75.20(a)	Initial Certification Approval Process; Loss of Certification
40 CFR 75.20(b)	Recertification Procedures (if recertification necessary)
40 CFR 75.20(c)	Certification Procedures (if recertification necessary)
40 CFR 75.20(d)	Recertification Backup/portable monitor
40 CFR 75.20(f)	Alternate Monitoring system
40 CFR 75.21(a)	QA/QC; CEMS; Appendix B (Suspended 7/17/95-12/31/96)
40 CFR 75.21(c)	QA/QC; Calibration Gases
40 CFR 75.21(d)	QA/QC; Notification of RATA
40 CFR 75.21(e)	QA/QC; Audits
40 CFR 75.21(f)	QA/QC; CEMS (Effective 7/17/96-12/31/96)
40 CFR 75.22	Reference Methods
40 CFR 75.24	Out-of-Control Periods; CEMS
40 CFR 75.30(a)(3)	General Missing Data Procedures; NO_x
40 CFR 75.30(a)(4)	General Missing Data Procedures; SO_2
40 CFR 75.30(b)	General Missing Data Procedures; certified backup monitor
40 CFR 75.30(c)	General Missing Data Procedures; certified backup monitor
40 CFR 75.30(d)	General Missing Data Procedures; SO_2 (optional before 1/1/97)
40 CFR 75.30(e)	General Missing Data Procedures; bypass/multiple stacks
40 CFR 75.31	Initial Missing Data Procedures (new/re-certified CMS)
40 CFR 75.32	Monitoring Data Availability for Missing Data
40 CFR 75.33	Standard Missing Data Procedures
40 CFR 75.36	Missing Data for Heat Input
40 CFR 75.40	Alternate Monitoring Systems-General
40 CFR 75.41	Alternate Monitoring Systems-Precision Criteria
40 CFR 75.42	Alternate Monitoring Systems-Reliability Criteria

40 CFR 75.43	Alternate Monitoring Systems-Accessability Criteria
40 CFR 75.44	Alternate Monitoring Systems-Timeliness Criteria
40 CFR 75.45	Alternate Monitoring Systems-Daily QA
40 CFR 75.46	Alternate Monitoring Systems-Missing data
40 CFR 75.47	Alternate Monitoring Systems-Criteria for Class
40 CFR 75.48	Alternate Monitoring Systems-Petition
40 CFR 75.53	Monitoring Plan; revisions
40 CFR 75.54(a)	Recordkeeping-general
40 CFR 75.54(b)	Recordkeeping-operating parameter
40 CFR 75.54(c)	Recordkeeping-SO_2
40 CFR 75.54(d)	Recordkeeping- NO_x
40 CFR 75.54(e)	Recordkeeping-CO_2
40 CFR 75.54(f)	Recordkeeping-Opacity
40 CFR 75.55(c)	General Recordkeeping (Specific Situations)
40 CFR 75.55(e)	General Recordkeeping (Specific Situations)
40 CFR 75.56	Certification; QA/QC Provisions
40 CFR 75.60	Reporting Requirements-General
40 CFR 75.61	Reporting Requirements-Notification cert/recertification
40 CFR 75.62	Reporting Requirements-Monitoring Plan
40 CFR 75.63	Reporting Requirements-Certification/Recertification
40 CFR 75.64(a)	Reporting Requirements-Quarterly reports; submission
40 CFR 75.64(b)	Reporting Requirements-Quarterly reports; DR statement
40 CFR 75.64(c)	Rep. Req.; Quarterly reports; Compliance Certification
40 CFR 75.64(d)	Rep. Req.; Quarterly reports; Electronic format
40 CFR 75.66	Petitions to the Administrator (if required)
Appendix A-1	Installation and Measurement Locations
Appendix A-2.	Equipment Specifications
Appendix A-3.	Performance Specifications
Appendix A-4.	Data Handling and Acquisition Systems
Appendix A-5.	Calibration Gases
Appendix A-6.	Certification Tests and Procedures
Appendix A-7.	Calculations
Appendix B	QA/QC Procedures
Appendix C-1.	Missing Data; SO_2/ NO_x for controlled sources
Appendix C-2.	Missing Data; Load-Based Procedure; NO_x & flow
Appendix D	Optional SO_2; Oil-/gas-fired units
Appendix F	Conversion Procedures
Appendix H	Traceability Protocol

Acid Rain Program-Excess Emissions (these are future requirements):

40 CFR 77.3	Offset Plans (future)
40 CFR 77.5(b)	Deductions of Allowances (future)
40 CFR 77.6	Excess Emissions Penalties (SO_2 and NO_x;future)

D. EMISSION POINT (STACK/VENT) INFORMATION
(Regulated Emissions Units Only)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram? **See Att. PSD-OEC**	2. Emission Point Type Code: **1**	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point): **Exhausts through a single stack.**		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:		
5. Discharge Type Code: **V**	6. Stack Height: **135** feet	7. Exit Diameter: **19** feet
8. Exit Temperature: **200** °F	9. Actual Volumetric Flow Rate: **1,021,086** acfm	10. Water Vapor: **8.4** %
11. Maximum Dry Standard Flow Rate: dscfm	12. Nonstack Emission Point Height: feet	
13. Emission Point UTM Coordinates: Zone: **17** East (km): **421.0** North (km): **3103.2**		
14. Emission Point Comment (limit to 200 characters): **Stack parameters for ISO operating condition firing natural gas. See PSD-OEC; Appendix A for all operating conditions.**		

E. SEGMENT (PROCESS/FUEL) INFORMATION
(All Emissions Units)

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type) (limit to 500 characters): **Natural Gas**		
2. Source Classification Code (SCC): **20100201**	3. SCC Units: **Million Cubic Feet**	
4. Maximum Hourly Rate: **1.814**	5. Maximum Annual Rate: **15,892**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: **0.008**	8. Maximum % Ash:	9. Million Btu per SCC Unit: **920**
10. Segment Comment (limit to 200 characters): **Based on 920 Btu/cf (LHV); ISO conditions; 8,760 hrs/yr operation; and 2 grains/100 cf**		

Segment Description and Rate: Segment ____ of ____

1. Segment Description (Process/Fuel Type) (limit to 500 characters):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment (limit to 200 characters):		

F. EMISSIONS UNIT POLLUTANTS
(All Emissions Units)

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
PM			EL
SO_2			EL
NO_x	026	065	EL
CO			EL
VOC			EL
PM_{10}			EL

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: **PM**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **24.1** lb/hour **94.8** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **Siemens-Westinghouse, 2000; Golder, Nooter/Eriksen**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters): **See Attachment PSD-OEC; Section 2.0; Appendix A.**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr and tons/yr based on natural gas firing in the CT and Duct Burner, ISO conditions.**	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **24.1 lb/hr**	4. Equivalent Allowable Emissions: **24.1** b/hour **94.8** tons/year
5. Method of Compliance (limit to 60 characters): **Annual stack test; EPA Methods 5 or 17; if < 400 hours**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Gas firing – 8,760 hours of operation and 2,880 hours per year of duct firing. See Attachment PSD-OEC; Section 2.0 Appendix A.**	

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: **SO_2**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **12.0** lb/hour **47.7** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **Siemens-Westinghouse, 2000; Golder, Nooter/Eriksen**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters): **See Attachment PSD-OEC; Section 2.0; Appendix A.**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Emission Factor: 2 grain S per 100 CF gas; lb/hr and TPY based on natural gas firing in the CT and Duct burner for 8,760 and 2,880 hr/yr, respectively.**	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **See Comment**	4. Equivalent Allowable Emissions: **12.0** lb/hour **47.7** tons/year
5. Method of Compliance (limit to 60 characters): **Fuel Sampling**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Requested allowable emissions and units: Pipeline Natural Gas. Gas firing, 2 grains/100 cf - 59°F, 100% load; 8,760 hrs/yr. See Attachment PSD-OEC; Section 2.0; Appendix A.**	

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: NO_x	2. Total Percent Efficiency of Control:
3. Potential Emissions: 31.3 lb/hour 124.7 tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: Siemens-Westinghouse, 2000; Golder, Nooter/Eriksen	7. Emissions Method Code: 2
8. Calculation of Emissions (limit to 600 characters): See Attachment PSD-OEC; Section 2.0; Appendix A.	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Lb/hr and ton/yr based on natural gas firing; 100% load; 59°F. Ton/yr based on 8,760 hrs/yr for CT gas firing and 2,880 hrs/yr for natural gas duct firing; ISO conditions.	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: 4 ppmvd	4. Equivalent Allowable Emissions: 31.3 lb/hour 124.7 tons/year
5. Method of Compliance (limit to 60 characters): CEM – 3-Hour Block Average	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Requested Allowable Emissions and Units at 15% O_2-100% load. Gas firing; 59°F; 100% load; TPY @ 59°F, 8,760 and 2,880 hours of duct firing per year. See Attachment PSD-OEC; Section 2.0; Appendix A.	

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: **CO**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **152** lb/hour **396.2** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **Siemens-Westinghouse, 2000; Golder, Nooter/Eriksen**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters): **See Attachment PSD-OEC; Section 2.0; Appendix A.**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr based on 60% load @ 32°F TPY based on CT operating 8,760 hours including 1,500 hours @ 60% load and 2,880 hours with power augmentation and natural gas duct firing.**	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **See Section 4.0 in Att. PSD-OEC**	4. Equivalent Allowable Emissions: **152.0** lb/hour **396.2** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Method 10; high and low load**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Lb/hr based on 60% load; TPY, 8,760 hr/yr for CT, including 1,500 hours at 60% load and 2,880 hours of power augmentation and of duct firing. See Attachment PSD-OEC; Section 2.0; Appendix A.**	

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: **VOC**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **12.4** lb/hour **34.6** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **Siemens-Westinghouse, 2000; Golder, Nooter/Eriksen**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters): **See Attachment PSD-OEC; Section 2.0; Appendix A.**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr based on 100% load and duct firing and ton/yr based on 4,380 hours @ base, 2,880 hours with power augmentation/duct firing, 1,500 hours at 60% load.**	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **See Section 4.0 in Att. PSD-OEC**	4. Equivalent Allowable Emissions: **12.4** lb/hour **34.6** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Method 25A; high and low load**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **See Attachment PSD-OEC; Section 2.0; Appendix A.**	

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: **PM_{10}**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **24.1** lb/hour **94.8** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **Siemens-Westinghouse, 2000; Golder, Nooter/Eriksen**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters): **See Attachment PSD-OEC; Section 2.0; Appendix A.**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr and ton/yr based on natural gas firing in the CT and duct burner, ISO conditions.**	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **24.1 lb/hr**	4. Equivalent Allowable Emissions: **24.1** lb/hour **94.8** tons/year
5. Method of Compliance (limit to 60 characters): **Annual stack test; EPA Methods 5 or 17; if < 400 hours**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Gas firing – 8,760 hours of operation and 2,880 hours per year of duct firing. See Attachment PSD-OEC; Section 2.0 Appendix A.**	

H. VISIBLE EMISSIONS INFORMATION
(Only Regulated Emissions Units Subject to a VE Limitation)

Visible Emissions Limitation: Visible Emissions Limitation 1 of 2

1. Visible Emissions Subtype: **VE20**	2. Basis for Allowable Opacity: [X] Rule [ ] Other
3. Requested Allowable Opacity: Normal Conditions: **20 %** Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **Annual VE Test EPA Method 9**	
5. Visible Emissions Comment (limit to 200 characters):	

I. CONTINUOUS MONITOR INFORMATION
(Only Regulated Emissions Units Subject to Continuous Monitoring)

Continuous Monitoring System: Continuous Monitor 1 of 1

1. Parameter Code: **EM**	2. Pollutant(s): **NO_x**
3. CMS Requirement:	[X] Rule [ ] Other
4. Monitor Information: **Not yet determined** Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment (limit to 200 characters): **NO_x CEM proposed to meet requirements of 40 CFR Part 75.**	

H. VISIBLE EMISSIONS INFORMATION
(Only Regulated Emissions Units Subject to a VE Limitation)

Visible Emissions Limitation: Visible Emissions Limitation 2 of 2

1. Visible Emissions Subtype: **VE99**	2. Basis for Allowable Opacity: [X] Rule [ ] Other
3. Requested Allowable Opacity: Normal Conditions: % Exceptional Conditions: **100** % Maximum Period of Excess Opacity Allowed: **6** min/hour	
4. Method of Compliance: **None**	
5. Visible Emissions Comment (limit to 200 characters): **FDEP Rule 62-201.700(1), Allowed for 2 hours (120 minutes) per 24 hours for start up, shutdown and malfunction.**	

I. CONTINUOUS MONITOR INFORMATION
(Only Regulated Emissions Units Subject to Continuous Monitoring)

Continuous Monitoring System: Continuous Monitor _____ of _____

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	[ ] Rule [ ] Other
4. Monitor Information: Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment (limit to 200 characters):	

J. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
(Regulated Emissions Units Only)

Supplemental Requirements

1. Process Flow Diagram [X] Attached, Document ID: PSD-OEC [ ] Not Applicable [ ] Waiver Requested
2. Fuel Analysis or Specification [X] Attached, Document ID: PSD-OEC [ ] Not Applicable [ ] Waiver Requested
3. Detailed Description of Control Equipment [X] Attached, Document ID: PSD-OEC [ ] Not Applicable [ ] Waiver Requested
4. Description of Stack Sampling Facilities [X] Attached, Document ID: PSD-OEC [ ] Not Applicable [ ] Waiver Requested
5. Compliance Test Report [ ] Attached, Document ID:_____ [ ] Previously submitted, Date:_____ [X] Not Applicable
6. Procedures for Startup and Shutdown [ ] Attached, Document ID:_____ [X] Not Applicable [ ] Waiver Requested
7. Operation and Maintenance Plan [ ] Attached, Document ID:_____ [X] Not Applicable [ ] Waiver Requested
8. Supplemental Information for Construction Permit Application [X] Attached, Document ID: PSD-OEC [ ] Not Applicable
9. Other Information Required by Rule or Statute [X] Attached, Document ID: PSD-OEC [ ] Not Applicable
10. Supplemental Requirements Comment:

Additional Supplemental Requirements for Title V Air Operation Permit Applications

11. Alternative Methods of Operation
[ ] Attached, Document ID:_____ [ ] Not Applicable

12. Alternative Modes of Operation (Emissions Trading)
[ ] Attached, Document ID:_____ [ ] Not Applicable

13. Identification of Additional Applicable Requirements
[ ] Attached, Document ID:_____ [ ] Not Applicable

14. Compliance Assurance Monitoring Plan
[ ] Attached, Document ID:_____ [ ] Not Applicable

15. Acid Rain Part Application (Hard-copy Required)

[ ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))
Attached, Document ID:_____

[ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)
Attached, Document ID:_____

[ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.)
Attached, Document ID:_____

[ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)
Attached, Document ID:_____

[ ] Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.)
Attached, Document ID:_____

[ ] Phase NOx Averaging Plan (Form No. 62-210.900(1)(a)5.)
Attached, Document ID:_____

[ ] Not Applicable

III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through J as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application.

A. GENERAL EMISSIONS UNIT INFORMATION (All Emissions Units)

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in This Section: (Check one)

[X] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Regulated or Unregulated Emissions Unit? (Check one)

[X] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[ ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

3. Description of Emissions Unit Addressed in This Section (limit to 60 characters):

Siemens-Westinghouse 501FD Combustion Turbine with HRSG Duct Firing

4. Emissions Unit Identification Number: [ ] No ID
ID: [X] ID Unknown

5. Emissions Unit Status Code:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
C	April 2003	49	[X]

9. Emissions Unit Comment: (Limit to 500 Characters)

This emission unit is a Siemens-Westinghouse 501 FD combustion turbine operating in combined cycle mode, with duct firing. See Attachment PSD-OEC.

Emissions Unit Control Equipment

1. Control Equipment/Method Description (Limit to 200 characters per device or method):

   Dry Low NO_x combustion - Natural gas firing

2. Control Device or Method Code(s): **25**

Emissions Unit Details

1. Package Unit:
   Manufacturer: **Siemens-Westinghouse** Model Number: **501 FD**
2. Generator Nameplate Rating: **181** MW
3. Incinerator Information:
   Dwell Temperature: °F
   Dwell Time: seconds
   Incinerator Afterburner Temperature: °F

Emissions Unit Control Equipment

1. Control Equipment/Method Description (Limit to 200 characters per device or method):

   Selective Catalytic Reduction (SCR)

2. Control Device or Method Code(s): **65**

Emissions Unit Details

1. Package Unit:
   Manufacturer: **Siemens-Westinghouse** Model Number: **501 FD**
2. Generator Nameplate Rating: **181** MW
3. Incinerator Information:
   Dwell Temperature: °F
   Dwell Time: seconds
   Incinerator Afterburner Temperature: °F

B. EMISSIONS UNIT CAPACITY INFORMATION
(Regulated Emissions Units Only)

Emissions Unit Operating Capacity and Schedule

1. Maximum Heat Input Rate:		**1,669**	mmBtu/hr
2. Maximum Incineration Rate:	lb/hr		tons/day
3. Maximum Process or Throughput Rate:			
4. Maximum Production Rate:			
5. Requested Maximum Operating Schedule:			
	hours/day		days/week
	weeks/year	**8,760**	hours/year
6. Operating Capacity/Schedule Comment (limit to 200 characters):			

Maximum heat input at ISO conditions and natural gas firing (LHV); maximum heat input for duct burners is 250 mmBTU/hr (LHV).

C. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

List of Applicable Regulations

See Attachment OEC-EU1-D for operational requirements	
See Attachment PSD-OEC for permitting requirements	

D. EMISSION POINT (STACK/VENT) INFORMATION
(Regulated Emissions Units Only)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram? **See Att. PSD-OEC**	2. Emission Point Type Code: **1**	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point): **Exhausts through a single stack.**		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:		
5. Discharge Type Code: **V**	6. Stack Height: **135** feet	7. Exit Diameter: **19** feet
8. Exit Temperature: **200** °F	9. Actual Volumetric Flow Rate: **1,021,086** acfm	10. Water Vapor: **8.4** %
11. Maximum Dry Standard Flow Rate: dscfm	12. Nonstack Emission Point Height: feet	
13. Emission Point UTM Coordinates: Zone: **17** East (km): **421.0** North (km): **3103.2**		
14. Emission Point Comment (limit to 200 characters): **Stack parameters for ISO operating condition firing natural gas. See PSD-OEC; Appendix A for all operating conditions.**		

E. SEGMENT (PROCESS/FUEL) INFORMATION
(All Emissions Units)

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type) (limit to 500 characters):		
Natural Gas		
2. Source Classification Code (SCC): **20100201**	3. SCC Units: **Million Cubic Feet**	
4. Maximum Hourly Rate: **1.814**	5. Maximum Annual Rate: **15,892**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: **0.008**	8. Maximum % Ash:	9. Million Btu per SCC Unit: **920**
10. Segment Comment (limit to 200 characters): **Based on 920 Btu/cf (LHV); ISO conditions; 8,760 hrs/yr operation; and 2 grains/100 cf**		

Segment Description and Rate: Segment ____ of ____

1. Segment Description (Process/Fuel Type) (limit to 500 characters):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment (limit to 200 characters):		

F. EMISSIONS UNIT POLLUTANTS
(All Emissions Units)

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
PM			EL
SO_2			EL
NO_x	026	065	EL
CO			EL
VOC			EL
PM_{10}			EL

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: **PM**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **24.1** lb/hour **94.8** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **Siemens-Westinghouse, 2000; Golder, Nooter/Eriksen**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters): **See Attachment PSD-OEC; Section 2.0; Appendix A.**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr and tons/yr based on natural gas firing in the CT and Duct Burner, ISO conditions.**	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **24.1 lb/hr**	4. Equivalent Allowable Emissions: **24.1** b/hour **94.8** tons/year
5. Method of Compliance (limit to 60 characters): **Annual stack test; EPA Methods 5 or 17; if < 400 hours**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Gas firing – 8,760 hours of operation and 2,880 hours per year of duct firing. See Attachment PSD-OEC; Section 2.0 Appendix A.**	

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: **SO_2**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **12.0** lb/hour **47.7** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **Siemens-Westinghouse, 2000; Golder, Nooter/Eriksen**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters): **See Attachment PSD-OEC; Section 2.0; Appendix A.**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Emission Factor: 2 grain S per 100 CF gas; lb/hr and TPY based on natural gas firing in the CT and Duct burner for 8,760 and 2,880 hr/yr, respectively.**	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **See Comment**	4. Equivalent Allowable Emissions: **12.0** lb/hour **47.7** tons/year
5. Method of Compliance (limit to 60 characters): **Fuel Sampling**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Requested allowable emissions and units: Pipeline Natural Gas. Gas firing, 2 grains/100 cf - 59°F, 100% load; 8,760 hrs/yr. See Attachment PSD-OEC; Section 2.0; Appendix A.**	

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: NO_x	2. Total Percent Efficiency of Control:
3. Potential Emissions: 31.3 lb/hour 124.7 tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: Siemens-Westinghouse, 2000; Golder, Nooter/Eriksen	7. Emissions Method Code: 2
8. Calculation of Emissions (limit to 600 characters): See Attachment PSD-OEC; Section 2.0; Appendix A.	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Lb/hr and ton/yr based on natural gas firing; 100% load; 59°F. Ton/yr based on 8,760 hrs/yr for CT gas firing and 2,880 hrs/yr for natural gas duct firing; ISO conditions.	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: OTHER	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: 4 ppmvd	4. Equivalent Allowable Emissions: 31.3 lb/hour 124.7 tons/year
5. Method of Compliance (limit to 60 characters): CEM – 3-Hour Block Average	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Requested Allowable Emissions and Units at 15% O_2-100% load. Gas firing; 59°F; 100% load; TPY @ 59°F, 8,760 and 2,880 hours of duct firing per year. See Attachment PSD-OEC; Section 2.0; Appendix A.	

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: **CO**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **152** lb/hour **396.2** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **Siemens-Westinghouse, 2000; Golder, Nooter/Eriksen**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters): **See Attachment PSD-OEC; Section 2.0; Appendix A.**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr based on 60% load @ 32°F TPY based on CT operating 8,760 hours including 1,500 hours @ 60% load and 2,880 hours with power augmentation and natural gas duct firing.**	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **See Section 4.0 in Att. PSD-OEC**	4. Equivalent Allowable Emissions: **152.0** lb/hour **396.2** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Method 10; high and low load**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Lb/hr based on 60% load; TPY, 8,760 hr/yr for CT, including 1,500 hours at 60% load and 2,880 hours of power augmentation and of duct firing. See Attachment PSD-OEC; Section 2.0; Appendix A.**	

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: **VOC**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **12.4** lb/hour **34.6** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **Siemens-Westinghouse, 2000; Golder, Nooter/Eriksen**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters): **See Attachment PSD-OEC; Section 2.0; Appendix A.**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr based on 100% load and duct firing and ton/yr based on 4,380 hours @ base, 2,880 hours with power augmentation/duct firing, 1,500 hours at 60% load.**	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **See Section 4.0 in Att. PSD-OEC**	4. Equivalent Allowable Emissions: **12.4** lb/hour **34.6** tons/year
5. Method of Compliance (limit to 60 characters): **EPA Method 25A; high and low load**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **See Attachment PSD-OEC; Section 2.0; Appendix A.**	

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: **PM_{10}**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **24.1** lb/hour **94.8** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **Siemens-Westinghouse, 2000; Golder, Nooter/Eriksen**	7. Emissions Method Code: **2**
8. Calculation of Emissions (limit to 600 characters): **See Attachment PSD-OEC; Section 2.0; Appendix A.**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Lb/hr and ton/yr based on natural gas firing in the CT and duct burner, ISO conditions.**	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **24.1 lb/hr**	4. Equivalent Allowable Emissions: **24.1** lb/hour **94.8** tons/year
5. Method of Compliance (limit to 60 characters): **Annual stack test; EPA Methods 5 or 17; if < 400 hours**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Gas firing – 8,760 hours of operation and 2,880 hours per year of duct firing. See Attachment PSD-OEC; Section 2.0 Appendix A.**	

H. VISIBLE EMISSIONS INFORMATION
(Only Regulated Emissions Units Subject to a VE Limitation)

Visible Emissions Limitation: Visible Emissions Limitation 1 of 2

1. Visible Emissions Subtype: **VE20**	2. Basis for Allowable Opacity: [X] Rule [ ] Other
3. Requested Allowable Opacity: Normal Conditions: **20 %** Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **Annual VE Test EPA Method 9**	
5. Visible Emissions Comment (limit to 200 characters):	

I. CONTINUOUS MONITOR INFORMATION
(Only Regulated Emissions Units Subject to Continuous Monitoring)

Continuous Monitoring System: Continuous Monitor 1 of 1

1. Parameter Code: **EM**	2. Pollutant(s): **NO_x**
3. CMS Requirement:	[X] Rule [ ] Other
4. Monitor Information: **Not yet determined** Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment (limit to 200 characters): **NO_x CEM proposed to meet requirements of 40 CFR Part 75.**	

H. VISIBLE EMISSIONS INFORMATION
(Only Regulated Emissions Units Subject to a VE Limitation)

Visible Emissions Limitation: Visible Emissions Limitation 2 of 2

1. Visible Emissions Subtype: **VE99**	2. Basis for Allowable Opacity: [X] Rule [ ] Other
3. Requested Allowable Opacity: Normal Conditions: % Exceptional Conditions: **100** % Maximum Period of Excess Opacity Allowed: **6** min/hour	
4. Method of Compliance: **None**	
5. Visible Emissions Comment (limit to 200 characters): **FDEP Rule 62-201.700(1), Allowed for 2 hours (120 minutes) per 24 hours for start up, shutdown and malfunction.**	

I. CONTINUOUS MONITOR INFORMATION
(Only Regulated Emissions Units Subject to Continuous Monitoring)

Continuous Monitoring System: Continuous Monitor _____ of _____

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	[ ] Rule [ ] Other
4. Monitor Information: Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment (limit to 200 characters):	

J. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
(Regulated Emissions Units Only)

Supplemental Requirements

1. Process Flow Diagram [X] Attached, Document ID: PSD-OEC [ ] Not Applicable [ ] Waiver Requested
2. Fuel Analysis or Specification [X] Attached, Document ID: PSD-OEC [ ] Not Applicable [ ] Waiver Requested
3. Detailed Description of Control Equipment [X] Attached, Document ID: PSD-OEC [ ] Not Applicable [ ] Waiver Requested
4. Description of Stack Sampling Facilities [X] Attached, Document ID: PSD-OEC [ ] Not Applicable [ ] Waiver Requested
5. Compliance Test Report [ ] Attached, Document ID:_____ [ ] Previously submitted, Date:_____ [X] Not Applicable
6. Procedures for Startup and Shutdown [ ] Attached, Document ID:_____ [X] Not Applicable [ ] Waiver Requested
7. Operation and Maintenance Plan [ ] Attached, Document ID:_____ [X] Not Applicable [ ] Waiver Requested
8. Supplemental Information for Construction Permit Application [X] Attached, Document ID: PSD-OEC [ ] Not Applicable
9. Other Information Required by Rule or Statute [X] Attached, Document ID: PSD-OEC [ ] Not Applicable
10. Supplemental Requirements Comment:

Additional Supplemental Requirements for Title V Air Operation Permit Applications

11. Alternative Methods of Operation
[ ] Attached, Document ID:_____ [ ] Not Applicable

12. Alternative Modes of Operation (Emissions Trading)
[ ] Attached, Document ID:_____ [ ] Not Applicable

13. Identification of Additional Applicable Requirements
[ ] Attached, Document ID:_____ [ ] Not Applicable

14. Compliance Assurance Monitoring Plan
[ ] Attached, Document ID:_____ [ ] Not Applicable

15. Acid Rain Part Application (Hard-copy Required)

[ ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))
Attached, Document ID:_____

[ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)
Attached, Document ID:_____

[ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.)
Attached, Document ID:_____

[ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)
Attached, Document ID:_____

[ ] Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.)
Attached, Document ID:_____

[ ] Phase NOx Averaging Plan (Form No. 62-210.900(1)(a)5.)
Attached, Document ID:_____

[ ] Not Applicable

III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through J as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application.

A. GENERAL EMISSIONS UNIT INFORMATION
(All Emissions Units)

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in This Section: (Check one)

[X] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Regulated or Unregulated Emissions Unit? (Check one)

[X] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[X] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

3. Description of Emissions Unit Addressed in This Section (limit to 60 characters):

Fresh Water Cooling Tower

4. Emissions Unit Identification Number: [ ] No ID
ID: [X] ID Unknown

5. Emissions Unit Status Code:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
C	April 2003	49	[X]

9. Emissions Unit Comment: (Limit to 500 Characters)

Emissions Unit Control Equipment

1. Control Equipment/Method Description (Limit to 200 characters per device or method):

   Drift eliminators

2. Control Device or Method Code(s): **15**

Emissions Unit Details

1. Package Unit:		
Manufacturer:	Model Number:	
2. Generator Nameplate Rating:	MW	
3. Incinerator Information:		
Dwell Temperature:		°F
Dwell Time:		seconds
Incinerator Afterburner Temperature:		°F

B. EMISSIONS UNIT CAPACITY INFORMATION
(Regulated Emissions Units Only)

Emissions Unit Operating Capacity and Schedule

1. Maximum Heat Input Rate:				mmBtu/hr
2. Maximum Incineration Rate:		lb/hr		tons/day
3. Maximum Process or Throughput Rate:			140,000	gal/min
4. Maximum Production Rate:				
5. Requested Maximum Operating Schedule:				
	24	hours/day	7	days/week
	52	weeks/year	8,760	hours/year

6. Operating Capacity/Schedule Comment (limit to 200 characters):

Maximum process rate (Field 3) is cooling tower water recirculation rate.

C. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

List of Applicable Regulations

See Attachment PSD-OEC	

D. EMISSION POINT (STACK/VENT) INFORMATION
(Regulated Emissions Units Only)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram? **Cooling Tower**	2. Emission Point Type Code: **3**	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point): **Cooling tower consists of 10 modules**		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: **N/A**		
5. Discharge Type Code: **V**	6. Stack Height: **55** feet	7. Exit Diameter: **28** feet
8. Exit Temperature: °F	9. Actual Volumetric Flow Rate: acfm	10. Water Vapor: %
11. Maximum Dry Standard Flow Rate: dscfm	12. Nonstack Emission Point Height: feet	
13. Emission Point UTM Coordinates: Zone: East (km): North (km):		
14. Emission Point Comment (limit to 200 characters): **Cooling tower consists of 10 modules with 10 individual exhaust fans. Stack height and diameter data provided in Fields 6 and 7 are for each module. Exhaust volume and temperature will vary with ambient temperature.**		

E. SEGMENT (PROCESS/FUEL) INFORMATION
(All Emissions Units)

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type) (limit to 500 characters):		
Fresh water cooling tower recirculation water flow rate		
2. Source Classification Code (SCC):	3. SCC Units: **Thousand gallons transferred or handled**	
4. Maximum Hourly Rate: **8,400**	5. Maximum Annual Rate: **73,584,000**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment (limit to 200 characters):		

Segment Description and Rate: Segment ____ of ____

1. Segment Description (Process/Fuel Type) (limit to 500 characters):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment (limit to 200 characters):		

F. EMISSIONS UNIT POLLUTANTS
(All Emissions Units)

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
PM	015		NS
PM_{10}	015		NS

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: **PM**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **1.96** lb/hour **8.6** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **AP-42, Section 13.4**	7. Emissions Method Code: **3**
8. Calculation of Emissions (limit to 600 characters): **(140,000 gal/min) x (0.002/100) x (1400 ppm)/10^6 x** **(8.345 lb/gal water) x (60 min/hr) = 1.96 lb/hr PM** **(1.96 lb/hr) x (8,760 hr/yr) x (1 ton/2,000 lb) = 8.6 ton/yr PM**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **0.002 % drift loss**	4. Equivalent Allowable Emissions: **1.96** b/hour **8.6** tons/year
5. Method of Compliance (limit to 60 characters): **Cooling tower vendor design data.**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters):	

G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

Potential/Fugitive Emissions

1. Pollutant Emitted: **PM_{10}**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **0.98** lb/hour **4.3** tons/year	4. Synthetically Limited? [ ]
5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year	
6. Emission Factor: Reference: **AP-42, Section 13.4**	7. Emissions Method Code: **3**
8. Calculation of Emissions (limit to 600 characters): **Calculations same as PM. However, PM_{10} emission is assumed equal to one-half (50%) of PM emission rates.**	
9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):	

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Requested Allowable Emissions and Units: **0.002 % drift loss**	4. Equivalent Allowable Emissions: **0.98** lb/hour **4.3** tons/year
5. Method of Compliance (limit to 60 characters): **Cooling tower vendor design data.**	
6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters):	

H. VISIBLE EMISSIONS INFORMATION
(Only Regulated Emissions Units Subject to a VE Limitation)

Visible Emissions Limitation: Visible Emissions Limitation 1 of 1

1. Visible Emissions Subtype: 20	2. Basis for Allowable Opacity: [X] Rule [ ] Other
3. Requested Allowable Opacity: Normal Conditions: 20 % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: EPA Reference Method 9	
5. Visible Emissions Comment (limit to 200 characters): Rule 62-296.320(4)(b)1., F.A.C.; does not include uncombined water.	

I. CONTINUOUS MONITOR INFORMATION
(Only Regulated Emissions Units Subject to Continuous Monitoring)

Continuous Monitoring System: Continuous Monitor _____ of _____

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	[ ] Rule [ ] Other
4. Monitor Information: Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment (limit to 200 characters):	

J. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
(Regulated Emissions Units Only)

Supplemental Requirements

1. Process Flow Diagram [X] Attached, Document ID: See PSD App. [ ] Not Applicable [ ] Waiver Requested
2. Fuel Analysis or Specification [ ] Attached, Document ID: _____ [X] Not Applicable [ ] Waiver Requested
3. Detailed Description of Control Equipment [X] Attached, Document ID: See PSD App. [ ] Not Applicable [ ] Waiver Requested
4. Description of Stack Sampling Facilities [ ] Attached, Document ID: _____ [X] Not Applicable [ ] Waiver Requested
5. Compliance Test Report [ ] Attached, Document ID: _____ [ ] Previously submitted, Date: _____ [X] Not Applicable
6. Procedures for Startup and Shutdown [ ] Attached, Document ID: _____ [X] Not Applicable [ ] Waiver Requested
7. Operation and Maintenance Plan [ ] Attached, Document ID: _____ [X] Not Applicable [ ] Waiver Requested
8. Supplemental Information for Construction Permit Application [X] Attached, Document ID: See PSD App. [ ] Not Applicable
9. Other Information Required by Rule or Statute [ ] Attached, Document ID: _____ [X] Not Applicable
10. Supplemental Requirements Comment:

Additional Supplemental Requirements for Title V Air Operation Permit Applications

11. Alternative Methods of Operation
[ ] Attached, Document ID:_____ [ ] Not Applicable

12. Alternative Modes of Operation (Emissions Trading)
[ ] Attached, Document ID:_____ [ ] Not Applicable

13. Identification of Additional Applicable Requirements
[ ] Attached, Document ID:_____ [ ] Not Applicable

14. Compliance Assurance Monitoring Plan
[ ] Attached, Document ID:_____ [ ] Not Applicable

15. Acid Rain Part Application (Hard-copy Required)

[ ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))
Attached, Document ID:_____

[ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)
Attached, Document ID:_____

[ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.)
Attached, Document ID:_____

[ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)
Attached, Document ID:_____

[ ] Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.)
Attached, Document ID:_____

[ ] Phase NOx Averaging Plan (Form No. 62-210.900(1)(a)5.)
Attached, Document ID:_____

[ ] Not Applicable

ATTACHMENT PSD-OEC
PREVENTION OF SIGNIFICANT DETERMINATION ANALYSIS

1.0 INTRODUCTION AND EXECUTIVE SUMMARY

1.1 INTRODUCTION

Calpine Construction and Finance Company, L.P. (Calpine), a wholly owned subsidiary of Calpine Corporation, Inc., is proposing to construct and operate a combined cycle power production facility capable of generating a nominal net electrical output of 527 megawatts (MW) in Florida (Figure 1-1). The facility is referred to as the Osprey Energy Center ("the Project"). The facility will be located within the City of Auburndale on a 19.5-acre tract approximately 1.5 miles [2.5 kilometers (km)] from downtown Auburndale and about 12 miles (20 km) east of Lakeland, Florida. The Project will consist of two 170-MW Westinghouse "F" Class combustion turbines (CTs), two heat recovery steam generators (HRSG) with duct firing, and one steam turbine (generating approximately 200 MW unfired) operating in combined cycle mode. The CTs and duct burners will be fired by natural gas only. A cooling tower will be installed and operated to provide cool water to the condensing steam turbine. The tower will be a mechanical draft counter-flow design. This Project is planned for a construction commencement date of April 2001. The facility will be designed for providing baseload service and permitted at an annual capacity of 100 percent. In actual operation, the plant's annual capacity would be approximately 80 percent.

The combined cycle units will be Siemens-Westinghouse 501FD models or equivalent with DLN burners fired by natural gas only. To further reduce nitrogen oxide (NO_x) emissions, selective catalytic reduction (SCR) systems will also be installed on these CTs.

Because the operation of the Project will result in airborne emissions, a permit must be obtained prior to the commencement of the construction based on Florida Rule 62-212.300(1)(a), Florida Administrative Code (F.A.C.). In addition, the Project will be located in an attainment area and will have potential emissions of regulated pollutants of more than 100 tons per year (TPY). Therefore, the Project is classified as a new major facility and is subject to the Prevention of Significant Deterioration (PSD) requirements under Florida Rule 62-212.400, F.A.C.

This application contains the technical information developed in accordance with PSD regulations as promulgated by the U.S. Environmental Protection Agency (EPA) and implemented through delegation to the Florida Department of Environmental Protection (DEP). It presents an evaluation of regulated pollutants subject to PSD review, a demonstration of Best Available Control Technology (BACT), a demonstration that pollutant emission rates comply with New Source Performance Standards (NSPS), and an assessment of potential air quality impacts associated with the Project.

Through this application, Calpine has provided analyses demonstrating compliance with all federal and State of Florida requirements for air quality protection that are applicable to the Osprey Energy Center. Calpine requests that the Florida DEP issue an Air Construction Permit for the Project.

1.2 PREVENTION OF SIGNIFICANT DETERIORATION (PSD) REQUIREMENTS

The permitting of the Osprey Energy Center in Florida requires an air construction permit and PSD review and approval. The Project will be a new air emission source in the City of Auburndale. The U.S. EPA has implemented regulations requiring a PSD review for new or modified sources that increase air emissions above certain threshold amounts. Because the threshold amounts will be exceeded by the Project, the Project is subject to PSD review. The total predicted emissions in tons per year associated with this Project are presented as Table 1-1.

PSD regulations are promulgated under 40 Code of Federal Regulations (CFR) Part 52.21 and implemented through delegation to the Florida DEP. Florida's PSD regulations are codified in Rules 62-212.400, F.A.C. These regulations incorporate the EPA PSD regulations.

Based on the emissions from the proposed Project, a PSD review is required for each of the following regulated pollutants:

- Sulfur dioxide (SO_2),
- Particulate matter (PM) as total suspended particulate matter (TSP),

- Particulate matter with aerodynamic diameter of 10 microns or less (PM_{10}),
- Nitrogen dioxide (NO_2),
- Carbon monoxide (CO),
- Volatile organic compounds (VOC), and
- Sulfuric acid mist.

Polk County has been designated as an attainment or unclassifiable area for all criteria pollutants. The county is also classified as a PSD Class II area for PM_{10}, SO_2, and NO_2; therefore, the new source review will follow PSD regulations pertaining to such designations.

Table 1-1. Summary of Maximum Annual Pollutant Emissions for the Osprey Energy Center (see Section 2.0 for Details)[a]

Pollutant	Project (tons per year)	EPA Significant Emission Rate Threshold (tons per year)	PSD Review Required?
SO_2	95	40	Yes
PM	199	25	Yes
PM_{10}	194	15	Yes
NO_x	258	40	Yes
CO	797	100	Yes
VOC	70	40	Yes
Sulfuric Acid Mist	15	7	Yes
Mercury	0.000014	0.1	No

[a] Based on Project operating in combined cycle mode with two CTs at baseload conditions firing natural gas for 5,880 hours at 59°F ambient temperature and power augmentation with duct firing at a maximum heat input rate of 250 mmBtu/hr for 2,880 hours at 95°F ambient temperature. Includes emissions from cooling tower, emergency generator and fire pump. For CO emissions, the two CTs are assumed to operate at 60 percent load for 1,500 hours displacing those hours at baseload operations.

Other regulated pollutants will not be emitted or emitted in negligible amounts. These pollutants lead, fluorides, total reduced sulfur, reduced sulfur compounds, hydrogen

sulfide, mercury, municipal waste combustor (MWC) organics, MWC metals, MWC acid gases, and municipal solid waste (MSW) gases.

BACT analyses were conducted for each pollutant with emissions greater than the EPA significance threshold. The proposed BACT to control NO_x emissions from the Project's two CTs operating in combined cycle mode is the use of DLN burners and SCR. The NO_x concentration will be 4 parts per million, volume dry (ppmvd), corrected to 15 percent oxygen (O_2) including duct firing in the HRSG. The proposed BACTs for PM, PM_{10}, CO and VOC are good combustion practices utilizing the DLN combustor and firing natural gas fuel. The proposed BACTs for SO_2 and sulfuric acid mist are the use of natural gas with very low sulfur content.

An air quality impact analysis was conducted to determine if the proposed operation of the Project would cause or contribute to a violation of any National Ambient Air Quality Standard (NAAQS) or allowable PSD increment concentration. The analysis demonstrates that emissions from the Project will not result in ambient concentrations above the PSD Class II or I significant impact levels. As a result, the Project will not cause or contribute to any adverse impacts on air quality.

Additional impacts of the Project, such as soils, vegetation, and growth impacts, were analyzed and found to be negligible (see analysis in Section 7.0).

1.3 SUMMARY OF RESULTS

Results from the analyses presented in this PSD Air Permit application lead to the following conclusions.

- The proposed BACT for each applicable pollutant provides the maximum degree of emissions reduction that is achievable when energy, environmental, and economic impacts and technical feasibility are considered.
- National and State Ambient Air Quality Standards will not be exceeded as a result of the operation of the Project.

- Applicable PSD increments will not be exceeded as a result of the operation of the Project.
- Non-criteria pollutants emitted from the Project will not adversely affect the public.
- Visibility impacts from the Project's plume on Class II and I areas are insignificant.
- No effects on soils and vegetation are expected as a result of the operation of the Project.
- The operation of the Project is not expected to adversely affect population or economic growth in the area; thus, no additional secondary emissions or impacts are anticipated.

As substantiated in this application, the Project will be constructed and operated in compliance with all applicable state and federal rules, regulations and laws.

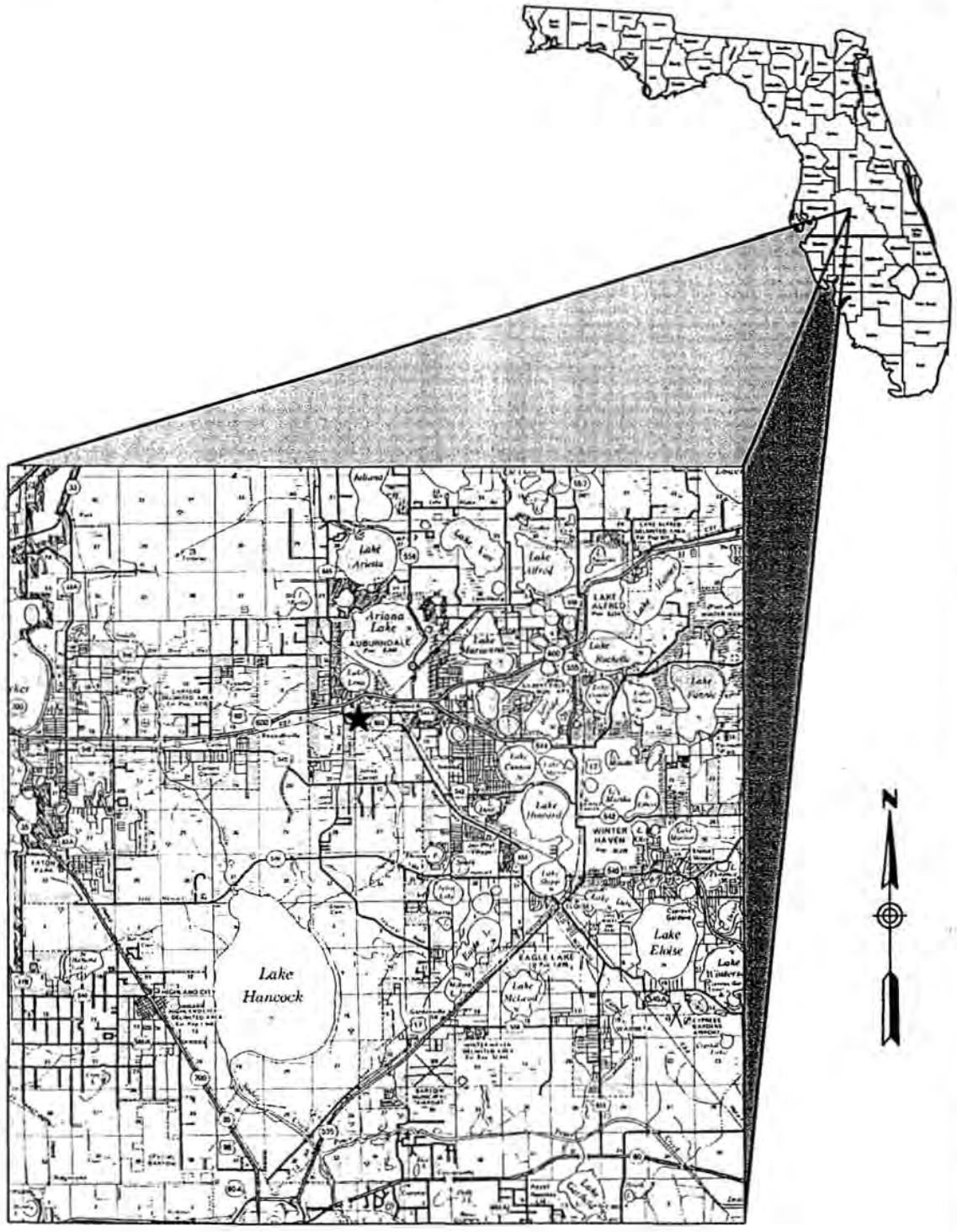
1.4 AIR PERMIT APPLICATION ORGANIZATION

The air permit application is divided into seven major sections.

- Section 2.0 presents a description of the facility, including air emissions and stack parameters.
- Section 3.0 provides a review of the PSD and nonattainment requirements applicable to the proposed Project.
- Section 4.0 includes the control technology review with discussions on BACT.
- Section 5.0 discusses the ambient air monitoring analysis (pre-construction monitoring) required by PSD regulations.
- Section 6.0 presents a summary of the air modeling approach and results used in assessing compliance of the proposed Project with ambient air quality standards (AAQS), PSD increments, and good engineering practice (GEP) stack height regulations.
- Section 7.0 provides the additional impact analyses for soils, vegetation, and visibility.

IMAGE QUALITY

AS YOU REVIEW THE NEXT FEW PAGES, PLEASE NOTE THAT THE ORIGINAL DOCUMENT WAS OF POOR QUALITY.



★ Project Site

Golder Associates Tampa, Florida	Project Site Area		
Client / Project: Calpine Construction Finance Company, L.P. Osprey Energy Center	CAD BY: CDT	SCALE: NTS	Job No. 993-9570
	CHK BY: CA	DATE: 02/04/00	FIGURE 1-1
	REV BY: —	FILE No.: fig1_3_2-1.dwg	

2.0 PROJECT DESCRIPTION

2.1 SITE DESCRIPTION

The Project will be built on a site (Site) that consists of 19.5 acres located in the City of Auburndale. The Site is approximately 1.5 miles (2.5 kilometers (km)) from downtown Auburndale and about 12 miles (20 km) east of Lakeland, Florida. The existing 150-MW Auburndale Power Plant and Tampa Electric Company's Recker Substation border the Site on the east. The Site is bordered on the south by Recker Highway (SR 655), on the west by Auburndale's Memorial Park Cemetery, and the north by Derby Avenue.

The plant elevation will be approximately 140 feet above mean sea level. This Site is currently used as a citrus grove but it has not been maintained or harvested for many years. With the exception of the citrus grove, the Site is undeveloped.

The Project will interconnect directly with the adjacent Tampa Electric Company's Recker Substation. An underground natural gas lateral pipeline will be permitted separately and built by ANR/Coastal Gas Transmission Company to transport fuel to the Site. In addition, the City of Auburndale will permit and build an underground pipeline to supply reclaim water to the Site. The City of Auburndale also will permit and build an underground wastewater pipeline to Auburndale's Allred Wastewater Treatment Facility.

2.2 POWER PLANT

The Project will consist of two 170- MW Westinghouse "F" Class combustion turbines (CTs) that will operate in combined cycle mode, two heat recovery steam generators (HRSG) fired by two duct burners (one per HRSG), one steam turbine generator (STG) (approximately 200 MW unfired), and associated equipment. The total electric power capacity of the Project will be 527 MW (average ambient). The Project will consist of the power block and operations control center and directly associated facilities, including a water treatment building and storage facilities; a general services/warehouse building; a mechanical draft cooling tower; an emergency natural gas-fired generator; a fuel gas heater; various pumps, including an emergency firewater pump; and a gas metering station.

A CT is an internal combustion engine that operates with rotary motion to drive an electric generator to produce electricity. CTs are essentially composed of three major components: compressor, combustor, and power turbine. In the compressor section, ambient air is drawn in, compressed and directed to the combustor section where fuel is introduced, ignited, and burned. The rotary power is achieved by the expansion of the combustion gases through the power turbine. For this Project, the combustion process is based on lean premix staged combustion. For lean premix combustors, fuel and air are thoroughly mixed in an initial stage resulting in a uniform, lean, unburned fuel/air mixture which is delivered to a secondary stage where the combustion reaction takes place. Manufacturers use different types of fuel/air staging, including fuel staging, air staging, or both; however, the same staged, lean premix principle is applied. CTs using staged combustion are also referred to as dry, low NO_x combustors.

Hot gases from the combustion section are diluted with additional air from the compressor section and directed to the power turbine section at very high temperatures. Energy from the hot exhaust gases, which expand in the power turbine section, is recovered in the form of shaft horsepower. More than 50 percent of the shaft horsepower is needed to drive the internal compressor and the balance of recovered shaft horsepower is available to drive an external load. The heat content of the exhaust gases exiting the turbine can be exhausted to the atmosphere without heat recovery (referred to as simple cycle mode) or recovered in a heat recovery steam generator (HRSG) to raise steam for a steam turbine (referred to as combined cycle mode). In combined cycle mode, the gas turbine drives an electric generator and the steam from the HRSG drives a steam turbine, which also drives an electric generator.

Process flow diagrams of the facility operating at baseload in combined cycle mode at ambient temperatures of 32, 59, and 95°F (with power augmentation) are presented in Figures 2-1 through 2-3, respectively.

The anticipated schedule for the Project is as follows:

- Obtain air permit and begin construction by April 2001;

- First fire by the fourth quarter 2002; and
- Operate commercially by the first quarter 2003.

The Siemens-Westinghouse 501FD CTs are up to 10 percent more fuel-efficient than the previous generation of CT (501D5). Each CT will have an evaporative cooler at the turbine air inlet that reduces the inlet air temperature and increases the efficiency, mass flow and power output. These coolers add water vapor to the exhaust from the CTs but do not affect emissions of regulated pollutants.

The CTs typically will operate between 60 and 100 percent of load. The economic incentive is to dispatch the plant as near to 100 percent load, whenever possible. The facility will be dispatched to meet peak electrical demand. The turbines may be operated individually or in any combination of one or two.

In addition, each of the HRSGs may be supplementary fired by a duct burner. Each duct burner will have a maximum heat input rate of 250 mmBtu/hr and be fired by natural gas. The duct burners will be used when the Project is operating at or near baseload conditions. For permitting purposes, the duct burners are assumed to operate for 2,880 hours per year.

Natural gas will be transported to the Site via pipeline and will be the exclusive fuel.

The facility will be capable of continuous operation at baseload for up to 8,760 hours per year and permitted at an annual capacity of 100 percent. In actual operation, the average annual availability would be approximately 80 percent.

Air emissions controls will consist of state-of-the-art DLN burners and SCR. The DLN combustors for the Siemens-Westinghouse 501FD CTs have premixed fuel zones plus a standard diffusion flame pilot burner for flame stability. Low NO_x levels are achieved by introducing fuel primarily to the pre-mix zones to create a very uniform temperature in the combustion zone. This also reduces the amount of fuel being combusted from the pilot nozzle. Steam injection will be used during some operating conditions to increase the

power output from the units. This is commonly referred to as "steam for power augmentation". This is different than using steam injection in the combustion zone for standard combustors, which is used for NO_x control. The turbine inlet will be equipped with inlet foggers to reduce the compressor's inlet temperature through evaporative cooling. Lower compressor inlet temperature increases the power output.

In addition to DLN combustors, NO_x emission levels will be controlled with an SCR system which will reduce NO_x emissions from the CTs and duct burners to 4 parts per million volume dry (ppmvd), corrected to 15 percent oxygen (O_2).

The SCR reactor will be located to provide the proper operating temperature range for the required conversion efficiency and system economy. The catalyst will be provided in modules, which will be field installed into a structural steel reactor housing which is integral to the HRSG. Ammonia is carried by a diluent and injected into the exhaust gas upstream of the catalyst modules. NO_x emissions are reduced by a chemical reaction with the ammonia in the presence of the catalyst.

The aqueous ammonia handling system will include primary and standby diluent air blowers (each sized for 100 percent capacity), ammonia flow control and measurement devices, an ammonia/air mixing chamber, distribution header(s) and an ammonia injection grid (AIG). Overall control of the system will be handled by the distribution control system (DCS). The reactor housing will include an internal support structure for the catalyst modules, access manways and catalyst loading openings and instrument connections for monitoring catalyst performance.

The SO_2 and sulfuric acid emissions will be controlled by the use of natural gas, the cleanest-burning fossil fuel commercially available. Good combustion practices and the use of natural gas fuel will also minimize potential emissions of PM, PM_{10}, CO, VOC, and other pollutants (e.g., trace metals). The engineering and environmental design of the Project will maximize control of air emissions while minimizing economic, environmental, and energy impacts (see Section 4.0 for the BACT evaluation).

The Project will have one cooling tower comprising 10 cells. The cooling tower will be used to provide cool water to the condensing steam turbine. The tower will be a mechanical draft counter-flow design.

The Project will also have one 600-kW emergency generator and one emergency fire water pump. The emergency generator will be fired by natural gas while the emergency fire water pump will be fired by low sulfur content distillate fuel oil. These units are exempt under FDEP Rules in 62-210 F.A.C. Each of these units will be operated for up to 2 hour per week for readiness testing and maintenance and could operate up to about 500 hours per year as required during emergencies.

2.3 PROPOSED SOURCE EMISSIONS AND STACK PARAMETERS

As discussed previously, the CTs will operate only in combined cycle mode and will typically operate from 60 to 100 percent of their full load capacity. At CT operating loads below 100 percent, the mass emissions of all criteria pollutants decrease as load decreases to approximately 75 percent of full load. When the CTs are operated at about 75 percent load, the mass emissions (lb/hr) of VOC may begin to increase above the mass emission levels in the operating loads between 75 to 100 percent. At about 65 percent load, the mass emissions (lb/hr) of CO may begin to increase above the mass emission levels for higher operating loads. As a result, the minimum sustained load will be limited to 60 percent of the CT's full load rating.

The estimated maximum hourly emissions and exhaust information representative of the advanced CT design operating at 100-, 75-, and 60- percent load conditions for combined cycle mode are presented in Table 2-1. The information in these tables is presented for one CT unit operation based on natural gas combustion for air inlet ambient temperatures of 32, 59, and 95°F. These temperatures represent the range of ambient temperatures that the CTs are most likely to experience. Although the annual average temperature for the Project Site is about 74°F, annual emissions are estimated assuming an ambient temperature of 59°F, which represents conservatively higher annual emissions.

The data in these tables were derived from the data provided on the vendor's data sheets (see Appendix A). The vendor data sheets also include operating scenarios with and without evaporative coolers in operation. The evaporative coolers will be used when ambient conditions will permit. When the evaporative coolers are operating, the CTs combust more natural gas and generate more mass emissions of pollutants than when the coolers are not operating. To provide a conservative estimate of maximum pollutant emissions, the maximum emissions assume that the evaporative coolers would be used when the CTs operate with power augmentation when the ambient temperature about 95°F or higher.

The estimated maximum hourly emissions and exhaust information when the HRSG is fired with supplemental heating from the duct burner are also presented in Table 2-1. These maximum hourly emissions are based on a duct burner with a maximum heat input rate of 250 mmBtu/hr.

Under Florida Rule 62-210.700(1), F.A.C., excess emissions are allowed for startup, shutdown, or malfunction for no more than 2 hours in any 24 hours unless a longer duration is specifically authorized by the Florida DEP.

During cold startup of the combined cycle units, the steam must be regulated from the HRSG to the steam turbine to allow gradual increases in temperatures. This incremental temperature increase must be carefully regulated from the combined cycle unit since the CTs, even at low loads, can produce high exhaust temperatures and flow through the HRSGs. Excess emissions can also occur during shut downs beyond the 2 hours provided by the rule.

For the Osprey Energy Center, an exception from the allowable excess emissions in Rule 62-210.700(1) F.A.C. is requested for cold startup and shutdown. Since the Project has 2 CTs on one steam turbine, a cold startup period of 4 hours and a shutdown period of 3-hours is requested. This request is similar to that approved by FDEP in the Kissimmee Utility

Authority Cane Island Unit 3 PSD Permit (PSD-FL-254). The requested condition is: "During cold startup of the combined cycle unit, up to four hours of excess emissions are allowed. During shutdowns of the combined cycle unit, up to three hours of excess emissions are allowed. Cold startup is defined as a startup of the combined cycle unit following complete shutdown lasting at least 4-hours."

The maximum potential PM emissions for the cooling tower are presented in Table 2-2. PM in the form of drift will result from the operation of the tower. The tower will be equipped with high-efficiency drift eliminators that will reduce drift to 0.002 percent of the circulating water flow rate. Since the drift will contain dissolved solids, PM will be formed when the drift aerosols evaporate in the atmosphere. For the purposes of regulatory applicability and impact analysis, it is assumed that all drift is PM and that 50 percent of the drift is PM_{10}. The latter assumption is conservative since representative data of cooling tower particle size indicate that 50 percent of the drift is less than 50 um in diameter (Marley Cooling Tower Company, 1992).

The emission estimates for the emergency generator and emergency diesel fire pump are presented in Table 2-3. Maximum emissions will be typically less than about 1 ton per year.

The maximum potential annual emissions for the Project are presented in Table 2-4 for one and two CTs. The potential annual emissions are based on the 59°F ambient air condition since it represents a nominal average between the higher emission levels at the 32°F ambient condition (winter) and the 95°F ambient condition (summer). It also represents the temperature referenced in the new source performance standards (NSPS) for stationary gas turbines (40 CFR Part 60, Subpart GG). PM and PM_{10} emissions from the cooling tower are also included. The maximum emissions are presented for several operating scenarios that include the CTs operating at 100 percent load (at an ambient temperature of 95°F) with duct firing and power augmentation up to 2,880 hours each year and at 60 percent load up to 1,500 hours each year.

The overall potential annual emissions for the CTs, cooling tower, emergency generator and diesel fire pump are presented in Table 2-5.

2.4 SITE LAYOUT, STRUCTURES, AND STACK SAMPLING FACILITIES

A plot plan of the proposed facility is presented in Figure 2-4. The dimensions of the buildings and structures are presented in Section 6.0. Stack sampling facilities will be constructed in accordance to Florida's Rule 62-297.310(6) F.A.C. for stack sampling.

The plot plan shows facility property lines, major process equipment and structures, and all emission points. The entrance to the Site will have security gates to control Site access. The fenced property boundary is shown in the figure.

Table 2-1. Stack, Operating, and Emission Data for the Combustion Turbines/HRSG and Duct Burners
Osprey Energy Center

Parameter		Operating and Emission Data [a] for Ambient Temperarure				
		Combustion Turbine/ HRSG				CT/ HRSG/ Duct Burner
					Power Augmentation	Power Augmentation
		32 °F	59 °F	95 °F	95 °F	95 °F
Stack Data (ft)						
Height		135	135	135	135	135
Diameter		19	19	19	19	19
100 Percent Load						
Operating Data						
Temperature (°F)		200	200	200	200	200
Velocity (ft/sec)		62.9	60.0	55.2	59.7	60.0
Maximum Hourly Emissions per Unit [b]						
SO_2	lb/hr	11.0	10.4	9.4	10.4	12.0
PM/PM_{10}	lb/hr	22.3	21.1	19.0	19.8	22.8
NO_x	lb/hr	29.5	27.7	25.2	27.9	31.4
CO	lb/hr	45.0	43.0	39.0	106.0	139.3
VOC (as methane)	lb/hr	5.8	5.4	4.9	5.5	12.4
Sulfuric Acid Mist	lb/hr	1.69	1.59	1.44	1.59	1.83
Mercury	lb/hr	1.57E-06	1.48E-06	1.35E-06	1.49E-06	1.71E-06
75 Percent Load						
Operating Data						
Temperature (°F)		200	200	200	-	-
Velocity (ft/sec)		54.8	52.8	50.2	-	-
Maximum Hourly Emissions per Unit [b]						
SO_2	lb/hr	8.6	8.1	7.6	-	-
PM/PM_{10}	lb/hr	19.0	18.2	16.9	-	-
NO_x	lb/hr	22.9	21.7	20.2	-	-
CO	lb/hr	35.0	33.0	31.0	-	-
VOC (as methane)	lb/hr	8.4	7.9	7.4	-	-
Sulfuric Acid Mist	lb/hr	1.31	1.25	1.16	-	-
Mercury	lb/hr	1.23E-06	1.16E-06	1.08E-06	-	-
60 Percent Load						
Operating Data						
Temperature (°F)		200	200	200	-	-
Velocity (ft/sec)		45.9	44.5	42.5	-	-
Maximum Hourly Emissions per Unit [b]						
SO_2	lb/hr	7.4	7.2	6.5	-	-
PM/PM_{10}	lb/hr	16.0	15.4	14.3	-	-
NO_x	lb/hr	19.9	19.1	17.4	-	-
CO	lb/hr	152.0	146.0	133.0	-	-
VOC (as methane)	lb/hr	7.3	7.0	6.3	-	-
Sulfuric Acid Mist	lb/hr	1.14	1.10	1.00	-	-
Mercury	lb/hr	1.07E-06	1.02E-06	9.30E-07	-	-

[a] Refer to Appendix A for detailed information. Data at 100% load and duct firing for 95 °F are based on power augmentation with evaporative cooler on and operating at 95 percent efficiency. With evaporative cooler not operating, emissions are lower. Duct firing is assumed for 100% operating load. No duct firing is assumed for loads less than 100%

[b] Other regulated pollutants are assumed to have negligible emissions. These pollutants include lead, reduced sulfur compounds, hydrogen sulfide, fluorides, beryllium, arsenic, asbestos, vinyl chloride, and radionuclides.

See Appendix A for basis of pollutant emission rates and operating data.

Table 2-2. Physical, Performance and Emissions Data for the Mechanical Draft Cooling Tower

Parameter	Values Typical[a]
Physical Data	
Number of Cells	10
Deck Dimensions, ft	
Length	270
Width	84
Height	45
Stack Dimensions	
Height, ft	55
Stack Top Effective Inner Diameter, per cell, ft	28
Effective Diameter, all cells, ft	88.5
Performance Data	
Discharge Velocity, ft/min	1,944
Circulating Water Flow Rate (CWFR), gal/min	140,000
Design hot water temperature, °F	99
Design cold water temperature, °F	80
Heat Rejected, million Btu/hr[f]	1350
Design Air Flow Rate per cell, acfm	1,197,017
Liquid/ Gas (Air Flow) (L/G) Ratio	1.349
Hours of operation	8,760
Emission Data	
Drift Rate[b] (DR), percent	0.002
Total Dissolved Solids (TDS) Concentration[c] ,maximum ppm	1,400
Solution Drift[d] (SD), lb/hr	1,401
PM Drift[e] , lb/hr	1.96
tons/year	8.6
PM_{10} Drift	
PM_{10} Portion (percent) of PM Drift	50
PM_{10} Emissions, lb/hr	0.98
tons/year	4.3

[a] Data used in the impact analyses

[b] Drift rate is the percent of circulating water

[c] TDS assumed for modeling

[d] Includes water and based on circulating water flow rate and drift rate (CWFR x DR x 8.34 lb/gal x 60 min/hr)

[e] PM calculated based on total dissolved solids and solution drift (TDS x SD)

[f] Heat rejected for duct fired case

Table 2-3. Performance, Stack Parameters and Emissions for the Emergency Generator and Diesel Fire Pump

	Emergency Generator	Diesel Fire Pump	Total
Performance			
Fuel	Natural gas	Diesel	
Fuel Usage (scf/hr- generator; gallons/hr-diesel)	6,170.42	17.56	
Rating (kW-generator or hp-fire pump)	600	310	
Heat Input (mmBtu/hr-HHV)	6.30	2.43	
Typical Hours per Year (2 hours/week)	104	104	
Typical Fuel Usage (scf/hr; gallons/yr)	641,724	1,826	
Maximum Fuel Usage (scf/yr; gallons/yr)[a]	2,200,000	16,000	
Maximum Operation (hours)	357	899	
Number of Units	1	1	
Stack Parameters			
Diameter (ft)	0.5	0.5	
Height (ft)	6	6	
Temperature (°F)	770	770	
Velocity (ft/sec)	83	62	
Flow (acfm)	1,951	1,456	
Emissions			
SO_2 - Basis (grains S/100 scf-gas; %S diesel)[b]	2	0.05%	
(lb/hr)	0.035	0.125	
(tpy) - typical maximum	0.0018	0.006	0.008
(tpy) - maximum[a]	0.006	0.056	0.062
NO_x - (lb/kW-generator; lb/mmBtu-diesel)[c]	0.035	4.410	
(lb/hr)	21.286	10.704	
(tpy)	1.1069	0.557	1.663
(tpy) - maximum[a]	3.795	4.809	8.604
CO - (lb/kW-generator; lb/mmBtu-diesel)[c]	0.035	0.950	
(lb/hr)	21.286	2.306	
(tpy)	1.1069	0.120	1.227
(tpy) - maximum[a]	3.795	1.036	4.831
VOC - (lb/kW-generator; lb/mmBtu-diesel)[c]	0.001	0.350	
(lb/hr)	0.532	0.850	
(tpy)	0.0277	0.044	0.072
(tpy) - maximum[a]	0.095	0.382	0.477
PM/PM_{10} - (lb/mmBtu)[c]	0.029	0.310	
(lb/hr)	0.183	0.752	
(tpy)	0.0095	0.039	0.049
(tpy) - maximum[a]	0.033	0.338	0.371

[a] Maximum based on Rule 62-210.300(3)(a)20.b. F.A.C. using total fuel heat input from these units.

[b] Typical maximum sulfur content for pipeline natural gas and distillate fuel oil

[c] Emission data for generator from Waukesha gas engines with tuning producing equal NO_x and CO; PM/PM_{10} emissions based on filterable PM from EPA, 1996 (AP-42, Table 3.2-2).
Emission data for diesel fire pump based on EPA, 1996 (AP-42, Table 3.3-1).

Table 2-4 Summary of Maximum Potential Annual Emissions for the CT/HRSG, Duct Burner, and Cooling Tower

	Annual Emissions (tons/year) [a]					Maximum Emissions (tons/year) [b]			
Pollutant / Load: / Hours:	100% 8,760	75% 8,760	60% 8,760	Power Augmentation 100% 8,760	Duct Burner/ Power Augmentation 100% 8,760 (@95 Deg. F)	Case A	Case B	Case C	Case D
One Combustion Turbine- Combined Cycle									
SO_2	45.4	35.6	31.4	45.6	52.4	45.4	47.7	43.0	45.3
PM/PM10	92.4	79.7	67.6	86.6	99.8	92.4	94.8	87.1	90.6
NO_x	122	95	84	122	131	121.5	124.7	115.2	118.3
CO	188	145	639	464	586	188.3	319.0	314.7	396.2
VOC (as methane)	23.8	34.8	30.6	23.9	53.0	23.8	33.4	25.0	34.6
Sulfuric Acid Mist	7.0	5.5	4.8	7.0	8.0	7.0	7.3	6.6	6.9
Mercury	6.49E-06	5.10E-06	4.49E-06	6.52E-06	7.49E-06	6.49E-06	6.82E-06	6.15E-06	6.48E-06
Cooling Tower									
PM	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
PM10	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
Two Combustion Turbines- Combined Cycle									
SO_2	90.8	71.3	62.7	91.1	104.7	90.8	95.4	86.1	90.6
PM/PM10	185	159	135	173	199.7	185	190	174	181
NO_x	243	190	168	244	262.5	243	249	230	237
CO	377	289	1,279	929	1,171.4	377	638	629	792
VOC (as methane)	47.6	69.6	61.2	47.8	106.0	47.6	66.8	49.9	69.1
Sulfuric Acid Mist	13.9	10.91	9.60	13.96	16.0	13.91	14.61	13.18	13.87
Mercury	1.30E-05	1.02E-05	8.97E-06	1.30E-05	1.50E-05	1.30E-05	1.36E-05	1.23E-05	1.30E-05
Two Combustion Turbines- Combined Cycle with Cooling Tower									
PM	193	168	144	182	208	193	198	183	190
PM10	189	164	139	177	204	189	194	179	185

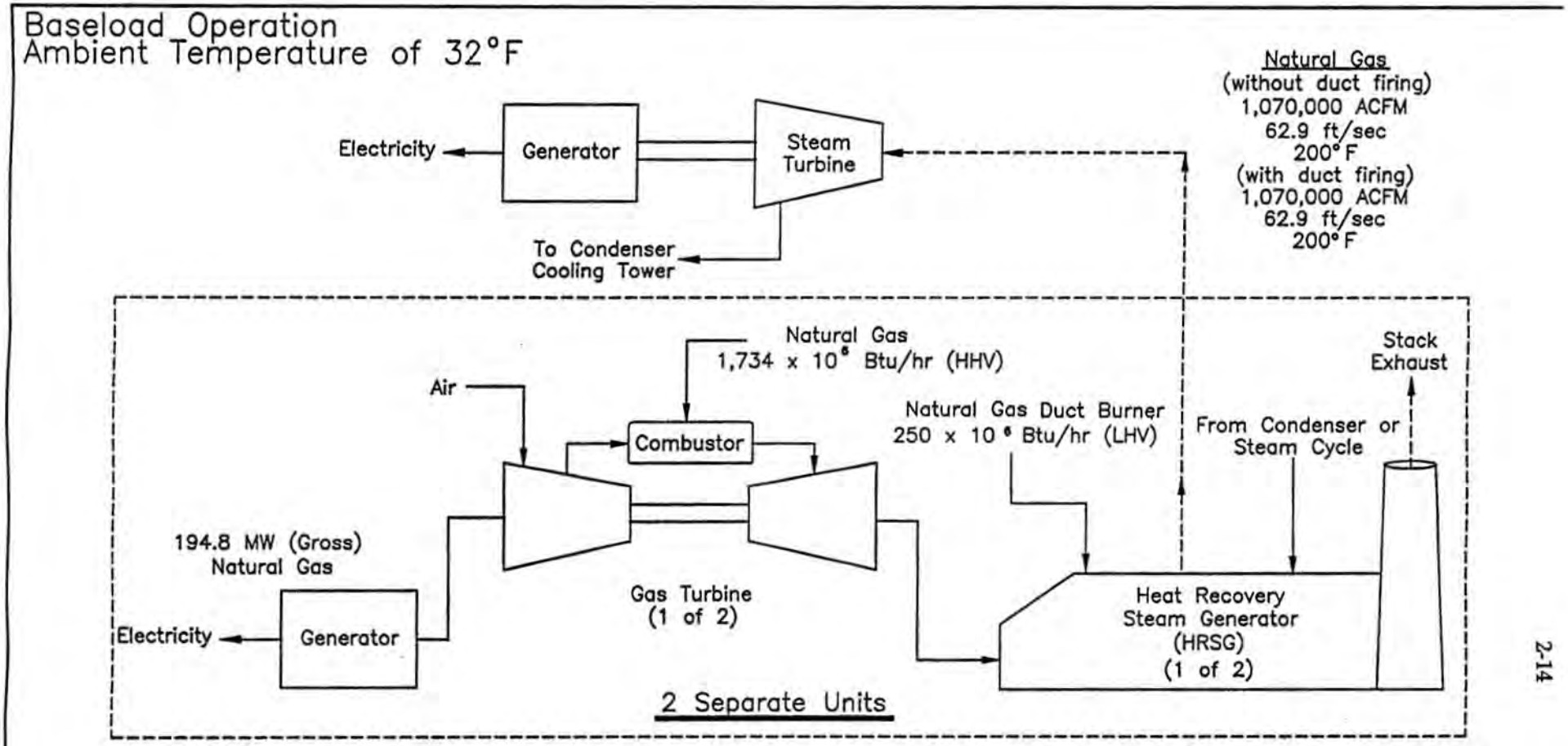
[a] Based on 59 °F ambient inlet air temperature except for power augmentation.
Power augmentation and duct firing will be used with CTs operating at 100 percent load, 95 °F ambient inlet air temperature, and evaporative cooler at 95% efficiency. With evaporative cooler not operating, emissions are lower.

[b] Maximim emission cases:

	Number of Hours for Operation			
Operation	Case A	Case B	Case C	Case D
100 % Load	8,760	5,880	5,700	4,380
100 % Load with PA	0	0	1,560	0
100% Load with PA & Duct firing)	0	2880	0	2,880
60% Load	0	0	1,500	1,500
Total hours	8,760	8,760	8,760	8,760

Table 2-5. Summary of Maximum Potential Annual Emissions for the Osprey Energy Center

Pollutant	Annual Emissions (tons/year)					PSD Significant Emission Rate (tons/year)
	2 CT/HRSG with Duct Burners	Cooling Tower	Emergency Gas-Fired Generator	Diesel Fire Pump	TOTAL	
SO_2	95	–	0.006	0.056	95	40
PM	190	8.6	0.03	0.34	199	25
PM_{10}	190	4.3	0.03	0.34	194	15
NO_x	249	–	3.8	4.8	258	40
CO	792	–	3.79	1.04	797	100
VOC (as methane)	69.1	–	0.09	0.38	70	40
Sulfuric Acid Mist	14.6	–	Neg.	Neg.	15	7
Mercury	0.000014	–	Neg.	Neg.	0.000014	0.1



MATERIAL FLOW

AIR FLOW

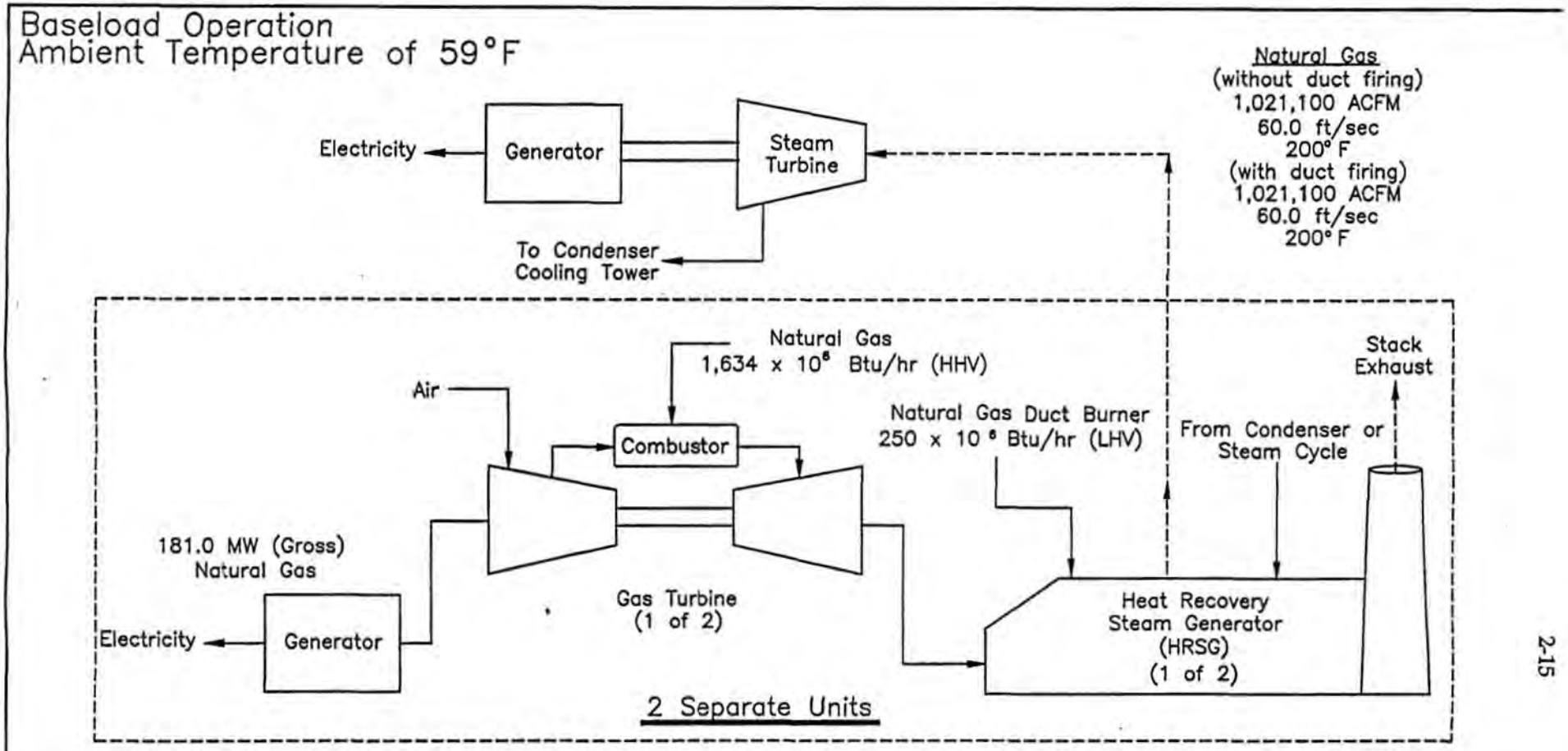
Figure 2–1
Osprey Energy Center

Process Flow Diagram

BASELOAD OPERATION, AMBIENT TEMPERATURE of 32° F

FILENAME: GNV/CALPINE/PSD/Osprey2–1.DWG

LATEST REVISION: 3/11/2000 by ARZ

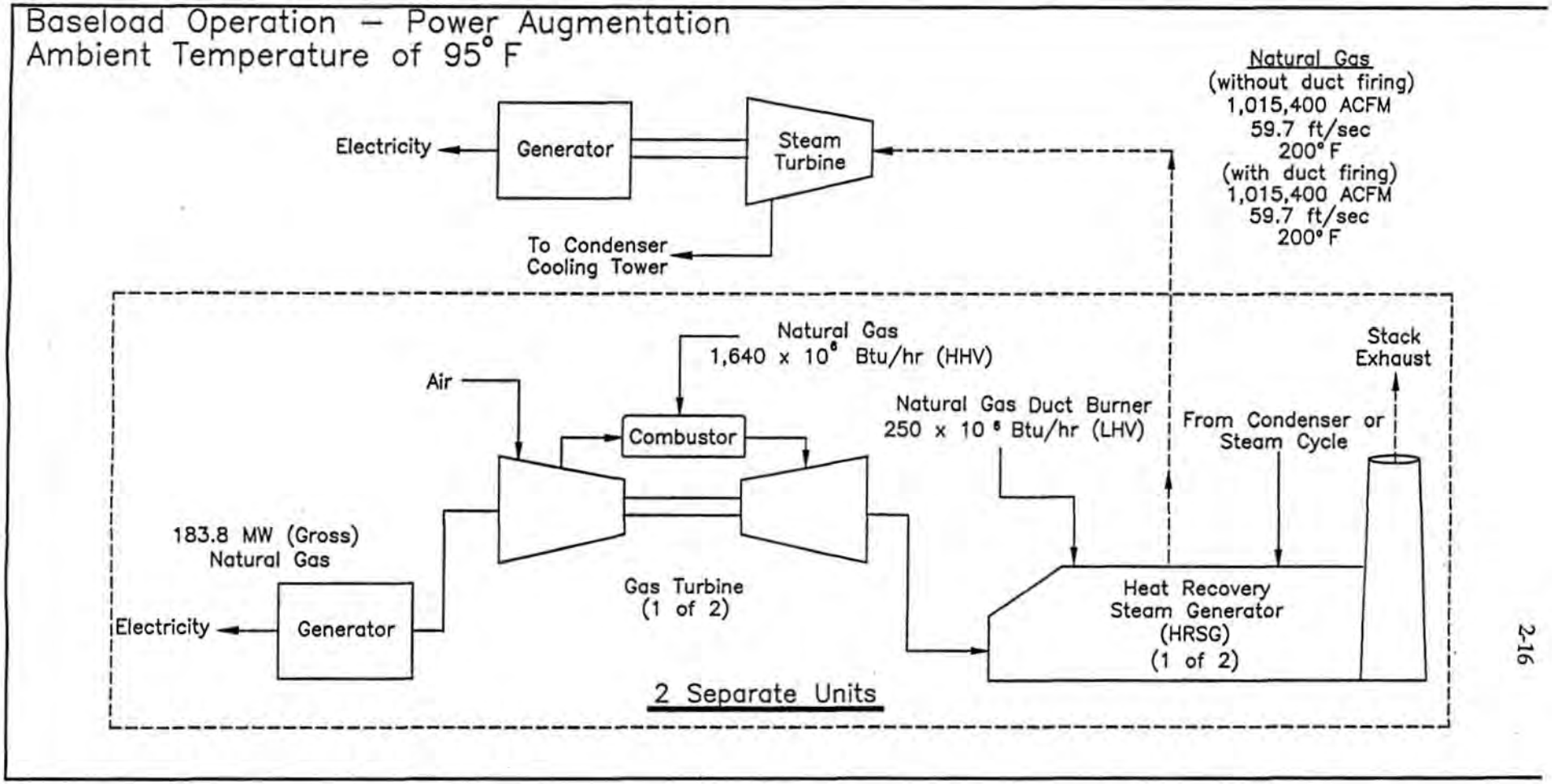


MATERIAL FLOW

AIR FLOW

Figure 2-2
Osprey Energy Center

Process Flow Diagram
BASELOAD OPERATION, AMBIENT TEMPERATURE of 59° F
FILENAME: GNV/CALPINE/PSD/Osprey2-2.DWG
LATEST REVISION: 3/11/2000 by ARZ

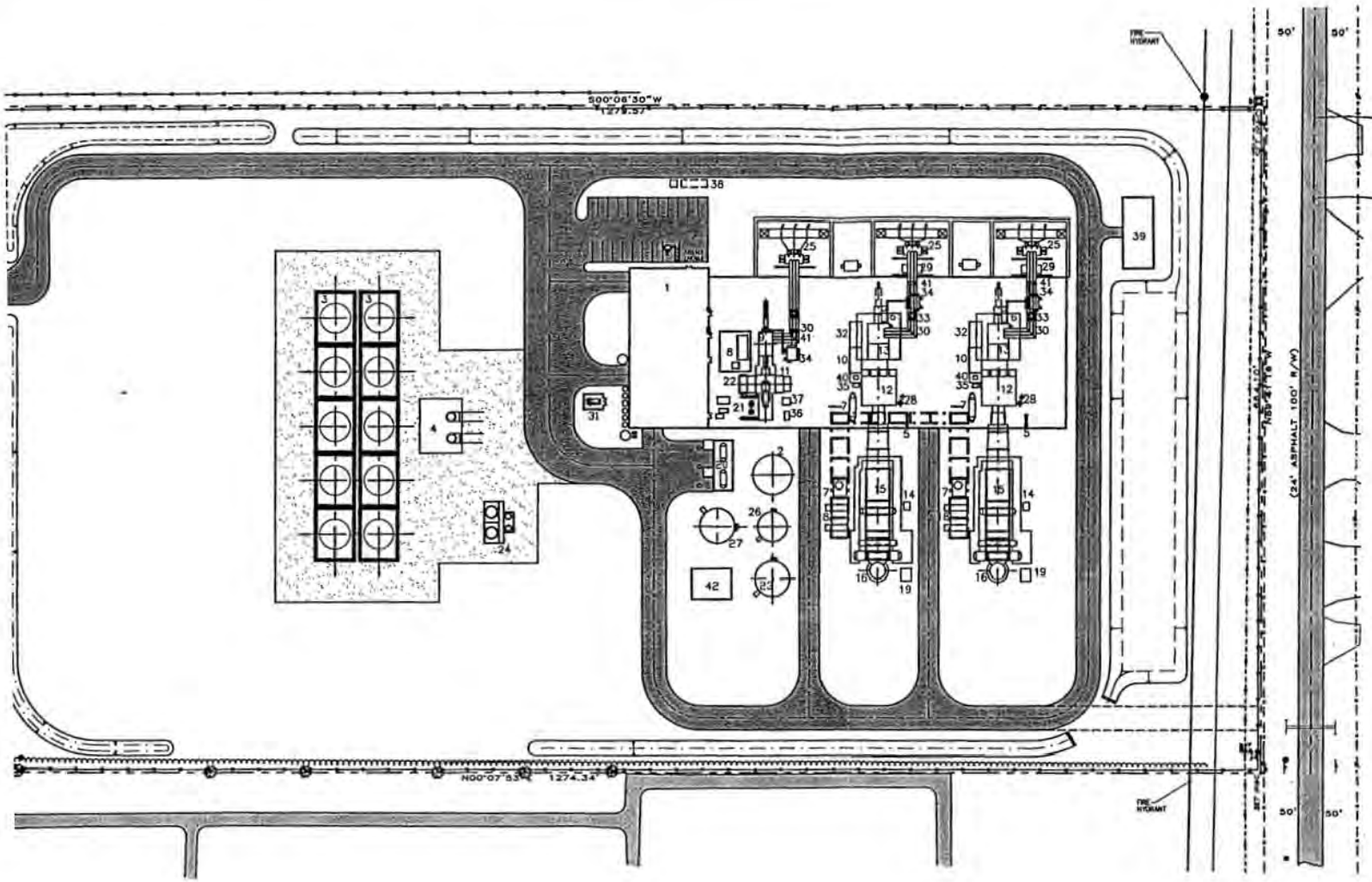


MATERIAL FLOW

AIR FLOW

Figure 2–3
Osprey Energy Center

Process Flow Diagram
BASELOAD OPERATION–POWER AUGMENTATION, AMBIENT TEMPERATURE of 95° F
FILENAME: GNV/CALPINE/PSD/Osprey2–3.DWG
LATEST REVISION: 3/11/2000 by ARZ



Legend

1. ADMINISTRATION AND MAINTI
2. SERVICE WATER TANK
3. COOLING TOWER
4. CIRCULATING WATER PUMPS
5. FUEL GAS HEATER
6. COMBUSTION TURBINE AIR IN
7. KETTLE BOILER
8. LUBE OIL SKID
9. ST GENERATOR
10. CT MECHANICAL PACKAGE
11. STEAM TURBINE
12. COMBUSTION TURBINE
13. CT GENERATOR
14. AMMONIA INJECTION SKID
15. HEAT RECOVERY STEAM GEN
16. HRSG STACK
17. HRSG BLOWDOWN TANK
18. BOILER FEED PUMP HOUSE
19. CEMS
20. AMMONIA STORAGE TANKS
21. CONDENSATE PUMPS
22. CONDENSER
23. DEMINERALIZED WATER STOR
24. WET SURFACE AIR COOLER
25. GENERATOR STEP-UP TRANS
26. WASTEWATER TANK
27. RAW WATER STORAGE TANK
28. FUEL GAS SCRUBBER
29. UNIT AUX. TRANSFORMER
30. ISO-PHASE BUS DUCT
31. STANDBY GENERATOR
32. ELECTRICAL EQUIPMENT PACK
33. GENERATOR VT & SURGE CU
34. GENERATOR EXCITATION SKID
35. COMPRESSOR WATER WASH S
36. STEAM JET AIR EJECTORS
37. GLAND STEAM CONDENSER
38. OIL/WATER SEPARATOR
39. GAS METER BUILDING
40. HYDRAULIC SKID
41. EXCITATION TRANSFORMER
42. CENTRAL PUMP HOUSE

N

120' 0 12

scale feet

Golder Associates — Tampa, Florida

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

Site Plan

CAD BY:	CDT	SCALE: 1"=120'	Jo
CHK BY:	RAZ	DATE: 03/08/00	FIG
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3.0 AIR QUALITY REVIEW REQUIREMENTS AND APPLICABILITY

Federal and state air regulatory requirements for a new source of air pollution are discussed in Sections 3.1 to 3.3. The applicability of these regulations to the proposed Project is presented in Section 3.4. These regulations must be satisfied before the proposed Project can begin construction.

3.1 NATIONAL AND STATE AAQS

The existing applicable National and Florida Ambient Air Quality Standard (AAQS) are presented in Table 3-1. National primary AAQS were promulgated to protect the health of the general public, including the young, elderly, and those with respiratory ailments, with an adequate margin of safety. National secondary AAQS were promulgated to protect the public welfare, including consideration of economic interests, vegetation, visibility, and other factors, from any known or anticipated adverse effects associated with the presence of pollutants in the ambient air. Areas of the country in violation of AAQS are designated as nonattainment areas, and new sources to be located in or near these areas may be subject to more stringent air permitting requirements.

Florida has adopted EPA's primary and secondary AAQS in Chapter 62-204, F.A.C. In addition, Florida has additional AAQS for SO_2 of 60 and 260 $\mu g/m^3$ for the annual and 24-hour averaging periods, respectively, not to be exceeded more than once per year.

3.2 PREVENTION OF SIGNIFICANT DETERIORATION (PSD) REQUIREMENTS

3.2.1 GENERAL REQUIREMENTS

Under federal and State of Florida PSD review requirements, all major new or modified sources of air pollutants regulated under the Clean Air Act (CAA) must be reviewed and a pre-construction permit issued. EPA has approved Florida's State Implementation Plan (SIP), which contains PSD regulations; PSD approval authority has been granted to DEP.

A "major facility" is defined as any one of 28 named source categories that have the potential to emit 100 tons per year (TPY) or more or any other stationary facility that has the potential

to emit 250 TPY or more of any pollutant regulated under CAA. "Potential to emit" means the capability, at maximum design capacity, to emit a pollutant after the application of control equipment. Once a new source is determined to be a "major facility" for a particular pollutant, any pollutant emitted in amounts greater than the PSD significant emission rates is subject to PSD review. The PSD significant emission rates are presented in Table 3-2.

EPA regulations identify certain increases above an air quality baseline concentration level of SO_2, PM_{10}, and NO_2 concentrations that would constitute significant deterioration. The EPA class designations and allowable PSD increments are presented in Table 3-1. The magnitude of the allowable increment depends on the classification of the area in which a new source (or modification) will be located or have an impact. Two classifications are designated based on criteria established in the Clean Air Act Amendments. Congress authorized EPA to classify areas as Class I (international parks, national wilderness areas, and memorial parks larger than 5,000 acres and national parks larger than 6,000 acres) or as Class II (all areas not designated as Class I). No Class III areas, which would be allowed greater deterioration than Class II areas, were designated. The State of Florida has adopted the EPA class designations and allowable PSD increments for SO_2, PM_{10}, and NO_2 increments.

PSD review is used to determine whether significant air quality deterioration will result from the new or modified facility. Federal PSD requirements are contained in 40 CFR 52.21, Prevention of Significant Deterioration of Air Quality. The State of Florida has adopted PSD regulations in Rule 62-212.400 F.A.C. Major facilities are required to undergo the following analysis related to PSD for each pollutant emitted in significant amounts:

1. Control technology review,
2. Source impact analysis,
3. Air quality analysis (monitoring),
4. Source information, and
5. Additional impact analyses.

In addition to these analyses, a new facility also must be reviewed with respect to Good Engineering Practice (GEP) stack height regulations. Discussions concerning each of these requirements are presented in the following sections.

3.2.2 CONTROL TECHNOLOGY REVIEW

The control technology review requirements of the federal and state PSD regulations require that all applicable federal and state emission-limiting standards be met, and that Best Available Control Technology (BACT) be applied to control emissions from the source. The BACT requirements are applicable to all regulated pollutants for which the increase in emissions from the facility exceeds the significant emission rate (see Table 3-2).

BACT is defined in 40 CFR 52.21 (b)(12), as:

> An emissions limitation (including a visible emission standard) based on the maximum degree of reduction of each pollutant subject to regulation under the Act which would be emitted by any proposed major stationary source or major modification which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques (including fuel cleaning or treatment or innovative fuel combustion techniques) for control of such pollutant. In no event shall application of best available control technology result in emissions of any pollutant, which would exceed the emissions allowed by any applicable standard under 40 CFR Parts 60 and 61. If the Administrator determines that technological or economic limitations on the application of measurement methodology to a particular part of a source or facility would make the imposition of an emission standard infeasible, a design, equipment, work practice, operational standard or combination thereof, may be prescribed instead to satisfy the requirement for the application of BACT. Such standard shall, to the degree possible, set forth the emissions reductions achievable by implementation of such design, equipment, work practice, or operation and shall provide for compliance by means, which achieve equivalent results.

BACT was promulgated within the framework of the PSD requirements in the 1977 amendments of the CAA [Public Law 95-95; Part C, Section 165(a)(4)]. The primary purpose of BACT is to optimize consumption of PSD air quality increments and thereby enlarge the potential for future economic growth without significantly degrading air quality (EPA, 1978; 1980). Guidelines for the evaluation of BACT can be found in EPA's *Guidelines for*

Determining Best Available Control Technology (BACT) (EPA, 1978) and in the *PSD Workshop Manual* (EPA, 1980). These guidelines were promulgated by EPA to provide a consistent approach to BACT and to ensure that the impacts of alternative emission control systems are measured by the same set of parameters. In addition, through implementation of these guidelines, BACT in one area may not be identical to BACT in another area. According to EPA (1980), "BACT analyses for the same types of emissions unit and the same pollutants in different locations or situations may determine that different control strategies should be applied to the different sites, depending on site-specific factors. Therefore, BACT analyses must be conducted on a case-by-case basis."

The BACT requirements are intended to ensure that the control systems incorporated in the design of a proposed facility reflect the latest in control technologies used in a particular industry and take into consideration existing and future air quality in the vicinity of the proposed facility. BACT must, as a minimum, demonstrate compliance with new source performance standards (NSPS) for a source (if applicable). An evaluation of the air pollution control techniques and systems, including a cost-benefit analysis of alternative control technologies capable of achieving a higher degree of emission reduction than the proposed control technology, is required. The cost-benefit analysis requires the documentation of the materials, energy, and economic penalties associated with the proposed and alternative control systems, as well as the environmental benefits derived from these systems. A decision on BACT is to be based on sound judgment, balancing environmental benefits with energy, economic, and other impacts (EPA, 1978).

Historically, a "bottom-up" approach consistent with the BACT Guidelines and PSD Workshop Manual has been used. With this approach, an initial control level, which is usually NSPS, is evaluated against successively more stringent controls until a BACT level is selected. However, EPA developed a concern that the bottom-up approach was not providing the level of BACT decisions originally intended. As a result, in December 1987, the EPA Assistant Administrator for Air and Radiation mandated changes in the implementation of the PSD program, including the adoption of a new "top-down" approach to BACT decision making.

The top-down BACT approach essentially starts with the most stringent (or top) technology and emissions limit that have been applied elsewhere to the same or a similar source category. The applicant must next provide a basis for rejecting this technology in favor of the next most stringent technology or propose to use it. Rejection of control alternatives may be based on technical or economic infeasibility. Such decisions are made on the basis of physical differences (e.g., fuel type), location differences (e.g., availability of water), or significant differences that may exist in the environmental, economic, or energy impacts. The differences between the proposed facility and the facility on which the control technique was applied previously must be justified. EPA has issued a draft guidance document on the top-down approach entitled *Top-Down Best Available Control Technology Guidance Document* (EPA, 1990).

3.2.3 SOURCE IMPACT ANALYSIS

A source impact analysis must be performed for a proposed major source subject to PSD review for each pollutant for which the increase in emissions exceeds the significant emission rate (Table 3-2). The PSD regulations specifically provide for the use of atmospheric dispersion models in performing impact analyses, estimating baseline and future air quality levels, and determining compliance with AAQS and allowable PSD increments. Designated EPA models normally must be used in performing the impact analysis. Specific applications for other than EPA-approved models require EPA's consultation and prior approval. Guidance for the use and application of dispersion models is presented in the EPA publication Guideline on Air Quality Models (Revised).

To address compliance with AAQS and PSD Class II increments, a source impact analysis must be performed for the criteria pollutants. This analysis may be limited to the new source alone if the new source's impacts are less than the EPA significant impact levels presented in Table 3-1. The significant impact levels are threshold levels that are used to determine the level of air impact analyses needed for the Project. If the new source's impacts are predicted to be less than significant, then the source's impacts are assumed not to have a significant adverse affect on air quality and additional modeling with other sources is not required. However, if the source's impacts are predicted to be greater than the

significant impact levels, additional modeling with other sources is required to demonstrate compliance with ambient standards.

The EPA has proposed significant impact levels for Class I areas as follows:

•	SO_2	3-hour	1 $\mu g/m^3$
		24-hour	0.2 $\mu g/m^3$
		Annual	0.1 $\mu g/m^3$
•	PM_{10}	24- hour	0.3 $\mu g/m^3$
		Annual	0.2 $\mu g/m^3$
•	NO_2	Annual	0.1 $\mu g/m^3$

Although these levels have not been officially promulgated as part of the PSD review process and may not be binding for states in performing PSD review, the proposed levels serve as a guideline in assessing a source's impact in a Class I area. The EPA action to incorporate Class I significant impact levels in the PSD process is part of implementing NSR provisions of the 1990 CAA Amendments. Because the process of developing the regulations will be lengthy, EPA believes that the proposed rules concerning the significant impact levels is appropriate in order to assist states in implementing the PSD permit process.

Various lengths of record for meteorological data can be used for impact analysis. A 5-year period is normally used with corresponding evaluation of highest, second-highest short-term concentrations for comparison to AAQS or PSD increments. The meteorological data are selected based on an evaluation of measured weather data from a nearby weather station that represents weather conditions at the Project Site. The criteria used in this evaluation include determining the distance of the Project Site to the weather station; comparing topographical and land use features between the locations; and determining availability of necessary weather parameters. The selection of the weather data is normally discussed with and approved by the regulatory agency reviewing the air permit application prior to initiating air modeling.

The term "highest, second-highest" (HSH) refers to the highest of the second-highest concentrations at all receptors (i.e., the highest concentration at each receptor is discarded). The second-highest concentration is important because short-term AAQS specify that the standard should not be exceeded at any location more than once a year. If fewer than 5 years of meteorological data are used in the modeling analysis, the highest concentration at each receptor normally must be used for comparison to air quality standards.

The term "baseline concentration" evolves from federal and state PSD regulations and refers to a concentration level corresponding to a specified baseline date and certain additional baseline sources. By definition, in the PSD regulations as amended August 7, 1980, baseline concentration means the ambient concentration level that exists in the baseline area at the time of the applicable baseline date. A baseline concentration is determined for each pollutant for which a baseline date is established and includes:

1. The actual emissions representative of facilities in existence on the applicable baseline date; and
2. The allowable emissions of major stationary facilities that commenced construction before January 6, 1975, for SO_2 and PM (TSP) concentrations, or February 8, 1988, for NO_2 concentrations, but that were not in operation by the applicable baseline date.

The following emissions are not included in the baseline concentration and therefore affect PSD increment consumption:

1. Actual emissions from any major stationary facility on which construction commenced after January 6, 1975, for SO_2 and PM(TSP) concentrations, and after February 8, 1988, for NO_2 concentrations; and
2. Actual emission increases and decreases at any stationary facility occurring after the baseline date.

In reference to the baseline concentration, the term "baseline date" actually includes three different dates:

1. The major facility baseline date, which is January 6, 1975, in the cases of SO_2 and PM (TSP), and February 8, 1988, in the case of NO_2.
2. The minor facility baseline date, which is the earliest date after the trigger date on which a major stationary facility or major modification subject to PSD regulations submits a complete PSD application.
3. The trigger date, which is August 7, 1977, for SO_2 and PM (TSP), and February 8, 1988, for NO_2.

The minor source baseline date for SO_2 and PM (TSP) has been set as December 27, 1977, for the entire State of Florida (Rule 62-204.360(1) and (2), F.A.C.). The minor source baseline for NO_2 has been set as March 28, 1988 (Rule 62-204.360(3), F.A.C). It should be noted that references to PM (TSP) are also applicable to PM_{10}.

3.2.4 AIR QUALITY MONITORING REQUIREMENTS

In accordance with requirements of 40 CFR 52.21(m), any application for a PSD permit must contain an analysis of continuous ambient air quality data in the area affected by the proposed major stationary facility or major modification. For a new major facility, the affected pollutants are those that the facility potentially would emit in significant amounts. For a major modification, the pollutants are those for which the net emissions increase exceeds the significant emission rate (see Table 3-2).

Ambient air monitoring for a period of up to 1 year generally is appropriate to satisfy the PSD monitoring requirements. A minimum of 4 months of data is required. Existing data from the vicinity of the proposed source may be used if the data meet certain quality assurance requirements; otherwise, additional data may need to be gathered. Guidance in designing a PSD monitoring network is provided in EPA's *Ambient Monitoring Guidelines for Prevention of Significant Deterioration* (EPA, 1987a).

The regulations include an exemption that excludes or limits the pollutants for which an air quality analysis must be conducted. A proposed major stationary facility or major modification is exempt from the monitoring requirements with respect to a particular

pollutant if the emissions increase of the pollutant from the facility or modification would cause, in any area, air quality impacts less than the *de minimis* levels presented in Table 3-2 (adopted by Florida in Rule 62-212.400-3, F.A.C.).

3.2.5 SOURCE INFORMATION/GOOD ENGINEERING PRACTICE STACK HEIGHT

Source information must be provided to adequately describe the proposed Project. The general type of information required for this Project is presented in Section 2.0.

The 1977 CAA Amendments require that the degree of emission limitation required for control of any pollutant not be affected by a stack height that exceeds Good Engineering Practice (GEP) or any other dispersion technique. On July 8, 1985, EPA promulgated final stack height regulations (EPA, 1985a). The Florida DEP (Rule 62-210.550, F.A.C.) has adopted identical regulations. GEP stack height is defined as the highest of:

1. 65 meters (m); or
2. A height established by applying the formula:

   $Hg = H + 1.5L$

   where: Hg = GEP stack height,

   H = Height of the structure or nearby structure, and

   L = Lesser dimension (height or projected width) of nearby structure(s); or
3. A height demonstrated by a fluid model or field study.

"Nearby" is defined as a distance up to five times the lesser of the height or width dimensions of a structure or terrain feature, but not greater than 0.8 km. Although GEP stack height regulations require that the stack height used in modeling for determining compliance with AAQS and PSD increments not exceed the GEP stack height, the actual stack height may be greater.

The stack height regulations also allow increased GEP stack height beyond that resulting from the above formula in cases where plume impaction occurs. Plume impaction is defined as concentrations measured or predicted to occur when the plume interacts with

elevated terrain. Elevated terrain is defined as terrain that exceeds the height calculated by the GEP stack height formula.

3.2.6 ADDITIONAL IMPACT ANALYSIS

In addition to air quality impact analyses, federal and State of Florida PSD regulations require analyses of the impairment to visibility and the impacts on soils and vegetation that would occur as a result of the proposed source [40 CFR 52.21(o); Florida Rule 62-212.400(5)(e), F.A.C.]. These analyses are to be conducted primarily for PSD Class I areas. Impacts as a result of general commercial, residential, industrial, and other growth associated with the source also must be addressed. These analyses are required for each pollutant emitted in significant amounts (Table 3-2).

3.3 EMISSION STANDARDS

3.3.1 NEW SOURCE PERFORMANCE STANDARDS

The NSPS are a set of national emission standards that apply to specific categories of new sources. As stated in the CAA Amendments of 1977, these standards "shall reflect the degree of emission limitation and the percentage reduction achievable through application of the best technological system of continuous emission reduction the Administrator determines has been adequately demonstrated."

The proposed Project will be subject to one or more NSPS.

3.3.1.1 Combustion Turbine

The CTs are subject to emission limitations covered under Subpart GG, which limits NO_x and SO_2 emissions from all stationary CTs with a heat input at peak load equal to 10.7 gigajoules per hour (10 mmBtu/hr), based on the lower heating value of the fuel fired.

NO_x emissions are limited to 75 ppmvd corrected to 15 percent oxygen and heat rate while sulfur dioxide emissions are limited to using a fuel with a sulfur content of 0.8 percent. In addition to emission limitations, these are requirements for notification, record keeping, reporting, performance testing and monitoring. These are summarized below:

40 CFR 60.7 Notification and Record Keeping

(a)(1) Notification of the date of construction - within 30 days after such date.

(a)(2) Notification of the date of initial start-up - no more than 60 days or less than 30 days prior to date.

(a)(3) Notification of actual date of initial start-up - within 15 days after such date.

(a)(5) Notification of date which demonstrates CEM - not less than 30 days prior to date.

(b) Maintain records of the start-up, shutdown, and malfunction quarterly.

(c) Excess emissions reports - by the 30th day following end of quarter (required even if no excess emissions occur).

(d) Maintain file of all measurements for two years.

40 CFR 60.8 Performance Tests

(a) Must be performed within 60 days after achieving maximum production rate but no later than 180 days after initial start-up.

(d) Notification of Performance tests at least 30 days prior to them occurring.

40 CFR Subpart GG

60.334 Monitoring of Operations

(b) Monitor sulfur and nitrogen content of fuel.
Gas - (2): daily monitoring required

3.3.1.2 Duct Burner

The applicable NSPS is 40 CFR Part 60, Subpart Da, Standards of Performance for Electric Utility Steam Generating Units for Which Construction is Commenced After September 18, 1978. This subpart applies to electric utility combined cycle combustion turbines that are capable of combusting more than 250 mmBtu/hr heat input of fossil fuel in the steam

generator. Only emissions resulting from combustion of fuels in the steam generating unit are subject to this regulation.

The applicable NO_x and PM NSPS limits are 1.6 lb/MW (gross) and 0.03 lb/mmBtu, respectively, for the duct burners being considered for the Project. The proposed NO_x and PM emission limits of 0.10 lb/MW and 0.008 lb/mmBtu, respectively, for the Project will be much lower than the NSPS.

3.3.2 FLORIDA RULES

The Florida DEP regulations for new stationary sources are contained in the F.A.C. The Florida DEP has adopted the EPA NSPS by reference in Rule 62-204.800(7); subsection (b)39 for Stationary Gas Turbines and subsection (b)3 for Industrial-Commercial-Institutional Steam Generating Units. Therefore, the Project is required to meet the same emissions, performance testings, monitoring, reporting, and record keeping as those described in Section 3.4.1. DEP has authority for implementing NSPS requirements in Florida.

3.3.3 FLORIDA AIR PERMITTING REQUIREMENTS

The Florida DEP regulations require any new source to obtain an air permit prior to construction. Major new sources must meet the appropriate PSD and nonattainment requirements as discussed previously. Required permits and approvals for air pollution sources include NSR for nonattainment areas, PSD, NSPS, National Emission Standards for Hazardous Air Pollutants (NESHAP), Permit to Construct, and Permit to Operate. The requirements for construction permits and approvals are contained in Rules 62-4.030, 62-4.050, 62-4.052, 62-4.210, and 62-210.300(1), F.A.C. Specific emission standards are set forth in Chapter 62-296, F.A.C.

3.4 PSD APPLICABILITY TO THE PROJECT

3.4.1 AREA CLASSIFICATION

The Osprey Energy Center will be located in Polk County, which has been designated by EPA and Florida DEP as an attainment area for all criteria pollutants. Polk County and surrounding counties are designated as PSD Class II areas for SO_2, PM, and NO_2. The

nearest Class I area to the Site is the Chassahowitzka National Wilderness Area (NWA) located about 102 km from the Site. Other PSD Class I areas are located more than 200 km from the site.

3.4.2 PSD REVIEW

3.4.2.1 Pollutant Applicability

The proposed Project is one of the named major sources (*fossil fuel-fired steam electric plant with heat input of more than 250 million Btus per hour*); therefore, the major source threshold is 100 TPY. The Project is considered to be a "major facility" because the annual emissions of several regulated pollutants from the two CTs and duct burners are estimated to exceed 100 TPY. Therefore, PSD review is required for any pollutant for which the emissions are considered major or exceed the PSD significant emission rates. As shown in Table 3-3, potential emissions from the Project will be major for PM, PM_{10}, NO_x and CO, and greater than the significant emission rate levels for SO_2, VOC and sulfuric acid mist.

The nearest Class I area to the Site is the Chassahowitzka NWA, located about 102 km from the Site. As a result, a PSD Class I analysis was performed to determine if the Project's impacts would be less than the PSD Class I significant impact levels.

3.4.2.2 Emission Standards

The applicable NSPS for the CTs is 40 CFR Part 60, Subpart GG. The proposed emissions for the turbines will be well below the specified limits (see Section 4.0).

The applicable NSPS for the duct burners is 40 CFR Part 60, Subpart Da. The proposed emissions for the duct burners will be well below the specified limits (see Section 4.0).

3.4.2.3 Ambient Monitoring

Based on the estimated pollutant emissions from the proposed Project (see Table 3-3), pre-construction ambient monitoring analyses for SO2, PM_{10}, NO2, CO, and sulfuric acid mist are required to be submitted as part of the application. However, if the net increase in impact of these pollutants is less than the applicable de minimis monitoring concentration

(100 TPY in the case of VOC), then an exemption from submittal of pre-construction ambient monitoring data may be obtained [40 CFR 52.21(i)(8)]. In addition, if EPA has not established an acceptable ambient monitoring method for the pollutant, monitoring is not required.

Pre-construction monitoring data should not be required to be submitted for this Project because, as shown in Table 3-4, the proposed Project's impacts are predicted to be below the applicable de minimis monitoring concentration (see Table 3-2) levels for all pollutants. For ozone, the Project's VOC emissions are less than the monitoring emission level of 100 TPY. For sulfuric acid mist, although the Project's emissions are greater than the significant emission rate, EPA has established no acceptable monitoring method for this pollutant. Therefore, an exemption from the preconstruction monitoring requirement for sulfuric acid is requested in accordance with the PSD regulations.

3.4.2.4 GEP Stack Height Impact Analysis

The GEP stack height regulations allow any stack to be at least 65 m [213 feet (ft)] high. The proposed HRSG stacks will be 135 ft while the cooling tower stacks will be 55 ft. These stack heights do not exceed the applicable GEP stack heights. However, as discussed in Section 6.0, Air Quality Modeling Approach, since the stack heights are less than GEP, building downwash effects must be considered in the modeling analysis. As a result, the potential for downwash of emissions from the CTs, duct burners, and cooling tower caused by nearby structures is included in the modeling analysis.

3.4.2.5 Emergency Generator and Emergency Diesel Fire Water Pump

The natural gas-fired generator and fire water pump are defined as "emergency" generators or units in Chapter 62-210.200, F.A.C. Each of these units will be operated for up to 2 hours per week for readiness testing and maintenance and up to 500 hours per year if required during emergencies when the primary power source for that Facility has been rendered inoperable. They are exempt from permitting in Chapter 62-210.300(3)(a) since:

- They are not subject to the Federal Acid Rain Program, and

- Total fuel consumption from all of these units will be limited to 4.4 million standard cubic feet per year (generator) and 32,000 gallons per year of diesel fuel (water pump), or an equivalent prorated amount.

3.4.3 NONATTAINMENT REVIEW

The Site is located in Polk County, which is classified as an attainment area for all criteria pollutants. Therefore, nonattainment requirements are not applicable.

3.4.4 OTHER CLEAN AIR ACT REQUIREMENTS

The 1990 CAA Amendments established a program to reduce potential precursors of acidic deposition. The Acid Rain Program was delineated in Title IV of the CAA Amendments and required EPA to develop the program. EPA's final regulations were promulgated on January 11, 1993, and included permit provisions (40 CFR Part 72), an allowance system (Part 73), continuous emission monitoring (Part 75), excess emission procedures (Part 77), and appeal procedures (Part 78). Florida DEP has implemented rules that are consistent with the federal permit regulations applicable to facilities affected by the requirements of Title IV of the CAA Amendments (Rule 62-214, F.A.C.).

EPA's Acid Rain Program applies to all existing and new utility units except those serving a generator less than 25 MW, existing simple cycle CTs, and certain non-utility facilities. Units which fall under the program are referred to as affected units. The EPA regulations are applicable to the proposed Project for the purposes for obtaining a permit and allowances, as well as emission monitoring. New units are required to obtain permits under the program by submitting a complete application 24 months before the later of January 1, 2000, or the date on which the unit begins serving an electric generator greater than 25 MW. An Acid Rain Permit application will be submitted under separate cover from this Air Construction/PSD application.

The Acid Rain (Title IV) permit will provide SO_2 and NO_x emission limitations and the requirement to hold SO_2 emission allowances. Emission limitations established in the Acid Rain Program are presumed to be less stringent than BACT for new units. An allowance is a

market-based financial instrument that is equivalent to 1 ton of SO_2 emissions. Allowances can be sold, purchased, or traded. For the proposed Project, SO_2 allowances will be obtained from the market. There is currently no NO_x allowance trading program in place (but there may be in the future).

Continuous emission monitoring (CEM) for SO_2 and NO_x is required for gas-fired and oil-fired affected units. SO_2 emissions for natural gas may be determined using procedures established in Appendix D, 40 CFR Part 75. CO_2 emissions must also be determined either through a CEM (e.g., as a diluent for NO_x monitoring) or calculation. Alternate procedures, test methods, and quality assurance/quality control (QA/QC) procedures for CEM are specified (Part 75 Appendices A through I). The CEM requirements including QA/QC procedures are, in general, more stringent than those specified in the NSPS for Subpart GG. New units are required to meet the requirements by the later of January 1, 1995, or not later than 90 days after the unit commences commercial operation. The Project will be required to either install CEMs for NO_x or establish predictive emission monitors (PEMs) to meet the Part 75 requirements.

The 1990 CAA Amendments also established a federally mandated air operating permitting program. The program requires the states to adopt regulations consistent with the CAA and the implementing regulations promulgated by EPA in 40 CFR 70. The program applies to "Title V or Part 70" sources that include major stationary sources of air pollutants. The State of Florida has adopted the requirements of 40 CFR 70 in Chapter 62-213, F.A.C., which specify that all affected sources, such as those proposed for this Project, have a Title V permit to operate. The Project must file for a Title V permit no later than 90 days before the expiration of the air construction/PSD permit, but no later than 180 days after commencing operation.

The US Environmental Protection Agency has, and is currently developing, emissions standards for hazardous air pollutants (HAPs) for various industrial categories. These new National Emission Standards for Hazardous Air Pollutants (NESHAPs) are based on the use of Maximum Achievable Control Technology (MACT). The adopted standards are

contained in 40 CFR Part 63. New sources that emit more than 10 tons/year of a single HAP or 25 tons/year of total HAPs are required to apply MACT for the promulgated industrial category or to obtain a case-by-case MACT determined from the applicable regulatory authority after submitting a MACT analysis. For the Project, emissions of HAPs will be less than 10 tons/year of a single HAP and 25 tons/year of all HAPs. There are no current or planned MACT standards for combined cycle power plants.

The 1990 CAA Amendments required both the EPA and the Occupational Safety and Health Administration (OSHA) to issue regulations which would help prevent accidental releases of hazardous chemicals. EPA was required to address the consequences of accidental releases beyond a facility's property while OSHA was required to address the consequences on the facility's property. The EPA met their obligation with the promulgation of 40 CFR 68, *Accidental Release Prevention Requirements: Risk Management Programs Under the Clean Air Act Section 112(r)(7)* in June 1996. The rule applies to all stationary sources that have a regulated substance present in a process in more than the listed threshold quantity. If the threshold quantity for a regulated substance is exceeded, then the facility would need to develop a risk management plan. Aqueous ammonia is a regulated substance if its concentration is 20 percent or more in a mixture. Since the aqueous ammonia proposed for the SCR system for this Project will be in a mixture that contains less than 20 percent ammonia, the Project does not need to develop a risk management plan as specified in the rule. However, the Project is subject to the general duty clause under Section 112(r)(1) of the CAA. The general duty clause directs owners and operators of stationary sources to identify hazards that may result from accidental releases, to design and maintain a safe facility, and to minimize the consequences of releases when they occur. The general duty clause applies to all stationary sources that have any "extremely hazardous substance" that are not limited to the list of regulated substances under Section 112(r) or under OSHA' s regulations.

Table 3-1. National and State AAQS, Allowable PSD Increments, and Significant Impact Levels

Pollutant	Averaging Time	AAQS ($\mu g/m^3$) National Standard Primary[a]	AAQS ($\mu g/m^3$) National Standard Secondary	AAQS ($\mu g/m^3$) Florida [a]	PSD Increments ($\mu g/m^3$) Class I [a]	PSD Increments ($\mu g/m^3$) Class II [a]	Significant Impact Levels ($\mu g/m^3$) [b]
Sulfur Dioxide	Annual Arithmetic Mean	80	NA	60	2	20	1
	24-Hour Maximum	365	NA	260	5	91	5
	3-Hour Maximum	NA	1,300	1,300	25	512	25
Particulate Matter[c] (PM_{10})	Annual Arithmetic Mean	50	50	50	4	17	1
	24-Hour Maximum	150	150	150	8	30	5
Total Suspended Particulate	24-Hour Maximum	NA	NA	150 [a]	NA	NA	NA
Nitrogen Dioxide	Annual Arithmetic Mean	100	100	100	2.5	25	1
Carbon Monoxide	8-Hour Maximum	10,000	10,000	10,000	NA	NA	500
	1-Hour Maximum	40,000	40,000	40,000	NA	NA	2,000
Ozone[c]	8-Hour Maximum[d]	157	157	157	NA	NA	NA
Lead	Calendar Quarter Arithmetic Mean	1.5	1.5	1.5	NA	NA	NA

Note: Particulate matter (PM_{10}) = particulate matter with aerodynamic diameter less than or equal to 10 micrometers.
NA = Not applicable, i.e., no standard exists.

[a] Short-term maximum concentrations are not to be exceeded more than once per year, except for PM_{10} AAQS which is based on 6th highest over five years.

[b] Maximum concentrations are not to be exceeded.

[c] On July 18, 1997, EPA promulgated revised AAQS for particulate matter and ozone. For particulate matter, $PM_{2.5}$ standards were introduced with a 24-hour standard of 65 g/m^3 (3-year average of 98th percentile) and an annual standard of 15 g/m^3 (3-year average at community monitors). The courts have stayed these standards

[d] 0.08 ppm; achieved when 3-year average of 99th percentile is 0.08 ppm or less. The courts have stayed this standard. The 1-hour standard of 0.12 ppm is still applicable. Florida DEP has not yet adopted the revised standards.

Sources: Federal Register, Vol. 43, No. 118, June 19, 1978.
40 CFR 50; 40 CFR 52.21. Florida Chapter 62.204, F.A.C.

Table 3-2. PSD Significant Emission Rates and *De Minimis* Monitoring Concentrations

Pollutant	Regulated Under	Significant Emission Rate (TPY)	*De Minimis* Monitoring Concentration[a] ($\mu g/m^3$)
Sulfur Dioxide	NAAQS, NSPS	40	13, 24-hour
Particulate Matter [PM(TSP)]	NSPS	25	10, 24-hour
Particulate Matter (PM_{10})	NAAQS	15	10, 24-hour
Nitrogen Dioxide	NAAQS, NSPS	40	14, annual
Carbon Monoxide	NAAQS, NSPS	100	575, 8-hour
Volatile Organic Compounds (Ozone)	NAAQS, NSPS	40	100 TPY[b]
Lead	NAAQS	0.6	0.1, 3-month
Sulfuric Acid Mist	NSPS	7	NM
Total Fluorides	NSPS	3	0.25, 24-hour
Total Reduced Sulfur	NSPS	10	10, 1-hour
Reduced Sulfur Compounds	NSPS	10	10, 1-hour
Hydrogen Sulfide	NSPS	10	0.2, 1-hour
Mercury	NESHAP	0.1	0.25, 24-hour
MWC Organics	NSPS	3.5×10^{-6}	NM
MWC Metals	NSPS	15	NM
MWC Acid Gases	NSPS	40	NM
MSW Landfill Gases	NSPS	50	NM

Note: Ambient monitoring requirements for any pollutant may be exempted if the impact of the increase in emissions is below *de minimis* monitoring concentrations.

NAAQS = National Ambient Air Quality Standards.
NM = No ambient measurement method established; therefore, no *de minimis* concentration has been established.
NSPS = New Source Performance Standards.
NESHAP = National Emission Standards for Hazardous Air Pollutants.
g/m^3 = micrograms per cubic meter.
MWC = Municipal waste combustor
MSW = Municipal solid waste

[a] Short-term concentrations are not to be exceeded.
[b] No *de minimis* concentration; an increase in VOC emissions of 100 TPY or more will require monitoring analysis for ozone.
[c] Any emission rate of these pollutants.

Sources: 40 CFR 52.21.
Chapter 62-204, F.A.C.

Table 3-3. Net Increase in Emissions Due to the Proposed Osprey Energy Center Compared to the PSD Significant Emission Rates

Pollutant	Emissions (TPY)		PSD Review Required?
	Potential Emissions from Proposed Project[a]	Significant Emission Rate	
Sulfur Dioxide	95	40	Yes
Particulate Matter [PM(TSP)]	198	25	Yes
Particulate Matter (PM_{10})	193	15	Yes
Nitrogen Dioxide	258	40	Yes
Carbon Monoxide	788	100	Yes
Volatile Organic Compounds	68	40	Yes
Lead	NEG	0.6	No
Sulfuric Acid Mist	15	7	Yes
Total Fluorides	NEG	3	No
Total Reduced Sulfur	NEG	10	No
Reduced Sulfur Compounds	NEG	10	No
Hydrogen Sulfide	NEG	10	No
Mercury	0.000014	0.1	No
MWC Organics (as 2,3,7,8-TCDD)	NEG	3.5 x 10-6	No
MWC Metals (as Be, Cd)	NEG	15	No
MWC Acid Gases (as HCl)	NEG	40	No
MSW Landfill Gases (NMOC)	NEG	50	No

Note: NEG= Negligible.
MWC= municipal waste combustor
MSW = municipal solid waste
TCDD= tetra- through octa-chlorinated dibenzo-p-dioxins and dibenzofurans
Be= beryllium
Cd= cadmium
HCl= hydrogen chloride
NMOC= non-methane organic compounds

[a] Based on Project operating in combined cycle mode with two CTs at baseload conditions firing natural gas for 5,880 hours at 59°F ambient temperature and power augmentation with duct firing at a maximum heat input rate of 250 mmBtu/hr for 2,880 hours at 95°F ambient temperature. Includes emissions from cooling tower, emergency generator and fire pump. For CO emissions, the two CTs are assumed to operate at 60 percent load for 1,500 hours displacing those hours at baseload operations.

Table 3-4. Predicted Net Increase in Impacts Due To the Proposed Osprey Energy Center Facility Compared to PSD *De Minimis* Monitoring Concentrations

Pollutant	Concentration ($\mu g/m^3$)		PSD Monitoring Required?
	Predicted Net Increase in Impacts[a]	*De Minimis* Monitoring Concentration	
Sulfur Dioxide	1.35	13, 24-hour	No
Particulate Matter [PM (TSP)]	4.5	10, 24-hour	No
Particulate Matter (PM_{10})	4.5	10, 24-hour	No
Nitrogen Dioxide	0.14	14, annual	No
Carbon Monoxide	79	575, 8-hour	No
Volatile Organic Compound (VOC)[b]	70 TPY	100 TPY	No

[a] See Section 6.0 for air dispersion modeling results. Predicted impacts for other pollutants are not required because PSD review is not required for those pollutants.

[b] For VOC, the de minimis monitoring requirement is based on maximum annual emissions in tons per year (TPY). For sulfuric acid mist, EPA has not established a PSD *de minimis* monitoring requirement.

4.0 CONTROL TECHNOLOGY REVIEW

4.1 APPLICABILITY

The PSD regulations require new major stationary sources to undergo a control technology review for each pollutant that may potentially be emitted above significant amounts. The control technology review requirements of the PSD regulations are applicable to emissions of SO_2, NO_x, CO, VOC, and PM/PM10 (see Section 3.0). The maximum potential annual emissions of these pollutants from the proposed Project for the combined cycle operation are summarized below (see Table 2-7):

Pollutant	Annual Emissions (TPY)
NO_x	258
CO	797
VOC	70
PM/PM_{10}	199/194
SO_2	95
H_2SO_4	15

* Maximum operation emissions include gas turbine emissions for 7,200 hours (natural gas) at 59°F ambient annual average design conditions (baseload) with power augmentation for 1,560 hours at 95°F, and natural gas duct firing at an annual average rate of 250 mmBtu/hr and 2,880 hours per year. Emissions calculated with SCR, low NO_x burners for the duct burners. See Table 2-5.

This section presents the applicable NSPS and the proposed BACT for these pollutants. The approach to the BACT analysis is based on the regulatory definitions of BACT, as well as EPA's current policy guidelines requiring a top-down approach. A BACT determination requires an analysis of the economic, environmental, and energy impacts of the proposed and alternative control technologies [see 40 CFR 52.21(b)(12)]. The analysis must be specific to the Project (i.e., case-by-case) as defined in Rule 62-210.200 F.A.C.

4.2 NEW SOURCE PERFORMANCE STANDARDS

The applicable NSPS for CTs are codified in 40 CFR 60, Subpart GG and summarized in Attachment B. The applicable NSPS emission limit for NO_x is 75 parts per million by volume dry (ppmvd) corrected for heat rate and 15-percent oxygen. For the CTs being considered for the Project, the NSPS emission limit for NO_x with the NSPS heat rate correction is about 111 parts per million (ppm corrected to 15-percent oxygen at ISO conditions). The proposed NO_x emission limit for the Project will be more than 20 times lower than the NSPS. The NSPS also contains emission limits for SO_2 emissions, which are more than 4 orders of magnitude than the SO_2 emissions resulting from pipeline natural gas.

The applicable NSPS for the duct burner are codified in 40 CRF 60, Subpart Da and is also summarized in Attachment B. The applicable NO_x emission limit is 1.6 lb/MW. The combined CT and duct burner emissions rate with SCR of 4 ppmvd corrected to 15-percent O_2 is equivalent about 0.1 lb/MW or over 10 times lower than the applicable NSPS. The applicable Subpart Da NSPS for SO_2 or PM when firing gaseous fuels are 0.03 lb/mmBtu and 0.8 lb/mmBtu, respectively. The emission rate for the Project will be less than 0.01 lb/mmBtu for both PM and SO_2.

4.3 BEST AVAILABLE CONTROL TECHNOLOGY

4.3.1 OVERVIEW OF PROPOSED BACT

In recent permitting actions, FDEP has determined BACT for heavy-duty industrial combustion turbines in combined cycle configurations. The most recent permit issued by FDEP was for the Kissimmee Utility Authority (KUA) Cane Island Project. This decision included BACT emission limits based on the use of advanced DLN combustors and SCR for limiting NO_x emissions and the use of clean fuels (natural gas) for control of other emissions, including SO_2. The proposed BACT for the Project is consistent with the KUA permit.

The proposed Project will fire natural gas exclusively in the gas turbines and in the duct burners. The Project will utilize the Siemens-Westinghouse 501FD gas turbines that incorporate state-of-the-art dry DLN combustion technology. The duct burners will utilize combustion controls that include low NO_x burners. SCR will be installed in the HRSG for NO_x control. The proposed BACT emission levels are summarized below and in Table 4-1:

- Combustion controls and SCR will achieve NO_x levels of no greater than 4.0 ppmvd corrected to 15-percent O_2.
- CO emissions will be limited to: 10 ppmvd (corrected to 15-percent O_2) at loads from 100 to 70 percent; 25 ppmvd (corrected to 15-percent O_2) operating during power augmentation; 16 ppmvd (corrected to 15-percent O_2) with duct firing; 30 ppmvd (corrected to 15-percent O_2) with duct firing during power augmentation mode (250 mmBtu/hr at 95°F ambient conditions); and 50 ppmvd (corrected to 15-percent O_2) at loads from 70- to 60-percent load.
- VOC emissions will be limited to: 2.3 ppmvd (corrected to 15 percent O_2) at loads from 100 to 75 percent; 4.6 ppmvd (corrected to 15-percent O_2) operating during power augmentation and/or duct firing; and 4.2 ppmvd (corrected to 15-percent O_2) at loads from 75 to 60 percent.
- PM emissions will be limited to 23.8 lb/hr during all operating conditions.
- SO_2 and sulfuric acid mist emissions will be limited by the exclusive use of pipeline natural gas.

4.3.2 NITROGEN OXIDES

4.3.2.1 Introduction

The BACT analysis was performed based on those available and feasible control technologies that can provide the maximum degree of emission reduction for emissions of NO_x. An evaluation of the available and feasible control technologies determined that DLN combustion along with selective catalytic reduction (SCR) could provide the maximum degree of emission

reduction. Other available technologies such as SCONO$_x$™, NO$_x$Out, Thermal DeNO$_x$, NSCR and XONON™ Combustion System were evaluated and determined to be technically infeasible or not commercially demonstrated for the Project.

A review of the latest control technology determinations, summarized in Appendix B, Table B-2 indicates that the lowest NO$_x$ emission limit established in Florida and EPA Region IV for a CT unit equipped with a DLN combustors and SCR is 3.5 ppmvd. This is for a natural gas-fired combined cycle (CC) unit, based on the use of DLN combustors operating with a CT that can achieve 9 ppmvd in combination with a selective catalytic reduction (SCR) system achieving about 61-percent NO$_x$ removal. Recently, Southern Company's Plant Barry received a NO$_x$ emission limit of 0.013 lb/mmBtu (equivalent to 3.5 ppmvd at 15-percent O_2) from the State of Alabama using DLN combustion in the gas turbines and low-NO$_x$ duct burners firing natural gas combined with SCR. In addition, in early 1999, the Alabama Power's Theodore Co-Gen facility proposed a NO$_x$ emission limit of 0.013 lb/mmBtu (3.5 ppmvd at 15-percent O_2) with CC operation including 115 mmBtu/hr duct firing with natural gas.

The most recent project approval in 1999, the Tenaska Alabama Project, was approved with an emission limit of 0.0145 lb/mmBtu (equivalent to 4 ppmvd at 15-percent O_2). This project had higher initial NO$_x$ emissions from the CT (15 ppmvd at 15-percent O_2) and up to 500 mmBtu/hr duct firing.

Table 4-2 presents a comparison of the KUA project and the Osprey Energy Center. As shown in the table, the amount of NO$_x$ control proposed for the Osprey Project is a third higher than the emission rate determined to be BACT for the KUA project. Moreover, the total potential NO$_x$ emission for each (OEC) combined cycle unit is lower than that for KUA.

Available technologies for controlling NO_x emissions from combustion turbines include combustion process modifications and post-combustion exhaust gas treatment systems. The BACT analysis for the Project was performed for the following alternatives:

1. DLN combustors and selective catalytic reduction (SCR) at a combined (combustion turbine and duct burner) baseload emission rate of 4 ppmvd corrected to 15-percent O_2 when firing natural gas. The duct burners will utilize low NO_x combustion prior to the SCR unit.
2. SCONO$_x$™, using a post combustion catalytic absorption to reduce emissions of NO_x and XONON™, using catalytic combustion to reduce emission of NO_x.
3. Selective non-catalytic reduction (SNCR) which uses ammonia to reduce NO_x but typically operates at a higher temperature than SCR.
4. DLN Combustors at an emission rate of 25 ppmvd corrected to 15-percent O_2 and duct burners at an emission rate of 0.1 lb/mmBtu.

Appendix B presents a discussion of NO_x control technologies and their feasibility for the Project.

DLN combustor technology has recently been offered and installed by manufacturers to reduce NO_x emissions by inhibiting thermal NO_x formation through premixing fuel and air prior to combustion and providing staged combustion to reduce flame temperatures. NO_x emissions ranging from 25 ppmvd (corrected to 15-percent O_2) down to 9 ppmvd been offered by manufacturers for "F" Class combustion turbines.

SCR is a post-combustion process where NO_x in the gas stream is reacted with ammonia in the presence of a catalyst to form nitrogen and water. The reaction occurs typically between 600°F and 750°F, which can be accommodated in combined cycle units where such temperatures occur in the HRSG.

Ammonium salts (ammonium sulfate and ammonium bisulfate) are formed by the reaction of sulfur oxides in the gas stream and ammonia. This is typically a concern with SCR applications applied to projects firing distillate oil and not unit exclusively fired with natural gas, where sulfur content is less than 0.01 percent. Ammonia injected in the SCR system that does not react with NO_x is emitted directly and referred to as ammonia slip. In general, SCR manufacturers guarantee ammonia slip to be no more than 9 ppmvd (corrected to 15-percent O_2).

As discussed in Section 2.1, the proposed CTs will be fired exclusively with natural gas for approximately 8,760 hours per year at base load conditions. In addition, the CTs will be operated in power augmentation mode for 1,560 hours. Duct firing will exclusively utilize natural gas for an equivalent of 2,880 hours at 250 mmBtu/hr. Table 4-3 presents a summary of NO_x emissions with DLN combustors at base load and power augmentation, assuming 100-percent operating capacity at an ambient temperature of 59°F and 95°F, respectively. The NO_x removed when firing natural gas is based on hours of operation at full load.

Technical Feasibility – All of the combustion process control technologies presented above and in Appendix B, would be potentially feasible for the Osprey Project. Of the post-combustion stack gas treatment technologies, SNCR is not feasible because the temperature required for this technology (between 1,600 and 2,000°F) exceeds that found in combustion turbine exhaust gas streams (approximately 1,000°F). The SCONO$_x$™ control technology and XONON™ catalytic combustion are not considered to be technically feasible because they have not been commercially or technically demonstrated on "F" Class CTs (see Appendix B).

The BACT analysis for NO_x for the Osprey Project evaluated the use of DLN combustors in the gas turbines and low NO_x combustors in the duct burner and SCR. The SCR system evaluated will achieve NO_x concentrations of 4.0 ppmvd corrected to 15-percent oxygen when firing

natural gas in the gas turbine and duct burners. This represents a control efficiency of about 84 percent, which is at the upper range of removal efficiencies established as emission limits for BACT with SCR. In contrast, the latest project approved in Florida with SCR at 3.5 ppmvd (corrected to 15-percent O_2) had a NO_x removal of about 61 percent (see Table 4-2). Information regarding energy, environmental, and economic impacts and proposed BACT limits for NO_x are provided in the following sections.

Energy and Environmental Impacts – The installation of SCR technology will cause an increase in back pressure on the CTs due to the pressure drop (1-2 inches) across the catalyst bed. The back pressure would also increase with the installation of additional catalyst volume. Higher NO_x removal would require additional catalyst volume resulting in greater energy penalty. The energy penalty would range from 0.3 to 0.5 percent for SCR installed on the Project. Additional energy (i.e., less than 0.04 percent of turbine output) would be needed for the pumping of aqueous NH_3 from storage to the injection nozzles and generation of steam for NH_3 vaporization. The energy penalty due to gas turbine back pressure is projected to be 4,756,680 kWh per year for each CT while reducing NO_x emission levels to 4.0 ppmvd corrected to 15-percent oxygen. The total SCR energy penalty is estimated to be 5,457,480 kWh per year for each gas turbine, which is equivalent to an energy loss of 52,856 mmBtu/yr (see Table 4-2). This is equivalent to the use of about 53 million ft^3 of natural gas per year based on a gas heating value of 1,000 Btu per ft^3. Under the same assumptions (8,760 hours of operation and 100-percent load at a compressor inlet temperature of 59°F), each turbine will generate about 2.4 million kW-hours, which is sufficient to supply the average electric energy needs of about 200,000 residential customers.

The application of SCR technology would result in the following environmental impacts:

- NH_3 emissions due to *ammonia slip*; NH_3 emissions are estimated to a maximum of 112 TPY (at base load and 59°F ambient temperature) for a typical SCR design and

ammonia slippage rate of 9 ppmvd (corrected to 15-percent O_2) for each combustion turbine. Ammonia slip is much lower during the early stages of catalyst usage and increases with age. Increasing NO_x removal efficiency, such as reducing exhaust NO_x emissions by more than 90 percent, can also potentially increase ammonia slip.

- Particulate emissions will increase due to the reaction of NH_3 with SO_3 present in the exhaust gases that form ammonium bisulfate and ammonium sulfate. As a result, total particulate matter emissions will increase by 4 to 6 lb/hr (see Appendix A).
- The storage and handling of NH_3 has the potential for leaks. Aqueous ammonia proposed for the Project is less hazardous than anhydrous ammonia.

Economic Impacts – An assessment of economic impacts was performed by assuming a baseline case of advanced DLN combustor technology with the addition of SCR controls. DLN technology provided by Siemens-Westinghouse is expected to achieve a NO_x exhaust concentration of 25 ppmvd at 15-percent O_2 for the gas turbine and 0.1 lb/mmBtu for the natural gas fired duct burner. SCR technology is expected to achieve combined NO_x concentrations of 4.0 ppmvd at 15-percent O_2 under all operating conditions.

The cost impact analysis was conducted using the OAQPS factors. Emission reductions were calculated assuming base load operations (5,880 hours at baseload, and 2,880 hours with power augmentation and duct firing). Specific capital and annual operating costs for the SCR control system are summarized in Tables B-3 and B-4 of Appendix B.

Cost effectiveness for the application of SCR technology to achieve 4 ppmvd at 15-percent O_2 was determined to be $2,477 per ton of NO_x removed. This included maximum duct firing at 250 mmBtu/hr at 2,880 hr/yr. This cost effectiveness accounts only for the reduction of NO_x with SCR use and not the potential emissions from ammonia slip or other criteria pollutants that could result. The net control cost, considering maximum emission of ammonia slip, additional

PM and secondary emissions (from energy losses), is estimated at about $3,000 per ton. The cost effectiveness is within the range considered by FDEP to be appropriate for BACT.

Proposed BACT and Rationale – The proposed BACT for the Project is DLN combustion with selective catalytic reduction (SCR) for the combustion turbines firing natural gas. This "top-level" of control cannot be rejected as BACT based on economic, environmental, or energy inputs. The proposed BACT for the natural gas fired duct burners is low NO_x combustion and SCR. The proposed NO_x emissions level using the technologies described above is 4.0 ppmvd (corrected to 15-percent O_2) when firing natural gas under base load conditions for the combustion turbine and natural gas-fired duct burner. Although this emission level is slightly higher than several recent BACT determinations in the southeastern United States, it reflects the highest proposed NO_x removal efficiency in the region. The emission level proposed is equivalent to about 0.10 lb/MW which is over 10 times lower than the recently promulgated EPA new source performance standards (NSPS) for steam electric units. This new NSPS has a NO_x limit for new sources of 1.6 lb/MW of gross energy output (September 16, 1998; 63FR179).

4.3.3 CARBON MONOXIDE

Emissions of CO are dependent upon the combustion design, which is a result of the manufacturer's operating specifications, including the air-to-fuel ratio, staging of combustion, and the amount of water used for the evaporative coolers. The CTs proposed for the Project have designs to optimize combustion efficiency and minimize CO as well as NO_x emissions.

For the Project, the following alternatives were evaluated as BACT for CO:

1. Combustion controls (good combustion practices) representing a range of operation under all loads and operating scenarios. Maximum annual CO emissions (per unit) are 359 TPY. To represent a maximum annual emissions condition, the following loads and operating hours were assumed:

- Gas turbines operating at 100-percent load and 59°F compressor inlet temperature for 4,380 hrs/yr (baseload). CO emissions at baseload conditions are 10 ppmvd corrected to 15-percent O_2.
- Gas turbines in power augmentation mode for 1,440 hours/year. CO emissions during power augmentation are 25 ppmvd (at 15-percent O_2)
- Gas turbines and duct burners operating for 1,440 hours/year at 100-percent load. Combined CO emissions (gas turbine and duct firing) are estimated at 16 ppmvd (at 15-percent O_2).
- Gas turbines operating at 60-percent load for 1,500 hrs/yr. At 60- to 70-percent load with no duct firing in the gas turbine, CO emissions will be 50 ppmvd (at 15-percent O_2).

2. Oxidation catalyst at 90 percent removal with an annual emission of 35 tons/year.

SCONO$_x$™ also provides CO removal; however, it was not evaluated because, as discussed in Appendix B, it is not commercially demonstrated on "F"-Class turbines.

4.3.3.1 Impact Analysis

Economic – The estimated annualized cost of a CO oxidation catalyst is $710,000/unit, resulting in a cost effectiveness of about $2,200 per ton of CO removed. The cost effectiveness is based on a representative "worst-case" operating scenario. In addition, the cost effectiveness assumes the maximum CO emission rates provided by the manufacturer; recent tests of "F" Class turbines have demonstrated CO emission rates several times lower than that provided. At an average emission rate of 10 ppmvd (corrected to 15-percent O_2) and 100-percent load, the cost effectiveness would be over, $4,000 per ton of CO removed.

Environmental – Experience with similar projects indicate that the air quality impacts of both oxidation catalyst control and combustion design control techniques would be well below the

significant impact levels for CO. Therefore, no significant environmental benefit would be realized by the installation of a CO catalyst. Indeed, there would be additional particulate and secondary emissions as a result of an oxidation catalyst. The particulate would result from the conversion of SO_2 to sulfates, and the secondary emissions would result from the heat rate reduction as described below. Moreover, the air quality impacts at the proposed CT emission rate are predicted to be much less than the PSD significant impact levels. The maximum predicted CO impacts are less than 0.1 percent of the applicable ambient air quality standards (see Section 6). There would also be no secondary benefits, such as reducing acidic deposition, associated with reductions of CO achieved using an oxidation catalyst.

Energy – An energy penalty would result from the pressure drop across the catalyst bed. A pressure drop of about 1-2 inches of water would be expected. At a catalyst back pressure of about 1-2 inches, an energy penalty of about 3,171,000 kWh/yr per unit would result at 100-percent load. This energy penalty is sufficient to supply the electrical needs of about 264 residential customers for a year. To replace this lost energy, about 30.7×10^9 Btu/yr or about 31 million ft^3/yr of natural gas would be required.

4.3.3.2 Proposed BACT and Rationale

Emission limitations (see Table 4-1) consistent with good combustion practices are proposed as BACT. The energy, environmental and economic consequences of using catalytic oxidation on CTs is unreasonable as BACT. The proposed BACT emission rates for CO will not exceed 10 ppmvd (corrected to 15-percent O_2) at loads from 100 to 70 percent, 16 ppmvd (corrected to 15-percent O_2) for duct firing, 25 ppmvd during power augmentation, and 30 ppmvd while operating during power augmentation and duct firing. CO emission under low load operation (i.e., loads from 70 to 60 percent) will not exceed 50 ppmvd (corrected to 15-percent O_2). Catalytic oxidation is considered unreasonable for the following reasons:

1. Catalytic oxidation will not produce measurable reductions in the air quality impacts;
2. The economic impacts are significant (i.e., the capital cost is about $1.68 million per unit, with an annualized cost of $710,000 per year per unit);
3. Recent projects in Florida have been authorized with BACT emission limits of 12 ppmvd at base load on gas, and 30 ppmvd when duct firing; and
4. The added back pressure on the turbine will result in additional fuel consumption and lost energy.

Moreover, recent tests on a Siemens-Westinghouse "F" Class turbine with DLN found concentrations much less than 10 ppmvd. This actual experience suggests that CO concentrations when operating will be lower than that evaluated; thus, the economic impact analysis is conservative.

4.3.4 VOLATILE ORGANIC COMPOUNDS (VOC)

VOC will be emitted by the gas turbine and are a result of incomplete combustion. The proposed BACT for VOC emissions will be the use of efficient combustion technology and the use of clean fuels so that emissions will not exceed 2.3 ppmvd (corrected to 15-percent O_2) at loads from 100 to 75 percent, 4.2 ppmvd (corrected to 15-percent O_2) at loads from 75 to 60 percent and 4.6 ppmvd(corrected to 15-percent O_2) during power augmentation and duct firing. These emission levels are similar to the BACT emission levels established for other similar sources such as the KUA Cane Island Project which has a maximum VOC emission limit of 4 ppm when firing natural gas and duct firing. Combustion controls and the use of clean fuels have been approved as BACT for CTs. The environmental effect of further reducing emissions would not be significant.

4.3.5 SO_2 AND H_2SO_4 POLLUTANT EMISSIONS

There are no technically feasible methods for controlling the emissions of these pollutants from the Calpine Osprey Project. Natural gas will be fired exclusively in the CTs and duct burners and will contain no more than 2.0 gr S/100 scf. Emissions of H_2SO_4 mist were estimated based on a conservative 10-percent conversion rate of SO_2 to H_2SO_4 mist. The proposed BACT for SO_2 and H_2SO_4 is based on the use of natural gas containing no more than 2.0 gr S/100 scf.

4.3.6 PM_{10} AND OTHER REGULATED POLLUTANT EMISSIONS

The emission of particulates from the CTs is a result of incomplete combustion and trace elements in the fuel. The design of the CT ensures that particulate emissions will be minimized by combustion controls and the use of clean fuels. A review of EPA's BACT/LAER Clearinghouse Documents did not reveal any post-combustion particulate control technologies being used on gas- or oil-fired CTs.

The grain loading associated with the maximum particulate emissions [about 23 pounds per hour (lb/hr) when firing natural gas with duct firing] is less than 0.01 grain per standard cubic foot (gr/scf), which is a typical design specification for a baghouse outlet. There are no technically feasible methods for controlling the emissions of PM_{10} from CTs.

During cooling tower operations, PM emissions will also occur. The Calpine Osprey Project will include a 10 cell, induced draft counterflow cooling tower. The installation of drift eliminators is the only feasible technology for controlling PM emission from cooling towers. Drift eliminators use inertial separation caused by airflow direction changes to remove water droplets from the airstream exhausting from the cooling tower. These water droplets generally contain the same concentration of dissolved solids and chemical impurities as the water circulating through the tower, and can be converted to airborne emissions.

Drift eliminator configurations include cellular (or honeycomb), wave form, and herringbone (blade-type) designs. Drift eliminators may include various materials such as wood installed or formed into closely spaced slats, sheets, honeycomb assemblies, or tiles; ceramics, fiberglass, metal, and plastic.

Particulate emissions from the Project's cooling tower will be controlled utilizing high efficiency drift eliminators achieving a drift loss rate of 0.002 percent of the cooling tower recirculating water flow.

For the regulated pollutants, none of the control technologies evaluated for other pollutants (i.e., SCR) would reduce such emissions; thus, natural gas represents BACT because of the inherently low contaminant content.

Table 4-1. Proposed BACT Emission Limitations and Compliance Methods for Osprey Energy Project

Pollutant	Emission Rate	Units	Load	Conditions[a]	Compliance Method Proposed
Particulate Matter	22.3	lb/hr	100%	Baseload	Initial and Annual VE
	22.5	lb/hr	100%	PA&DF	Initial and Annual VE
Sulfur Dioxide	10.4	lb/hr	100%	Baseload	Pipeline Natural Gas
	11.8	lb/hr	100%	PA&DF	Pipeline Natural Gas
Nitrogen Oxides	4	ppm @ 15% O_2	ALL	Baseload-PA&DF	3-hour Block Average
Carbon Monoxide	10	ppm @ 15% O_2	100% - 70%	Baseload	Initial & Annual Compliance Test
	25	ppm @ 15% O_2	100%	PA	Initial Compliance Test
	30	ppm @ 15% O_2	100%	PA&DF	Initial Compliance Test
	16	ppm @ 15% O_2	100%	DF	Initial Compliance Test
	50	ppm @ 15% O_2	60% - 70%	59° F	Initial Compliance Test
Volatile Organic Compounds	2.3	ppm @ 15% O_2	100% - 75%	Baseload	Initial Compliance Test[b]
	4.2	ppm @ 15% O_2	75% - 60%	59° F	Initial Compliance Test[b]
	4.6	ppm @ 15% O_2	100%	PA&DF	Initial Compliance Test[b]

[a] PA = power augmentation; DF = duct firing @ 250 mmBtu/hr.

[b] No annual test required if CO emission limit achieved.

Table 4-2. Comparison of the Kissimmee Utility Authority Cane Island Unit 3 Project and the Calpine Osprey Energy Center

	Units	Kissimmee Utility Authority-Cane Island	Calp Osprey Ene
Turbine-Natural Gas Firing			
heat input	mmBtu/hr (LHV)	1,600	1,669
NO_x	ppm @ 15% O_2	9	25
	lb/hr	65	173
	lb/mmBtu (LHV)	0.041	0.104
Duct Burner-Natural Gas Firing			
heat input	mmBtu/hr	44 (HHV)	250
NO_x	lb/hr	4.4	27.8
	lb/mmBtu	0.1 (HHV)	0.111
Total Combined Cycle-to SCR System			
NO_x	mmBtu/hr (LHV)	1,640	1,919
	lb/hr	69	201
	lb/mmBtu (LHV)	0.042	0.105
Total-from SCR System			
NO_x	lb/hr	26.0	31.4
	ppm @ 15% O_2	3.5	4
	NO_x Removal	62.5%	84.4%
Turbine-Distillate Oil Firing			
Heat Input	mmBtu/hr	1,910	NA
	ppm @ 15% O_2	15	NA
NO_x	lb/hr	108.00	NA
	hours/year	720.00	0
Combined Cycle Unit Emissions	tons/year	143	125

Table 4-3. NO_x Emission Estimates (TPY) of BACT Alternative Technologies (per Unit)

	Operating Mode[a]		
Alternative BACT Control Technologies	CT only	DB	Total
NO_x Emission (TPY)			
DLN	759.5	40	799.5
DLN with SCR[b] (CT and Duct burner combined)	121.5	4.0	125.5
Reduction (TPY)	(638)	(36.0)	(674)
(percent)	(84%)	(90%)	(84.3%)
Basis of Emissions (ppmvd at 15-percent O_2)			
DLN only	25	0.1 lb/mmBtu	
DLN with SCR	4	0.01 lb/mmBtu	4
Hours of Operation	8,760	2,880	8,760

Note: DLN = Dry low-NO_x.
SCR = selective catalytic reduction.
TPY = tons per year.

a Emission rates were based on a Siemens-Westinghouse 501FD combustion turbine at 100 percent load. Emission data are based on an ambient temperature of 59°F at maximum emission rates and includes power augmentation and duct firing at an average rate of 250 mmBtu/hr for 2,880 hours.

b Based on primary emissions with SCR; no account is made for additional emissions (secondary) due to lost energy from heat rate penalty and electrical usage for SCR operation.

c ppmvd is corrected to 15 -percent oxygen for combustion turbine emissions.

5.0 AMBIENT MONITORING ANALYSIS

The CAA requires that an air quality analysis be conducted for each criteria and noncriteria pollutant subject to regulation under the act before a major stationary source is constructed. Criteria pollutants are those pollutants for which AAQS have been established. Noncriteria pollutants are those pollutants that may be regulated by emission standards, but no AAQS have been established. This analysis may be performed by the use of modeling and/or by monitoring the air quality. In addition, if EPA has not established an acceptable ambient monitoring method for the pollutant, monitoring is not required.

Based on the estimated emissions from the proposed Project (see Table 3-3), pre-construction ambient monitoring analyses for SO_2, PM_{10}, NO_2, CO, ozone (based on VOC emissions) and sulfuric acid mist are required to be submitted as part of the application. A major source may waive the ambient monitoring analysis requirement if it can be demonstrated that the proposed source's maximum air quality impacts will not exceed the PSD *de minimis* concentration levels and, for ozone (based on VOC emissions), VOC emission level of 100 TPY.

As shown in Table 3-4, the proposed Project's impacts are predicted to be below the applicable *de minimis* monitoring concentrations for all pollutants. For ozone, the Project's VOC emissions are less than the monitoring emission level of 100 TPY. For sulfuric acid mist, which is a noncriteria pollutant, although the Project's emissions are greater than the significant emission rate, EPA has established no acceptable monitoring method for this pollutant. Therefore, Calpine requests an exemption from the preconstruction monitoring requirement for sulfuric acid in accordance with the PSD regulations.

6.0 AIR QUALITY IMPACT ANALYSIS

6.1 AIR MODELING PROTOCOL

Prior to performing air modeling for this Project, an air modeling protocol was prepared and sent to the Florida DEP for review and approval. The Florida DEP provided comments to the protocol which are incorporated into the modeling approach described in the following sections.

Copies of the letters that present the air modeling protocol and comments provided by the Florida DEP are presented in Appendix C.

6.2 SIGNIFICANT IMPACT ANALYSIS APPROACH

The modeling approach for the Project followed the EPA and Florida DEP modeling guidelines for determining compliance with AAQS and PSD increments. For all applicable pollutants that have emission increases that will exceed the PSD significant emission rate due to the proposed Project, a significant impact analysis was performed. This analysis determines whether the Project alone will result in predicted impacts that will exceed the EPA significant impact levels in any areas beyond the Project's fenced property.

If the Project's impacts are above the significant impact levels, then a more detailed air modeling analysis that includes background sources is required. If the Project's impacts are below the significant impact levels, a more detailed air modeling analysis is not required.

Generally, if a new Project also is within 200 km of a PSD Class I area, then a significant impact analysis is also performed for the PSD Class I area. EPA has proposed PSD Class I significant impact levels that have not been finalized as of this report (see Section 3.2.3).

Based on comments provided by the Florida DEP, a PSD Class I modeling analysis was required because the Project is located about 102 km from the Chassahowitzka NWA, the nearest Class I area to the Project Site.

6.3 PRECONSTRUCTION MONITORING ANALYSIS APPROACH

The modeling approach for the Project followed EPA and Florida DEP modeling guidelines for evaluating a project's impacts relative to the *de minimis* monitoring levels to determine the need to submit ambient monitoring data prior to construction. Current Florida DEP policies stipulate that the highest annual average and highest short-term concentrations are to be compared to the applicable *de minimis* monitoring levels.

6.4 AIR MODELING ANALYSIS APPROACH

6.4.1 GENERAL PROCEDURES

As stated in the previous sections, for each pollutant which is emitted above the significant emission rate, air modeling analyses are required to determine if the Project's impacts are predicted to be greater than the significant impact levels and *de minimis* monitoring levels. These analyses consider the Project's impacts alone. Air quality impacts are predicted using 5 years of meteorological data and selecting the highest predicted ground-level concentrations for comparison to the significant impact levels and *de minimis* monitoring levels.

If the Project's impacts are greater than the significant impact levels, the air modeling analyses must consider other nearby sources and background concentrations, and predict concentration for comparison to ambient standards. Because the Project's maximum impacts are predicted to be less than the significant impact levels, only the highest concentrations due to the Project's emissions were evaluated.

To develop the maximum short-term concentrations for the proposed Project, the modeling approach was divided into screening and refined phases to reduce the computation time required performing the modeling analysis. Concentrations are predicted for the screening phase using a coarse receptor grid and a 5-year meteorological data record. If the highest concentration is predicted at a receptor in an area where the receptor spacing is more than 100

m, then a refined analysis is performed. Modeling refinements are performed using a receptor spacing of 100 m with a receptor grid centered on the screening receptor at which the maximum concentration was predicted. The air dispersion model is then executed with the refined grid for the entire year of meteorology during which the screening concentration occurred.

More detailed descriptions of the model, along with the emission inventory, meteorological data, and receptor grids are presented in the following sections.

6.4.2 MODEL SELECTION

The selection of an air quality model to calculate air quality impacts for this Project was based on its applicability to simulate impacts in areas surrounding the Project as well as at the PSD Class I area of the Chassahowitzka NWA, located about 102 km from the Site. Two air quality dispersion models were selected and used in these analyses to address air quality impacts for the Project. These models were:

- The Industrial Source Complex Short Term (ISCST3) dispersion model, and
- The California Puff model (CALPUFF)

The Industrial Source Complex Short-term (ISCST3, Version 99155) dispersion model (EPA, 1999) was used to evaluate the pollutant impacts due to the Project in nearby areas surrounding the Site. This model is maintained by the EPA on its Internet website, Support Center for Regulatory Air Models (SCRAM), within the Technical Transfer Network (TTN). A listing of ISCST3 model features is presented in Table 6-1. The ISCST3 model is designed to calculate hourly concentrations based on hourly meteorological data (i.e., wind direction, wind speed, atmospheric stability, ambient temperature, and mixing heights). The ISCST3 model is applicable to sources located in either flat or rolling terrain where terrain heights do not exceed stack heights. These areas are referred to as simple terrain. The model can also be applied in areas where the terrain exceeds the stack heights. These areas are referred to as complex terrain.

The Site is about 140 ft above mean sea level (msl). Around the immediate vicinity of the Site, the terrain is flat to gently rolling with elevations that range within 10 to 20 ft of the Site elevation.

Since the proposed stack heights for the heat recovery steam generators (HRSG) and cooling tower are proposed to be 135 and 55 ft, respectively, the surrounding terrain is below the proposed stack top heights. Therefore, the surrounding terrain can be considered as simple (i.e., less than stack top) with respect to the proposed stack heights and the cooling tower. Due to the minimal amount of terrain elevation differences in the Project's vicinity, receptor elevations were not included in the analysis. As a result, the simple terrain option was used for the air modeling analysis which assumes that all receptors are at the same elevation as the stack base elevations for the HRSG and cooling tower.

In this analysis, the EPA regulatory default options were used to predict all maximum impacts. The ISCST3 model can run in the rural or urban land use mode that affects stability dispersion coefficients, wind speed profiles, and mixing heights. Land use can be characterized based on a scheme recommended by EPA (Auer, 1978). If more than 50-percent land use within a 3-km radius around a project is classified as industrial or commercial, or high-density residential, then the urban option should be selected. Otherwise, the rural option is appropriate. Based on the land-use within a 3-km radius of the proposed Site (see Figure 1-1), the rural dispersion coefficients were used in the modeling analysis.

The ISCST3 model was used to provide maximum concentrations for the annual and 24-, 8-, 3-, and 1-hour averaging times. To estimate impacts due to emissions from the HRSG stack, an emission rate of 79.365 pounds per hour (lb/hr) or 10 grams per second (g/s) was initially used to produce relative concentrations as a function of the modeled emission rate (i.e., $\mu g/m^3$ per 10 g/s). These impacts are referred to as generic pollutant impacts. Maximum air quality impacts

for specific pollutants were then determined by multiplying the maximum pollutant-specific emission rate in lb/hr (g/s) to the maximum predicted generic impact divided by 79.365 lb/hr (10 g/s).

At distances beyond 50 km from a source, the CALPUFF model, Version 5.0 (EPA, 1998), is recommended for use by the EPA and FDEP. The CALPUFF model is a long-range transport model applicable for estimating the air quality impacts in areas that are more than 50 km from a source. The methods and assumptions used in the CALPUFF model were based on the latest recommendations for modeling analysis as presented in the Interagency Workgroup on Air Quality Models (IWAQM), Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts (EPA, 1998). This model is also maintained by the EPA on the SCRAM website.

As a result, the CALPUFF model was used to perform the significant impact analysis for the Project at the Class I area of the Chassahowitzka NWA. The CALPUFF model was also used to assess the Project's impact on regional haze at the Class I area (see Section 7.0). Based on discussions with DEP, the ISCST3 model was used to determine the "worst-case" operating load and ambient temperature that produced the Project's maximum impact at the Class I area. Based on that analysis, air quality impacts were then predicted with the CALPUFF model using the "worst-case" operating scenario to compare the Project's impacts to Class I significant impact levels and potential contribution to regional haze. A more detailed description of the assumptions and methods used for the CALPUFF model is presented in Appendix D.

6.4.3 METEOROLOGICAL DATA

Meteorological data used in the ISCST3 model to determine air quality impacts consisted of a concurrent 5-year period of hourly surface weather observations and twice-daily upper air soundings from the National Weather Service (NWS) stations at Tampa International Airport

and Ruskin, Florida, respectively. The 5-year period of meteorological data was from 1987 through 1991, which are the latest readily available data for these stations that are acceptable to the Florida DEP. The NWS station at Tampa is located approximately 70 km (42 miles) west of the proposed Site while the NWS station at Ruskin is located approximately 75 km (45 miles) southwest of the proposed Site.

These meteorological data are the most complete and representative of the region around the Project Site because both the Site and the weather stations are located in areas that experience similar weather conditions, such as frontal passages. In addition, these data have been approved for use by the Florida DEP in previous air permit applications to address air quality impacts for other proposed sources locating in Polk County and adjacent counties.

For the CALPUFF model, additional meteorological parameters are needed (e.g., precipitation, relative humidity) to predict air quality concentrations than that required for the ISCST3 model. More detailed descriptions of the assumptions and methods used for processing the meteorological data and establishing the model domain are presented in Appendix D.

6.4.4 EMISSION INVENTORY

A summary of the criteria pollutant emission rates, physical stack and stack operating parameters for the proposed CTs used in the air modeling analysis is presented in Table 2-1. Emission and stack operating parameters are presented for 32°F, 59°F, and 95°F ambient temperatures. In an effort to obtain the maximum air quality impacts for a range of possible operating conditions, the air modeling analysis used a range of emission rates and stack parameter data to predict air quality impacts.

A total of ten modeling scenarios were considered. Nine of the modeling scenarios were based of the CTs operating without duct firing or power augmentation for the following cases:

1. 100 percent operating load for the ambient temperatures of 32°, 59°, and 95°F;
2. 75 percent operating load for the ambient temperatures of 32°, 59°, and 95°F; and
3. 60 percent operating load for the ambient temperatures of 32°, 59°, and 95°F.

One additional modeling scenario was based on the CTs operating at 100 percent operating load with duct firing and power augmentation for the ambient temperature of 95°F.

Each of the proposed HRSGs will have a stack height of 135 feet and an inside stack diameter of 19 ft. The proposed cooling tower will have a height of 45 ft. The tower will have 10 cells and each cell will have a fan that will have a stack height of 10 ft above the cell or 55 feet above the ground. Each fan will have a diameter of 28 ft.

The relative locations of the stacks used in the modeling were:

Emission Source	Relative Location (ft)	
	X	Y
HRSG Stack No. 1	0.0	0.0
HRSG Stack No. 2	0.0	115
Cooling Tower Cell No. 1	35	620
Cooling Tower Cell No. 2	89	620
Cooling Tower Cell No. 3	143	620
Cooling Tower Cell No. 4	197	620
Cooling Tower Cell No. 5	251	620
Cooling Tower Cell No. 6	35	665
Cooling Tower Cell No. 7	89	665
Cooling Tower Cell No. 8	143	665
Cooling Tower Cell No. 9	197	665
Cooling Tower Cell No. 10	251	665

Because the proposed HRSG and cooling tower stack heights are less than GEP, building downwash effects were included in the modeling analysis (see following section on building downwash).

6.4.5 BUILDING DOWNWASH EFFECTS

A review of the dimensions of structures proposed for the Project was conducted to determine those structures that could produce building downwash effects. The only significant structures in the vicinity of the proposed CT stacks are the proposed CT air inlet filters, CT enclosure/air inlet ducts, and HRSG structures. Because the heights of other structures, such as the administration building, are lower than those significant structures, and would not produce greater downwash effects for the Project's emissions, the other structures were not considered in the analysis.

The height and widths of the structures used in the modeling are as follows:

Structure	Height (ft)	Width (ft)	Length (ft)
CT air inlet filter	86	60	60
CT and steam turbine enclosure	96	150	360
HRSG No. 1 and 2 structures	80	50	100
Cooling Tower	45	84	270

Building dimensions for the Project's structures were entered into the EPA's Building Profile Input Program (BPIP, Version 95086) for the purpose of obtaining direction-specific building heights and widths for all downwash-affected sources. The direction-specific building dimensions were then input to the ISCST3 model as the building height and width for each of 36 ten-degree wind sectors. A summary of the direction-specific building dimensions used in the modeling is presented in Appendix E.

6.4.6 RECEPTOR LOCATIONS

For predicting maximum concentrations in the vicinity of the plant, a polar receptor grid was used which consisted of 729 receptors. These receptors included 36 receptors located on radials extending out from the proposed stack location for HRSG No. 1. Along each radial, receptors were located beginning at the fenced plant property and extending to distances of 100; 200; 300;

400; 500; 700; 1,000; 1,500; 2,000; 2,500; 3,000; 4,000; 5,000; 7,000, 10,000; 12,000; 15,000; 20,000; 25,000; and 30,000 m. However, concentrations were predicted only at receptors located off plant property that would be considered ambient air locations. As a result, because the proposed plant property extends out from a minimum distance of about 60 m in several directions to about 330 m for other directions, there were directions for which receptors were not modeled at certain distances (e.g., 200 m) which would not be considered ambient air locations.

For each pollutant and averaging time, modeling refinements were performed, as needed, by employing a Cartesian receptor grid with a maximum spacing of 100 m centered on the receptor and for the year during which the maximum impact from the Project was predicted.

To address impacts in the Chassahowitzka NWA, the following receptor locations were used:

Receptors at the PSD Class I Area of the Chassahowitzka National Wilderness Area

UTM Coordinates (m)	
East	North
340,300	3,165,700
340,300	3,167,700
340,300	3,169,800
340,700	3,171,900
342,000	3,174,000
343,000	3,176,200
343,700	3,178,300
342,400	3,180,600
341,100	3,183,400
339,000	3,183,400
336,500	3,183,400
334,000	3,183,400
331,500	3,183,400

Note: UTM Zone 17

These receptors have been used in previous PSD applications that addressed predicting impacts in the Chassahowitzka NWA. The Project's East and North UTM coordinates are 421.0 and 3,103.2 km, respectively.

6.5 AIR MODELING RESULTS

6.5.1 MAXIMUM PROJECT IMPACTS

The maximum pollutant concentrations due to the Project's emissions are summarized in Tables 6-2 and 6-3. The maximum concentrations predicted in the screening analysis for the two CTs at the three operating loads and three ambient temperatures are given in Table 6-2. Results are also provided with power augmentation and supplemental duct firing in the HRSG. PM_{10} concentrations due to the emissions from the cooling tower are also included. The overall maximum concentrations due to the Project's emissions are given in Table 6-3 for comparison to the PSD Class II significant impact levels, PSD Class II increments, and AAQS.

As shown in Table 6-3, the maximum PM, SO_2, NO_2, and CO impacts due to the Project are all predicted to be below the significant impact levels. Because the Project will not have a significant impact upon the air quality in the vicinity of the Site, more detailed modeling analyses for determining compliance with the AAQS and PSD Class II increments are not required. These maximum concentrations due to the Project are predicted to be about 3 percent or less than the AAQS and about 15 percent or less than the PSD Class II increments.

The maximum PM, SO_2, NO_2, and CO impacts due to the Project are also predicted to be below the *de minimis* monitoring levels. Because the proposed Project will not have predicted impacts greater than *de minimis* levels, preconstruction monitoring data are not required to be submitted as part of the PSD review.

A summary of the model results for each year is presented in Appendix F. The locations of the maximum predicted concentrations are also given in the summary. Model input files are also provided in Appendix F.

6.5.2 PSD CLASS I IMPACTS

The maximum pollutant concentrations due to the Project's emissions at the Class I area of the Chassahowitzka NWA are summarized in Tables 6-4 and 6-5. Similar to the results presented to determine the Project's maximum impacts, the maximum pollutant concentrations predicted using the ISCST3 model for two CTs at the three operating loads and three ambient temperature are given in Table 6-4. Results are provided with power augmentation and supplemental duct firing in the HRSG. PM_{10} concentrations due to the emissions from the cooling tower are also included.

As shown in Table 6-4, the "worst-case" operating load and ambient temperature that produced the Project's maximum impact at the Class I area occurred for baseload operation power augmentation and duct firing with an ambient temperature of 95°F. As a result, air quality impacts for the Project were predicted at the Class I area with the CALPUFF model using this "worst-case" operating scenario. A summary of the overall maximum concentrations predicted at the Class I area due to the Project's emissions is given in Table 6-5 for comparison to the PSD Class I significant impact levels and increments. Results are provided both for the ISCST3 and CALPUFF models.

As shown in Table 6-5, the maximum PM, SO_2, and NO_2 impacts due to the Project are all below the significant impact levels. Because the Project will not have a significant impact upon the air quality at the Class I area, more detailed modeling analyses for determining compliance with the PSD Class I increments are not required. These maximum concentrations due to the Project are predicted to be less than 1 percent of the PSD Class I increments.

A summary of the model results for the ISCST3 and CALPUFF models is presented in Appendix F. The locations of the maximum predicted concentrations are also given in the summary. Model input files are also provided in Appendix F.

6.5.3 CONCLUSIONS

Based on these air quality modeling analyses, the maximum pollutant concentrations due to the Project's emissions are predicted to be less than the PSD Class II and I significant impact levels. As a result, the Project's impacts will have not a significant affect on air quality and will comply with all applicable AAQS and PSD increments.

Table 6-1. Major Features of the ISCST3 Model, Version 99155

ISCST3 Model Features
• Polar or Cartesian coordinate systems for receptor locations
• Rural or one of three urban options which affect wind speed profile exponent, dispersion rates, and mixing height calculations
• Plume rise due to momentum and buoyancy as a function of downwind distance for stack emissions (Briggs, 1969, 1971, 1972, and 1975; Bowers, et al., 1979).
• Procedures suggested by Huber and Snyder (1976); Huber (1977); and Schulman and Scire (1980) for evaluating building wake effects
• Procedures suggested by Briggs (1974) for evaluating stack-tip downwash
• Separation of multiple emission sources
• Consideration of the effects of gravitational settling and dry deposition on ambient particulate concentrations
• Capability of simulating point, line, volume, area, and open pit sources
• Capability to calculate dry and wet deposition, including both gaseous and particulate precipitation scavenging for wet deposition
• Variation of wind speed with height (wind speed-profile exponent law)
• Concentration estimates for 1-hour to annual average times
• Terrain-adjustment procedures for elevated terrain including a terrain truncation algorithm for ISCST3; a built-in algorithm for predicting concentrations in complex terrain
• Consideration of time-dependent exponential decay of pollutants
• The method of Pasquill (1976) to account for buoyancy-induced dispersion
• A regulatory default option to set various model options and parameters to EPA recommended values (see text for regulatory options used)
• Procedure for calm-wind processing including setting wind speeds less than 1 m/s to 1 m/s.

Note: ISCST3 = Industrial Source Complex Short-Term.
Source: EPA, 1999.

Table 6-2. Maximum Pollutant Concentrations Predicted for Two Combined-Cycle Combustion Turbines and Cooling Tower by Operating Load and Air Inlet Temperature

Pollutant	Averaging Time	Maximum Predicted Concentrations (ug/m^3) by Operating Load and Air Inlet Temperature (1)									EPA Class II Significant Impact Levels (ug/m^3)
		Base Load			75% Load			60% Load			
		32°F	59°F	95°F	32°F	59°F	95°F	32°F	59°F	95°F	
WITHOUT DUCT FIRING											
Combustion Turbines Only											
SO_2	Annual	0.0313	0.0312	0.0314	0.0288	0.0321	0.0391	0.0499	0.0509	0.0515	1
	24-Hour	1.07	1.06	1.12	1.02	1.08	1.07	1.30	1.34	1.35	5
	3-Hour	6.44	6.49	6.70	6.17	6.22	6.27	7.06	7.07	6.83	25
PM_{10}	Annual	0.0634	0.0635	0.0633	0.064	0.072	0.087	0.107	0.110	0.114	1
	24-Hour	2.17	2.16	2.25	2.27	2.41	2.39	2.80	2.89	2.98	5
NO_2	Annual	0.084	0.083	0.084	0.077	0.086	0.104	0.133	0.136	0.138	1
CO	8-Hour	13.2	15.2	15.6	14.1	13.9	14.2	79	79	77	500
	1-Hour	78	79	82	74	74	76	426	427	415	2,000
Combustion Turbines and Cooling Tower											
PM_{10}	Annual	NM	NM	NM	NM	NM	NM	NM	NM	0.258	1
	24-Hour	NM	NM	NM	NM	NM	NM	NM	NM	4.50	5
WITH POWER AUGMENTATION & DUCT FIRING (2)											
Combustion Turbines Only											
SO_2	Annual	NA	NA	0.0360	NA	NA	NA	NA	NA	NA	1
	24-Hour	NA	NA	1.22	NA	NA	NA	NA	NA	NA	5
	3-Hour	NA	NA	7.48	NA	NA	NA	NA	NA	NA	25
PM_{10}	Annual	NA	NA	0.069	NA	NA	NA	NA	NA	NA	1
	24-Hour	NA	NA	2.33	NA	NA	NA	NA	NA	NA	5
NO_2	Annual	NA	NA	0.095	NA	NA	NA	NA	NA	NA	1
CO	8-Hour	NA	NA	49.2	NA	NA	NA	NA	NA	NA	500
	1-Hour	NA	NA	257	NA	NA	NA	NA	NA	NA	2,000
Combustion Turbines and Cooling Tower											
PM_{10}	Annual	NA	NA	0.227	NA	NA	NA	NA	NA	NA	1
	24-Hour	NA	NA	3.86	NA	NA	NA	NA	NA	NA	5

Note: NA= not applicable; NM= not modeled

(1) Concentrations are based on highest predicted concentrations using five years of meteorological for 1987 to 1991 of surface and upper air data from the National Weather Service stations at Tampa International Airport and Ruskin, respectively.

(2) Duct firing based on natural gas-fired duct burner with maximum heat input rate of 250 mmBtu/hr.

Table 6-3. Summary of Maximum Pollutant Concentrations Predicted for Two Combustion Turbines and Cooling Tower Compared to the EPA Class II Significant Impact Levels, PSD Class II Increments, and AAQS

Pollutant	Averaging Time	Maximum Predicted Concentration (ug/m^3)	EPA Class II Significant Impact Levels (ug/m^3)	PSD Class II Increments (ug/m^3)	AAQS (ug/m^3)
WITHOUT DUCT FIRING					
Combustion Turbines Only					
SO_2	Annual	0.051	1	25	60
	24-Hour	1.35	5	91	260
	3-Hour	7.07	25	512	1,300
PM_{10}	Annual	0.11	1	17	50
	24-Hour	2.98	5	30	150
NO_2	Annual	0.14	1	25	100
CO	8-Hour	79	500	NA	10,000
	1-Hour	427	2,000	NA	40,000
Combustion Turbines and Cooling Tower					
PM_{10}	Annual	0.26	1	17	50
	24-Hour	4.5	5	30	150
WITH POWER AUGMENTATION & DUCT FIRING					
Combustion Turbines Only					
SO_2	Annual	0.036	1	25	60
	24-Hour	1.22	5	91	260
	3-Hour	7.48	25	512	1,300
PM_{10}	Annual	0.07	1	17	50
	24-Hour	2.3	5	30	150
NO_2	Annual	0.09	1	25	100
CO	8-Hour	49	500	NA	10,000
	1-Hour	257	2,000	NA	40,000
Combustion Turbines and Cooling Tower					
PM_{10}	Annual	0.23	1	17	50
	24-Hour	3.9	5	30	150

NA= not applicable

Table 6-4. Maximum Pollutant Concentrations Predicted for Two Combined-Cycle Combustion Turbines and Cooling Tower by Operating Load and Air Inlet Temperature at the PSD Class I Area of the Chassahowitzka NWA

Pollutant	Averaging Time	Maximum Predicted Concentrations (ug/m^3) by Operating Load and Air Inlet Temperature (1)									EPA Class I Significant Impact Levels (ug/m^3)
		Base Load			75% Load			60% Load			
		32°F	59°F	95°F	32°F	59°F	95°F	32°F	59°F	95°F	
WITHOUT DUCT FIRING											
Combustion Turbines Only											
SO_2	Annual	0.0027	0.0026	0.0025	0.0022	0.0022	0.0020	0.0021	0.0020	0.0018	0.1
	24-Hour	0.056	0.054	0.051	0.047	0.045	0.043	0.044	0.043	0.039	0.2
	3-Hour	0.226	0.218	0.213	0.195	0.191	0.186	0.196	0.193	0.181	1.0
PM_{10}	Annual	0.0055	0.0053	0.0050	0.0050	0.0048	0.0045	0.0044	0.0043	0.0041	0.2
	24-Hour	0.114	0.111	0.104	0.104	0.101	0.096	0.095	0.092	0.087	0.3
NO_2	Annual	0.007	0.007	0.007	0.006	0.006	0.005	0.006	0.005	0.005	0.1
Combustion Turbines and Cooling Tower											
PM_{10}	Annual	0.0057	NM	NM	NM	NM	NM	NM	NM	NM	1
	24-Hour	0.121	NM	NM	NM	NM	NM	NM	NM	NM	5
WITH POWER AUGMENTATION & DUCT FIRING (2)											
Combustion Turbines Only											
SO_2	Annual	NA	NA	0.0030	NA	NA	NA	NA	NA	NA	0.1
	24-Hour	NA	NA	0.063	NA	NA	NA	NA	NA	NA	0.2
	3-Hour	NA	NA	0.251	NA	NA	NA	NA	NA	NA	1.0
PM_{10}	Annual	NA	NA	0.0057	NA	NA	NA	NA	NA	NA	0.2
	24-Hour	NA	NA	0.120	NA	NA	NA	NA	NA	NA	0.3
NO_2	Annual	NA	NA	0.008	NA	NA	NA	NA	NA	NA	0.1
Combustion Turbines and Cooling Tower											
PM_{10}	Annual	NA	NA	0.0060	NA	NA	NA	NA	NA	NA	1
	24-Hour	NA	NA	0.126	NA	NA	NA	NA	NA	NA	5

Note: NA= not applicable; NM= not modeled

(1) Concentrations are based on highest predicted concentrations using the ISCST3 model five years of meteorological for 1987 to 1991 of surface and upper air data from the National Weather Service stations at Tampa International Airport and Ruskin, respectively.
(2) Duct firing based on natural gas-fired duct burner with maximum heat input rate of 250 mmBtu/hr.

Table 6-5. Summary of Maximum Pollutant Concentrations Predicted for Two Combustion Turbines and Cooling Tower Compared to the EPA Class I Significant Impact Levels and PSD Class I Increments

Pollutant	Averaging Time	Maximum Predicted Concentration (ug/m^3) ISCST3 Model	Maximum Predicted Concentration (ug/m^3) CALPUFF Model	EPA Class I Significant Impact Levels (ug/m^3)	PSD Class I Increments (ug/m^3)
WITHOUT DUCT FIRING					
Combustion Turbines Only					
SO_2	Annual	0.0027	NM	0.1	2
	24-Hour	0.056	NM	0.2	5
	3-Hour	0.23	NM	1.0	25
PM_{10}	Annual	0.0055	NM	0.2	4
	24-Hour	0.114	NM	0.3	8
NO_2	Annual	0.0072	NM	0.1	2.5
Combustion Turbines and Cooling Tower					
PM_{10}	Annual	0.0057	NM	0.2	4
	24-Hour	0.12	NM	0.3	8
WITH POWER AUGMENTATION & DUCT FIRING					
Combustion Turbines Only					
SO_2	Annual	0.0030	0.0014	0.1	2
	24-Hour	0.063	0.024	0.2	5
	3-Hour	0.25	0.072	1.0	25
PM_{10}	Annual	0.0057	NM	0.2	4
	24-Hour	0.120	NM	0.3	8
NO_2	Annual	0.0079	0.0014	0.1	2.5
Combustion Turbines and Cooling Tower					
PM_{10}	Annual	0.0060	0.0034	0.2	4
	24-Hour	0.13	0.052	0.3	8

Note: NM= not modeled

7.0 ADDITIONAL IMPACT ANALYSIS

7.1 IMPACTS DUE TO DIRECT GROWTH

The Osprey Energy Center is being constructed to meet current and projected electric demands. Additional growth as a direct result of the additional electric power provided by the Project is not expected.

Construction of the Project will occur over a 24-month period requiring an average of approximately 235 workers during that time. It is anticipated that many of these construction personnel will commute to the Site.

The Osprey Energy Center will employ a total of 25 operational workers at Project build-out. The operational workforce will also include annual contracted maintenance workers to be hired for periodic routine services. The workforce needed to operate the proposed Project represents a small fraction of the population already present in the immediate area. Therefore, while there would be a small increase in vehicular traffic in the area, the effect on air quality levels would be minimal.

There are also expected to be no air quality impacts due to associated industrial/ commercial growth given the Site's location relative to the City of Auburndale. The existing commercial infrastructure should be adequate to provide any support services that the Project might require.

7.2 IMPACT ON SOILS, VEGETATION, WILDLIFE, AND VISIBILITY IN THE PROJECT'S VICINITY

Because the Project's impacts on the local air quality are predicted to be less than the significant impact levels for PSD Class II areas, the Project's impacts on soils, vegetation, and wildlife in the Project's vicinity are also not expected to be significant. According to the modeling results

presented in Section 6.0, the maximum air quality impacts due to the Project are predicted to be well below the PSD Class II significant impact levels, PSD Class II Increments, and AAQS. In addition, no visibility impairment in the Project's vicinity is expected due to the types and quantities of emissions proposed for the Project. The opacity of the proposed HRSG exhaust emissions will be 10 percent or less.

According to the USDA Polk County Soil Survey, soils in the vicinity of the Site are classified as Tavares fine sand, 0 to 5 percent slopes. Tavares fine sand is described as moderately well drained soils that formed in sandy marine sediments and are found on broad uplands and knolls within flatwoods (Polk County Soil Survey, USDA 1980). These soils can be described as strongly acid. The pollutants emitted by the Project that could cause potential impact to soils are SO_2 and NO_x. The primary effect of SO_2 and NO_x deposition and adsorption by soils is the resultant lowering of soil pH. Low soil pH will have an influence on most chemical and biological reactions in the soil including the level and availability of most plant nutrients in the soil. Based on the extremely low SO_2 and NO_2 impacts predicted for the Project and the ambient acidic nature of the soils, the Project's emissions will not have any significant adverse impact to soils at the Site or vicinity.

The Site is in an abandoned citrus grove within an urban area; therefore, vegetative communities in the vicinity of the Site are limited to small fragments of pine-mesic oak habitat surrounded by residential and commercial properties. The citrus grove is overgrown with weedy invasive species common to fallow agricultural lands, such as dog fennel (*Eupatorium capillifolium*), Mexican tea (*Chenopodium ambrosioides*), ragweed (*Ambrosia artemisiifolia*), passionflower (*Passiflora incarnata*), hyssop spurge (*Chamaesyce hyssopifolia*), southern crabgrass (*Digitaria ciliaris*), and grasses of the genus *Paspalum*. No areas of jurisdictional wetlands are found on the Site, although a small drainage swale is located adjacent to Recker Highway on the southern boundary. From the lack of wetland vegetation, it is apparent that the drainage

swale does not remain inundated for any significant length of time during the year. A dry culvert on the southwestern edge of the property is vegetated with Florida beggarweed (*Desmodium floridanum*), tickseed (*Bidens alba*), lantana (*Lantana camara*), and various species of weedy grasses.

Although air pollution impacts to wildlife have been reported in the literature, many of the incidents involved acute exposures to pollutants, usually caused by unusual or highly concentrated releases or unique weather conditions. Generally, there are three ways pollutants may affect wildlife: through inhalation, through exposure with skin, and through ingestion (Newman 1980). Ingestion is the most common means and can occur through eating or drinking of high concentrations of pollutants. Bioaccumulation is the process of animals collecting and accumulating pollutant levels in their bodies over time. Other animals that prey on these animals would then be ingesting concentrated pollutants levels.

It is unlikely that the Project's emissions will cause injury or death to wildlife based on a review of the limited literature on air pollutant effects on wildlife. The Project's impacts are predicted to be very low and dispersed over a large area. Coupled with the mobility of wildlife, the potential for exposure of wildlife to the Project's impacts under weather conditions that lead to high concentrations is extremely unlikely.

The maximum concentrations of SO_2, PM_{10}, NO_2, and CO due to the Project's emissions are predicted to be at least an order of magnitude lower than the EPA Class II significant impact levels; therefore, no significant impacts associated with facility operations are expected. The maximum predicted concentrations are less than one percent of the AAQS. Since the AAQS are designed to protect the public welfare, including effects on soils, vegetation and wildlife, no detrimental effects on soils, vegetation or wildlife should occur in this area.

Visibility impairment in the Project's vicinity is not expected due to the types and quantities of emissions proposed for the Project. The opacity of the proposed HRSG exhaust emissions will be 10 percent or less.

7.3 IMPACTS UPON PSD CLASS I AREAS

7.3.1 IDENTIFICATION OF AQRVS AND METHODOLOGY

The Osprey Energy Center is located about 102 km from the PSD Class I area of the Chassahowitzka NWA. Other PSD Class I areas are located more than 200 km from the Site. Based on discussions with the Florida DEP, an AQRV is required for this Project. Because the proposed Project will be fired with natural gas, a clean fuel, it is expected that the Project's impacts for SO_2, NO_2, and PM_{10} will be minimal and not significantly affect or impair visibility or soils and vegetation at the Class I areas.

An AQRV analysis was conducted to assess the potential risk to AQRVs of the Chassahowitzka NWA due to the proposed emissions from the proposed Osprey Energy Center. The U.S. Department of the Interior in 1978 administratively defined AQRVs to be:

> All those values possessed by an area except those that are not affected by changes in air quality and include all those assets of an area whose vitality, significance, or integrity is dependent in some way upon the air environment. These values include visibility and those scenic, cultural, biological, and recreational resources of an area that are affected by air quality.
>
> Important attributes of an area are those values or assets that make an area significant as a national monument, preserve, or primitive area. They are the assets that are to be preserved if the area is to achieve the purposes for which it was set aside (Federal Register 1978).

Except for visibility, AQRVs were not specifically defined. However, odor, soil, flora, fauna, cultural resources, geological features, water, and climate generally have been identified by land managers as AQRVs. Since specific AQRVs have not been identified for the Chassahowitzka

NWA, this AQRV analysis evaluates the effects of air quality on general vegetation types and wildlife found in the Chassahowitzka NWA.

Vegetation type AQRVs and their representative species types have been defined by the U.S. Fish and Wildlife as:

Marshlands - black needlerush, saw grass, salt grass, and salt marsh cordgrass
Marsh Islands - cabbage palm and eastern red cedar
Estuarine Habitat - black needlerush, salt marsh cordgrass, and wax myrtle
Hardwood Swamp - red maple, red bay, sweet bay, and cabbage palm
Upland Forests - live oak, scrub oak, longleaf pine, slash pine, wax myrtle, and saw palmetto
Mangrove Swamp - red, white, and black mangrove

Wildlife AQRVs have been identified as endangered species, waterfowl, marsh and waterbirds, shorebirds, reptiles, and mammals.

The maximum pollutant concentrations due to the Project's emissions predicted at the PSD Class I area of the Chassahowitzka NWA are presented in Table 7-1. These results are based on using the ISCST3 model that produces higher pollutant concentrations than those using the CALPUFF model (see Section 6.0). As a result, these analyses provide a conservative evaluation (i.e., higher-than-expected) of the Project's impacts at the PSD Class I area.

Similar to the evaluation performed in Section 7.2, a screening approach was used that compared the maximum ambient concentration of air pollutants of concern due to the Project's emissions at the PSD Class I area of the Chassahowitzka NWA with effect threshold limits for both vegetation and wildlife as reported in the scientific literature. A literature search was

conducted that specifically addressed the effects of air contaminants on plant species reported to occur in the NWA. While the literature search focused on such species as cabbage palm, eastern red cedar, lichens, and species of the hardwood swamplands and mangrove forest, no specific citations that addressed these species were found. It is recognized that effect threshold information is not available for all species found in the Chassahowitzka NWA, although studies have been performed on a few of the common species and on other similar species that can be used as indicators of effects.

7.3.2 IMPACTS TO SOILS

For soils, the potential and hypothesized effects of atmospheric deposition include:

- Increased soil acidification,
- Alteration in cation exchange,
- Loss of base cations, and
- Mobilization of trace metals.

The potential sensitivity of specific soils to atmospheric inputs is related to two factors. First, the physical ability of a soil to conduct water vertically through the soil profile is important in influencing the interaction with deposition. Second, the ability of the soil to resist chemical changes, as measured in terms of pH and soil cation exchange capacity (CEC), is important in determining how a soil responds to atmospheric inputs.

According to the USDA Soil Surveys of Citrus and Hernando Counties, nine soil complexes are found in the Chassahowitzka NWA. These include Aripeka fine sand, Aripeka-Okeelanta-Lauderhill, Hallendale-Rock outcrop, Homosassa mucky fine sandy loam, Lacooche, Okeelanta mucks, Okeelanta-Lauderdale-Terra Ceia mucks, Rock outcrop-Homosassa-Lacoochee, and Weekiwachee-Durbin mucks (Porter, 1996). The majority of the soil complexes found in the NWA are inundated by tidal waters, contain a relatively high organic matter content, and have

high buffering capacities based on their CEC, base saturation, and bulk density. The regular flooding of these soils by the Gulf of Mexico regulates the pH and any change in acidity in the soil would be buffered by this activity. Therefore, they would be relatively insensitive to atmospheric inputs. However, Terra Ceia, Okeelanta, and Lauderdale freshwater mucks are present along the eastern border of the NWA, and may be more sensitive to atmospheric sulfur deposition (Porter, 1996). Although not tidally influenced, these freshwater mucks are highly organic and therefore have a relatively high intrinsic buffering capacity.

The relatively low sensitivity of the soils to atmospheric inputs coupled with the extremely low ground-level concentrations of contaminants projected for the Chassahowitzka NWA from the proposed Project's emissions precludes any significant impact on soils.

7.3.3 IMPACTS TO VEGETATION

In general, the effects of air pollutants on vegetation occur primarily from SO_2, NO_2, O_3, and PM. Effects from minor air contaminants, such as fluoride, chlorine, hydrogen chloride, ethylene, ammonia, hydrogen sulfide, CO, and pesticides, have also been reported in the literature. The effects of air pollutants are dependent both on the concentration of the contaminant and the duration of the exposure. The term "injury," as opposed to damage, is commonly used to describe all plant responses to air contaminants and will be used in the context of this analysis. Air contaminants are thought to interact primarily with plant foliage, which is considered to be the major pathway of exposure. For purposes of this analysis, it was assumed that 100 percent of each air contaminant of concern is accessible to the plants.

Injury to vegetation from exposure to various levels or air contaminants can be termed acute, physiological, or chronic. Acute injury occurs as a result of a short-term exposure to a high contaminant concentration and is typically manifested by visible injury symptoms ranging from chlorosis (discoloration) to necrosis (dead areas). Physiological or latent injury occurs as the

result of a long-term exposure to contaminant concentrations below that which results in acute injury symptoms. Chronic injury results from repeated exposure to low concentrations over extended periods of time, often without any visible symptoms, but with some effect on the overall growth and productivity of the plant. In this assessment, 100 percent of the particular air pollutant in the ambient air was assumed to interact with the vegetation. This is a conservative approach.

The concentrations of the pollutants, duration of exposure and frequency of exposures influence the response of vegetation and wildlife to atmospheric pollutants. The pattern of pollutant exposure expected from the facility is that of a few episodes of relatively high ground-level concentration which occur during certain meteorological conditions interspersed with long periods of extremely low ground-level concentrations. If there are any effects of stack emissions on plants and animals they will be from the short-term, higher doses. A dose is the product of the concentration of the pollutant and duration of the exposure.

7.3.3.1 SO_2

Sulfur is an essential plant nutrient usually taken up as sulfate ions by the roots from the soil solution. When sulfur dioxide in the atmosphere enters the foliage through pores in the leaves, it reacts with water in the leaf interior to form sulfite ions. Sulfite ions are highly toxic. They interact with enzymes, compete with normal metabolites, and interfere with a variety of cellular functions (Horsman and Wellburn, 1976). However, within the leaf, sulfite is oxidized to sulfate ions, which can then be used by the plant as a nutrient. Small amounts of sulfite may be oxidized before they prove harmful.

SO_2 gas at elevated levels has long been known to cause injury to plants. Acute SO_2 injury usually develops within a few hours or days of exposure, and symptoms include marginal, flecked, and/or intercostal necrotic areas that appear water-soaked and dullish green initially.

This injury generally occurs to younger leaves. Chronic injury usually is evident by signs of chlorosis, bronzing, premature senescence, reduced growth, and possible tissue necrosis (EPA, 1982). Background levels of SO_2 in the Chassahowitzka NWA average 1.29 $\mu g/m^3$, with a 24-hour maximum average concentration of 14.5 $\mu g/m^3$. Observed SO_2 effect levels for several plant species and plant sensitivity groupings are presented in Tables 7-2 and 7-3, respectively.

Many studies have been conducted to determine the effects of high-concentration, short-term SO_2 exposure on natural community vegetation. Sensitive plants include ragweed, legumes, blackberry, southern pine, and red and black oak. These species are injured by exposure to 3-hour average SO_2 concentrations of 790 to 1,570 $\mu g/m^3$. Intermediate plants include locust and sweetgum. These species are injured by exposure to 3-hour average SO_2 concentrations of 1,570 to 2,100 $\mu g/m^3$. Resistant species (injured at concentrations above 2,100 $\mu g/m^3$ for 3 hours) include white oak and dogwood (EPA, 1982).

A study of native Floridian species (Woltz and Howe, 1981) demonstrated that cypress, slash pine, live oak, and mangrove exposed to 1,300 $\mu g/m^3$ SO_2 for 8 hours were not visibly damaged. This finding support the levels cited by other researchers on the effects of SO_2 on vegetation. A corroborative study (McLaughlin and Lee, 1974) demonstrated that approximately 20 percent of a cross-section of plants ranging from sensitive to tolerant was visibly injured at 3-hour average SO_2 concentrations of 920 $\mu g/m^3$.

Jack pine seedlings exposed to SO_2 concentrations of 470 to 520 $\mu g/m^3$ for 24 hours demonstrated inhibition of foliar lipid synthesis; however, this inhibition was reversible (Malhotra and Kahn, 1978). Black oak exposed to 1,310 $\mu g/m^3$ SO_2 for 24 hours a day for 1 week demonstrated a 48 percent reduction in photosynthesis (Carlson, 1979).

Two lichen species indigenous to Florida exhibited signs of SO_2 damage in the form of decreased biomass gain and photosynthetic rate as well as membrane leakage when exposed to concentrations of 200 to 400 $\mu g/m^3$ for 6 hours/week for 10 weeks (Hart et al., 1988).

The maximum 24-hour average SO_2 concentration that is predicted for the Project at the Class I area is 0.062 $\mu g/m^3$. When added to the average background concentration of 1.29 $\mu g/m^3$, total SO_2 impact is 1.35 $\mu g/m^3$. When added to the maximum 24-hour average background concentration of 14.5 $\mu g/m^3$ at the NWA, the maximum worst-case total SO_2 concentration is 14.6 $\mu g/m^3$, which is much lower than those known to cause damage to test species. The maximum 24-hour average SO_2 concentrations predicted for the Project at the Class I area are only 4 to 7 percent of those that caused damage to the most sensitive lichens. The modeled annual incremental increase in SO_2 adds slightly to background levels of this gas and poses only a minimal threat to area vegetation.

7.3.3.2 PM_{10}

Although information pertaining to the effects of particulate matter on plants is scarce, some research results are available. In a study conducted by Mandoli and Dubey (1988), ten species of native Indian plants were exposed to levels of particulate matter that ranged from 210 to 366 $\mu g/m^3$ for an 8-hour averaging period. Damage in the form of a higher leaf area/dry weight ratio was observed at varying degrees for most plants tested. Concentrations of particulate matter lower than 163 $\mu g/m^3$ did not appear to be injurious to the tested plants.

By comparison of these published toxicity values for particulate matter exposure with modeled concentrations, the possibility of plant damage in the Chassahowitzka NWA can be determined. The maximum PM_{10} concentrations predicted by the Project in the Class I area are 0.25 and 0.118 $\mu g/m^3$ for 8- and 24-hour averaging times, respectively (see Table 7-1). The 24-hour average background PM_{10} concentration reported for Chassahowitzka NWA is 21.1 $\mu g/m^3$. The 8-hour

average background was estimated by multiplying the 24-hour average concentration by three. This produced a conservative 8-hour average background concentration of 63.3 $\mu g/m^3$. When added to the maximum 8-hour average PM_{10} concentrations of 0.25 $\mu g/m^3$ predicted by the Project in the NWA, the maximum total 8-hour average concentration of 63.6 $\mu g/m^3$ is well below the lower threshold value that reportedly affects plant foliage. As a result, no effects to vegetative AQRVs are expected from the Project's emissions.

7.3.3.3 NO_2

NO_2 can injure plant tissue with symptoms usually appearing as irregular white to brown collapsed lesions between the leaf veins and near the margins. Conversely, non-injurious levels of NO_2 can be absorbed by plants, enzymatically transformed into ammonia, and incorporated into plant constituents such as amino acids (Matsumaru et al., 1979).

Plant damage can occur through either acute (short-term, high concentration) or chronic (long-term, relatively low concentration) exposure. For plants that have been determined to be more sensitive to NO_2 exposure than others, acute (1, 4, 8 hours) exposure caused 5 percent predicted foliar injury at concentrations ranging from 3,800 to 15,000 $\mu g/m^3$ (Heck and Tingey, 1979). Chronic exposure of selected plants (some considered NO_2-sensitive) to NO_2 concentrations of 2,000 to 4,000 $\mu g/m^3$ for 213 to 1,900 hours caused reductions in yield of up to 37 percent and some chlorosis (Zahn, 1975).

The 8-hour average NO_2 concentration for the Project in the Class I area is predicted to be 0.36 $\mu g/m^3$. This concentration is less than 0.01 percent of the levels that cause foliar injury in acute exposure scenarios. By comparison of published toxicity values for NO_2 exposure to long-term (annual averaging time) modeled concentrations, the possibility of plant damage in the Class I areas can be examined for chronic exposure situations. For a chronic exposure, the maximum annual average NO_2 concentration due to the Project in the Class I area is

0.0079 $\mu g/m^3$. This value is less than 0.001 percent of the levels that caused minimal yield loss and chlorosis in plant tissue. Average and maximum background 24-hour average concentrations of NO_2 reported in the Chassahowitzka NWA are 0.006 and 0.104 $\mu g/m^3$, respectively.

Although it has been shown that simultaneous exposure to SO_2 and NO_2 results in synergistic plant injury (Ashenden and Williams, 1980), the magnitude of this response is generally only 3 to 4 times greater than either gas alone and usually occurs at unnaturally high levels of each gas. Therefore, the concentrations within the wilderness areas are still far below the levels that potentially cause plant injury for either acute or chronic exposure.

7.3.3.4 CO

As with PM, information pertaining to the effects of CO on plants is scarce. The main effect of high concentrations of CO is the inhibition of cytochrome *c* oxidase, the terminal oxidase in the mitochondrial electron transfer chain. Inhibition of cytochrome *c* oxidase depletes the supply of ATP, the principal donor of free energy required for cell functions. However, this inhibition only occurs at extremely high concentrations of CO. Pollok et al. (1989) reported that acute exposure to $CO:O_2$ ratio of 25 (equivalent to an ambient CO concentration of 6.85×10^6 $\mu g/m^3$) resulted in stomatal closure in the leaves of the sunflower (*Helianthus annuus*). Naik et al. (1992) reported cytochrome *c* oxidase inhibition in corn, sorghum, millet, and Guinea grass at $CO:O_2$ ratios of 2.5 (equivalent to an ambient CO concentration of 6.85×10^5 $\mu g/m^3$). These plants were considered the species most sensitive to CO-induced inhibition of cytochrome *c* oxidase.

By comparison of published effect values for CO exposure, the possibility of plant damage in the Class I areas can be determined. The maximum 1-hour average concentration due to the Project in the Class I area is 6.6 $\mu g/m^3$, which is 0.001 percent of the minimum value that caused inhibition in laboratory studies.

7.3.3.5 Sulfuric Acid Mist

Acidic precipitation or acid rain is coupled to SO_2 emissions mainly formed during the burning of fossil fuels. This pollutant is oxidized in the atmosphere and dissolves in rain forming sulfuric acid mist which falls as acidic precipitation (Ravera, 1989). Although concentration data are not available, sulfuric acid mist has been reported to yield necrotic spotting on the upper surfaces of leaves (Middleton et al, 1950).

No significant adverse effects on vegetation are expected from the Project's emissions because SO_2 concentrations, which lead directly to the formation of sulfuric acid mist concentrations, are predicted to be well below levels which have been documented as negatively affecting vegetation. During the last decade, much attention has been focused on acid rain. Acidic deposition is an ecosystem-level problem that affects vegetation because of some alterations of soil conditions such as increased leaching of essential base cations or elevated concentrations of aluminum in the soil water (Goldstein et al. 1985). Although effects of acid rain in eastern North America have been well published and publicized, detrimental effects of acid rain on Florida vegetation are lacking documentation.

7.3.3.6 Summary

In summary, the phytotoxic effects from the Osprey Energy Center's emissions are minimal. It is important to note that the elements were conservatively modeled with the assumption that 100 percent was available for plant uptake. This is rarely the case in a natural ecosystem.

7.3.4 IMPACTS TO WILDLIFE

The major air quality risk to wildlife in the United States is from continuous exposure to pollutants above the National AAQS. This occurs in non-attainment areas, e.g., Los Angeles Basin. Risks to wildlife also may occur for wildlife living in the vicinity of an emission source that experiences frequent upsets or episodic conditions resulting from malfunctioning

equipment, unique meteorological conditions, or startup operations (Newman and Schreiber, 1988). Under these conditions, chronic effects (e.g., particulate contamination) and acute effects (e.g., injury to health) have been observed (Newman, 1981).

A wide range of physiological and ecological effects to fauna has been reported for gaseous and particulate pollutants (Newman, 1981; Newman and Schreiber, 1988). The most severe of these effects have been observed at concentrations above the secondary ambient air quality standards. Physiological and behavioral effects have been observed in experimental animals at or below these standards. For impacts on wildlife, the lowest threshold values of SO_2, NO_2, and particulates which are reported to cause physiological changes are shown in Table 7-4. These values are up to orders of magnitude larger than maximum concentrations predicted for the Osprey Energy Center for the Class I area. No effects on wildlife AQRVs from SO_2, NO_2, and particulates are expected. The proposed Project's contribution to cumulative impacts is negligible.

7.3.5 IMPACTS UPON VISIBILITY

7.3.5.1 General

Visibility is an AQRV for the Chassahowitzka NWA. Visibility can take the form of plume blight for nearby areas, or regional haze for long distances (e.g., distances beyond 50 km). Because the Chassahowitzka NWA lies more than 50 km from the Osprey Energy Center, the change in visibility is analyzed as regional haze. Current regional haze guidelines characterize a change in visibility by either of the following methods:

1. Change in the visual range, defined as the greatest distance that a large dark object can be seen, or
2. Change in the light-extinction coefficient (b_{ext}).

The b_{ext} is the attenuation of light per unit distance due to the scattering and absorption by gases and particles in the atmosphere. A change in the extinction coefficient produces a perceived visual change that is measured by a visibility index called the deciview. The deciview (dv) is defined as:

$$dv = 10 \ln (1 + b_{exts} / b_{extb})$$

where: b_{exts} is the extinction coefficient calculated for the source, and

b_{extb} is the background extinction coefficient

A similar index that simply quantifies the percent change in visibility due to the operation of a source is calculated as:

$$\Delta\% = (b_{exts} / b_{extb}) \times 100$$

7.3.5.2 IWAQM Recommendations

The CALPUFF air modeling analysis followed the recommendations contained in the IWAQM Phase 2 Summary Report (EPA, 1998). A detailed description of the methods and assumptions used in this is presented in Appendix D. Air quality impacts for the refined analyses were calculated as follows:

1. Obtain maximum 24-hour sulfate (SO_4) and nitrate (NO_3) impacts, in units of micrograms per cubic meter ($\mu g/m^3$).

2. Convert the SO_4 impact to ammonium sulfate $(NH_4)_2SO_4$ by the following formula:
   $(NH_4)_2SO_4$ ($\mu g/m^3$) = SO_4 ($\mu g/m^3$) x molecular weight $(NH_4)_2SO_4$ / molecular weight SO_4
   $(NH_4)_2SO_4$ ($\mu g/m^3$) = SO_4 ($\mu g/m^3$) x 132/96
   = SO_4 ($\mu g/m^3$) x 1.375

3. Convert the NO_3 impact to ammonium nitrate (NH_4NO_3) by the following formula:
   NH_4NO_3 (µg/m3) = NO3 ($\mu g/m^3$) x molecular weight NH_4NO_3 /molecular weight NO_3
   NH_4NO_3 ($\mu g/m^3$) = NO_3 ($\mu g/m^3$) x 80/62
   = NO_3 ($\mu g/m^3$) x 1.29

4. Compute b_{exts} (extinction coefficient calculated for the source) with the following formula:

$$b_{exts} = 3 \times NH_4NO_3 \times f(RH) + 3 \times (NH_4)_2SO_4 \times f(RH) + 3 \times PM_{10}$$

5. Compute b_{extb} (background extinction coefficient) using the background visual range (km) from the FLM with the following formula:

$$b_{extb} = 3.912 / \text{Visual range (km)}$$

6. Compute the change in extinction coefficients:

In terms of deciviews:

$$dv = 10 \ln (1 + b_{exts} / b_{extb})$$

In terms of percent change of visibility:

$$\Delta\% = (b_{exts} / b_{extb}) \times 100$$

Based on the predicted SO_4, NO_3, and PM_{10} concentrations, the Project's emissions are compared to a 5 percent change in light extinction of the background levels. This is equivalent to a change in deciview of 0.5.

7.3.5.3 Background Visual Ranges And Relative Humidity Factors

The background visual range is based on data representative of the top 20-percentile of visual range data measured at Chassahowitzka NWA. The background visual range for the Chassahowitzka NWA is 65 km and was provided by the FLM. The average relative humidity factor for each day during which the highest concentrations were predicted was computed by averaging the hourly relative humidity factor based on the hourly relative humidity for the 24-hour period. This factor was estimated by using data presented in the Federal Land Managers' Air Quality Related Values Workgroup (FLAG), Draft Phase I Report (October 1999).

7.3.5.4 Regional Haze Analysis

The results of the Phase 2 refined analysis for regional haze are summarized in Tables 7-5 through 7-7. As shown in Table 7-5, the maximum pollutant impacts were predicted to occur on August 16, 1990 (Julian Day 228) for SO_4, July 4, 1990 (Julian Day 185) for NO_3, and December 22, 1990 (Julian Day 356) for PM_{10}. The calculated average relative humidity factors for these

days are presented in Table 7-6. The maximum changes in visibility due to the Project for these days are summarized in Table 7-7. As shown in Table 7-7, the maximum change in visibility on July 4 is estimated to be 0.47 percent or 0.047 deciviews. This impact is below the FLM's screening criteria of 5 percent or 0.5 deciview change. As a result, this indicates that the Osprey Energy Center would not have an adverse impact on the existing regional haze at the PSD Class I area of the Chassahowitzka NWA.

Table 7-1. Maximum Pollutant Concentrations Due to the Osprey Energy Center Predicted at the PSD Class I Aarea of the Chassahowitzka National Wilderness Area

Pollutant	Maximum Concentration [a] ($\mu g/m^3$)				
	Annual	24-Hour	8-Hour	3-Hour	1-Hour
Sulfur Dioxide (SO_2)	0.0030	0.062	0.13	0.25	0.41
Nitrogen Dioxide (NO_2)	0.0079	0.165	0.36	0.66	1.09
Particulates (PM_{10})	0.0057	0.118	0.25	0.47	0.78
Carbon Monoxide (CO)	0.042	0.90	2.0	4.0	6.6

[a] Based on maximum concentrations using the ISCST3 model with 5 years of hourly surface and upper air data from the National Weather Service stations in Tampa and Ruskin, respectively. These are conservative estimates of air quality impacts from the Project since maximum concentrations with the CALPUFF model are predicted to be lower than those predicted with the ISCST3 model.

Table 7-2. SO_2 Effects Levels for Various Plant Species

Plant Species	Observed Effect Level ($\mu g/m^3$)	Exposure (Time)	Reference
Sensitive to tolerant	920 (20 percent displayed visible injury)	3 hours	McLaughlin and Lee, 1974
Lichens	200-400	6 hr/wk for 10 weeks	Hart *et al.*, 1988
Cypress, slash pine, live oak, mangrove	1,300	8 hours	Woltz and Howe, 1981
Jack pine seedlings	470-520	24 hours	Malhotra and Kahn, 1978
Black oak	1,310	Continuously for 1 week	Carlson, 1979

Table 7-3. Sensitivity Groupings of Vegetation Based on Visible Injury at Different SO_2 Exposures[a]

Sensitivity Grouping	SO_2 Concentration		Plants
	1-Hour	3-Hour	
Sensitive	1,310 - 2,620 $\mu G/m^3$ (0.5 - 1.0 ppm)	790 - 1,570 $\mu G/m^3$ (0.3 - 0.6 ppm)	Ragweeds Legumes Blackberry Southern pines Red and black oaks White ash Sumacs
Intermediate	2,620 - 5,240 $\mu G/m^3$ (1.0 - 2.0 ppm)	1,570 - 2,100 $\mu G/m^3$ (0.6 - 0.8 ppm)	Maples Locust Sweetgum Cherry Elms Tuliptree Many crop and garden species
Resistant	>5,240 $\mu G/m^3$ (>2.0 ppm)	>2,100 $\mu G/m^3$ (>0.8 ppm)	White oaks Potato Upland cotton Corn Dogwood Peach

[a] Based on observations over a 20-year period of visible injury occurring on over 120 species growing in the vicinities of coal-fired power plants in the southeastern United States.

Source: EPA, 1982a.

Table 7-4. Examples of Reported Effects of Air Pollutants at Concentrations Below National Secondary Ambient Air Quality Standards

Pollutant	Reported Effect	Concentration ($\mu g/m^3$)	Exposure
Sulfur Dioxide[a]	Respiratory stress in guinea pigs	427 to 854	1 hour
	Respiratory stress in rats	267	7 hours/day; 5 day/week for 10 weeks
	Decreased abundance in deer mice	13 to 157	continually for 5 months
Nitrogen Dioxide[b,c]	Respiratory stress in mice	1,917	3 hours
	Respiratory stress in guinea pigs	96 to 958	8 hours/day for 122 days
Particulates[a]	Respiratory stress, reduced respiratory disease defenses	120 PbO_3	continually for 2 months
	Decreased respiratory disease defenses in rats, same with hamsters	100 $NiCl_2$	2 hours

Source: [a]Newman and Schreiber, 1988.
[b]Gardner and Graham, 1976.
[c]Trzeciak et al., 1977.

Table 7-5. Maximum Species Concentrations for the Osprey Energy Center at the PSD Class I Area of the Chassahowitzka NWA

Species Predicted	Maximum Concentration[a] (ug/m^3)	Date	UTM Receptor Location	
			Easting (km)	Northing (km)
SO_4	0.0039	August 16, 1990	342.4	3180.6
NO_3	0.0091	July 4, 1990	341.1	3183.4
PM_{10}	0.052	December 22, 1990	340.3	3167.0

[a] Predicted with CALPUFF model in the refined mode.

Table 7-6. Computed Daily Average RH Factors for Days of Maximum Impacts Predicted for the Osprey Energy Center at the PSD Class I Area

Hour Ending	July 4 (185)[a]		August 16 (228)[a]		December 22 (356)[a]	
	RH(%)	f(RH)	RH(%)	f(RH)	RH(%)	f(RH)
1	90	4.7	82	3.0	90	4.7
2	82	3.0	88	4.0	90	4.7
3	85	3.4	91	5.3	93	7.0
4	87	3.8	88	4.0	93	7.0
5	90	4.7	88	4.0	93	7.0
6	87	3.8	85	3.4	97	15.1
7	93	7.0	88	4.0	97	15.1
8	85	3.4	91	5.3	93	7.0
9	74	2.1	77	2.4	97	15.1
10	69	1.9	75	2.2	87	3.8
11	67	1.7	68	1.8	76	2.3
12	61	1.5	60	1.4	71	2.0
13	55	1.3	59	1.4	60	1.4
14	52	1.3	58	1.4	56	1.3
15	42	1.1	54	1.3	51	1.2
16	46	1.2	52	1.3	51	1.2
17	52	1.3	56	1.3	53	1.3
18	61	1.5	61	1.5	56	1.3
19	67	1.7	56	1.3	64	1.6
20	72	2.0	63	1.5	74	2.1
21	72	2.0	70	1.9	82	3.0
22	74	2.1	74	2.1	82	3.0
23	79	2.6	82	3.0	71	2.0
24	82	3.0	88	4.0	76	2.3
Average		2.59		2.62		4.69

Note: RH= relative humidity; f(RH)= relative humidity factor

[a] Hourly relative humidity data for 1990 from the National Weather Service station in Tampa, Florida. Julian Day in parenetheses.

Table 7-7. Summary of the Refined Regional Haze Results for the Ospray Energy Center Predicted at the PSD Class I Area of the Chassahowitzka NWA

Parameter	Units	Days (Julian Day) of Maximum Concentrations Predicted for the Project		
		July 4 (185)	August 16 (228)	December 22 (356)
Maximum Predicted Concentration	ug/m^3			
SO_4		0.00171	0.003859	0.000755
NO_3		0.00914	0.004531	0.00629
PM_{10}		0.0323	0.0344	0.0519
Computed Concentrations	ug/m^3			
$(NH_4)_2SO_4$		0.00235	0.005306	0.001038
NH_4NO_3		0.0118	0.00584	0.0081
Average Relative Humidity Factor(a)		2.59	2.62	4.69
Background Visual Range(b), Vr		65	65	65
Background Extinction Coeff.(bext)	km^{-1}	0.0602	0.0602	0.0602
Source Extinction Coeff (bexts)	km^{-1}			
$(NH_4)_2SO_4$		0.000018	0.000042	0.0000146
NH_4NO_3		0.000092	0.000046	0.000114
PM_{10}		0.000097	0.000103	0.000156
Total bexts	km^{-1}	0.000207	0.000191	0.000285
Deciview Change		0.034	0.032	0.047
Percent Change (%)		0.34	0.32*	0.47
Allowable Criteria (%)		5.0	5.0	5.0

* Computed from relative humidity data measured in 1990 at the National Weather Service station in Tampa, Florida

[b] Provided by U.S. Fish and Wildlife Service

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APPENDIX A

VENDOR INFORMATION ON "F" CLASS COMBUSTION TURBINE

Table A-1. Design Information and Stack Parameters for the Osprey Energy Center Project
Siemens-Westinghouse 501F, Dry Low NOx Combustor, Natural Gas, 100 % Load including Power Augmentation (PA) and Duct Burner (DB)

Parameter	Ambient/Compressor Inlet Temperature 32 °F Case 9	59 °F Case 6	95 °F Case 3	95 °F Case 2	95 °F Case 1 (PA)	DUCT BURNER (Ambient Temperature) 59 °F Case 6 (DB)	95 °F Case 3 (DB)	95 °F Case 2 (DB)	95 °F Case 1 (DB&PA)
Combustion Turbine Performance									
Evaporative cooler status/ efficiency (%)	Off	Off	Off	95	95	Off	Off	95	95
Ambient Relative Humidity (%)	60	60	60	60	60	60	60	60	60
Gross power output (MW)	194.80	181.01	159.47	166.93	183.81	181.01	159.47	166.93	183.81
Gross heat rate (Btu/kWh, LHV)	9,100	9,225	9,510	9,420	9,115	9,225	9,510	9,420	9,115
(Btu/kWh, HHV)	10,100	10,240	10,560	10,455	10,120	10,240	10,560	10,455	10,120
Heat Input (MMBtu/hr, LHV)- calculated	1,773	1,670	1,517	1,572	1,675	1,670	1,517	1,572	1,675
- provided	1,772	1,669	1,517	1,572	1,675	1,669	1,517	1,572	1,675
(MMBtu/hr, HHV) - provided	1,968	1,853	1,684	1,746	1,860	1,853	1,684	1,746	1,860
(HHV/LHV)	1.111	1.110	1.110	1.111	1.110	1.110	1.110	1.111	1.110
Fuel heating value (Btu/lb, LHV)	20,981	20,981	20,981	20,981	20,981	20,981	20,981	20,981	20,981
(Btu/lb, HHV)	23,299	23,299	23,299	23,299	23,299	23,299	23,299	23,299	23,299
(HHV/LHV)	1.110	1.110	1.110	1.110	1.110	1.110	1.110	1.110	1.110
CT Exhaust Flow									
Mass Flow (lb/hr)	3,789,290	3,609,116	3,287,849	3,373,756	3,487,474	3,619,280	3,298,013	3,383,920	3,497,637
Temperature (°F)	1,088	1,102	1,133	1,126	1,125	1,102	1,133	1,126	1,125
Moisture (% Vol.)	7.92	8.44	10.62	11.08	15.81	9.40	11.65	12.08	16.73
Oxygen (% Vol.)	12.53	12.51	12.13	11.97	10.90	11.45	10.97	10.85	9.85
Molecular Weight - calculated	28.44	28.38	28.14	28.09	27.57	28.32	28.07	28.02	27.52
- provided	28.44	28.38	28.13	28.09	27.57	NA	NA	NA	NA
Volume Flow (acfm)= [(Mass Flow (lb/hr) x 1,545 x (Temp. (°F)+ 460°F)] / [Molecular weight x 2116.8] / 60 min/hr									
Mass flow (lb/hr)	3,789,290	3,609,116	3,287,849	3,373,756	3,487,474	3,619,280	3,298,013	3,383,920	3,497,637
Temperature (°F)	1,088	1,102	1,133	1,126	1,125	1,102	1,133	1,126	1,125
Molecular weight	28.44	28.38	28.14	28.09	27.57	28.32	28.07	28.02	27.52
Volume flow (acfm)- calculated	2,509,194	2,417,049	2,264,224	2,317,426	2,438,907	2,429,103	2,276,513	2,329,668	2,451,140
- provided									
Fuel Usage									
Fuel usage (lb/hr)= Heat Input (MMBtu/hr) x 1,000,000 Btu/MMBtu /(Fuel Heat Content, Btu/lb (LHV))									
Heat input (MMBtu/hr, LHV)	1,772	1,669	1,517	1,572	1,675	1,669	1,517	1,572	1,675
Heat content (Btu/lb, LHV)	20,981	20,981	20,981	20,981	20,981	20,981	20,981	20,981	20,981
Fuel usage (lb/hr)- calculated	84,456	79,547	72,302	74,924	79,833	79,547	72,302	74,924	79,833
- provided	84,460	79,550	72,280	74,930	79,830	79,500	72,280	74,930	79,830
Heat content (Btu/cf, LHV)- assumed	920	920	920	920	920	920	920	920	920
Fuel density (lb/ft³)	0.0438	0.0438	0.0438	0.0438	0.0438	0.0438	0.0438	0.0438	0.0438
Fuel usage (cf/hr)- calculated	1,926,087	1,814,130	1,648,913	1,708,696	1,820,652	1,814,130	1,648,913	1,708,696	1,820,652
Fuel Usage - Duct Burner Only									
Heat input (MMBtu/hr, HHV)	0	0	0	0	0	278	278	278	278
(MMBtu/hr, LHV)	0	0	0	0	0	250	250	250	250
Fuel usage (lb/hr)- calculated	0	0	0	0	0	11,915	11,915	11,915	11,915
Fuel usage (cf/hr)- calculated	0	0	0	0	0	271,739	271,739	271,739	271,739
Stack and Exit Gas Conditions- HRSG									
Stack height (ft)	135	135	135	135	135	135	135	135	135
Diameter (ft)	19.0	19.0	19.0	19.0	19.0	19	19	19	19
Temperature (°F)	200	200	200	200	200	200	200	200	200
HRSG- Volume flow (acfm)= CT Volume flow (acfm) x [(HRSG Temp. (°F) + 460 K) / (CT Temp. (°F) + 460)]									
CT Volume flow (acfm)	2,509,194	2,417,049	2,264,224	2,317,426	2,438,907	2,429,103	2,276,513	2,329,668	2,451,140
CT Temperature (°F)	1,088	1,102	1,133	1,126	1,125	1,102	1,133	1,126	1,125
HRSG Temperature (°F)	200	200	200	200	200	200	200	200	200
HRSG Volume flow (acfm)	1,069,704	1,021,086	938,198	964,348	1,015,417	1,026,178	943,290	969,442	1,020,510
Velocity (ft/sec)= Volume flow (acfm) / [((diameter)² /4) x 3.14159] / 60 sec/min									
Volume flow (acfm)	1,069,704	1,021,086	938,198	964,348	1,015,417	1,026,178	943,290	969,442	1,020,510
Diameter (ft)	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
Velocity (ft/sec)- calculated	62.9	60.0	55.2	56.7	59.7	60.3	55.4	57.0	60.0
Velocity (m/sec)- calculated	19.17	18.29	16.81	17.28	18.19	18.39	16.90	17.37	18.28

Source: Siemens-Westinghouse, 1999 (CTT-1939, Revision 0, 10/19/99).

Note: Universal gas constant = 1,545 ft-lb(force)/°R; atmospheric pressure = 2,116.8 lb(force)/ft²

Table A-2. Maximum Emissions for Criteria and Other Regulated Pollutants for the Osprey Energy Center Project
Siemens-Westinghouse 501F, Dry Low NOx Combustor, Natural Gas, 100 % Load including Power Augmentation (PA) and Duct Burner (DB)

Parameter	Ambient/Compressor Inlet Temperature					DUCT BURNER (Ambient Temperature)			
	32 °F	59 °F	95 °F	95 °F	95 °F	59 °F	95 °F	95 °F	95 °F
	Case 9	Case 6	Case 3	Case 2	Case 1 (PA)	Case 6 (DB)	Case 3 (DB)	Case 2 (DB)	Case 1 (DB&PA)
Temperature (°F)	1,088	1,102	1,133	1,126	1,125	1,102	1,133	1,126	1,125
Emission rate (lb/hr)- calculated from given ppmvd	42.4	40.0	36.3	37.7	100.4	70.0	66.3	67.7	130.4
(lb/hr)- provided	45.0	43.0	39.0	40.0	106.0	73.0	69.0	70.0	136.0
(TPY)	197.1	188.3	170.8	175.2	464.3	306.5	290.6	296.4	571.2
[Ratio lb/hr provided/calculated]	1.060	1.076	1.073	1.062	1.056	1.043	1.040	1.034	1.043
VOCs (lb/hr)= VOC(ppm) x [1 - Moisture(%)/ 100] x 2116.8 lb/ft2 x Volume flow (acfm) x 16 (mole. wgt as methane) x 60 min/hr / [1545 x (CT temp.(°F) + 460°F) x 1,000,000 (adj. for ppm)]									
Basis, ppmvd (as CH_4)- calculated	2.8	2.8	2.8	2.8	3.0	6.1	6.6	6.5	6.7
Basis, ppmvd @ 15% O2- calculated	2.3	2.3	2.3	2.3	2.3	4.4	4.6	4.5	4.4
- provided (a) (e)	2.3	2.3	2.3	2.3	2.3	-	-	-	-
Moisture (%)	7.92	8.44	10.62	11.08	15.81	9.40	11.65	12.08	16.73
Oxygen (%)	12.53	12.51	12.13	11.97	10.90	11.45	10.97	10.85	9.85
Volume Flow (acfm)	2,509,194	2,417,049	2,264,224	2,317,426	2,438,907	2,429,103	2,276,513	2,329,668	2,451,140
Temperature (°F)	1,088	1,102	1,133	1,126	1,125	1,102	1,133	1,126	1,125
Emission rate (lb/hr)- calculated	5.5	5.1	4.7	4.8	5.2	11.4	10.9	11.1	11.4
(lb/hr)- provided	5.8	5.4	4.9	5.1	5.5	11.7	11.2	11.4	11.7
(TPY)	25.2	23.8	21.6	22.4	23.9	49.9	47.8	48.6	50.0
[Ratio lb/hr provided/calculated]	1.056	1.056	1.056	1.056	1.056	1.025	1.024	1.024	1.025
Lead (lb/hr)= NA									
Emission Rate Basis	NA	NA	NA	NA	NA	NA	NA	NA	NA
Emission rate (lb/hr)	NA	NA	NA	NA	NA	NA	NA	NA	NA
(TPY)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu									
Basis, lb/10^{12} Btu (c)	8.00E-04	8.00E-04	8.00E-04	8.00E-04	8.00E-04	8.00E-04	8.00E-04	8.00E-04	8.00E-04
Heat Input Rate (MMBtu/hr), HHV- CT	1,968	1,853	1,684	1,746	1,860	1,853	1,684	1,746	1,860
- Duct Burner	0	0	0	0	0	250	250	250	250
Total	1,968	1,853	1,684	1,746	1,860	2,103	1,934	1,996	2,110
Emission Rate (lb/hr)	1.57E-06	1.48E-06	1.35E-06	1.40E-06	1.49E-06	1.68E-06	1.55E-06	1.60E-06	1.69E-06
(TPY)	6.90E-06	6.49E-06	5.90E-06	6.12E-06	6.52E-06	7.37E-06	6.78E-06	6.99E-06	7.39E-06
Sulfuric Acid Mist = SO2 emission rate (lb/hr) x conversion rate of SO2 to H_2SO_4 (%) x MW H_2SO_4 /MW SO_2 (98/64)									
SO2 emission rate (lb/hr)	11.0	10.4	9.4	9.8	10.4	11.8	10.8	11.2	11.8
lb H_2SO_4 /lb SO_2 (98/64)	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53
Conversion to H_2SO_4 (%) (b)	10	10	10	10	10	10	10	10	10
Emission Rate (lb/hr)	1.69	1.59	1.44	1.50	1.59	1.80	1.66	1.71	1.81
(TPY)	7.38	6.95	6.32	6.55	6.98	7.89	7.26	7.49	7.92

Source: (a) Siemens-Westinghouse 1999.
(b) Golder Associates Inc. 1999 .
(c) Electric Power Research Institute (EPRI), Electric Utility Trace Substances Report, 1994 (Table B-12) .
(d) For NOx emissions, data originally provided at 25 ppmvd at 15% oxygen.
(e) For VOC emissions, data originally provided at 1.5 ppmvd at 15% oxygen.

Note: ppmvd= parts per million, volume dry; O2= oxygen.

Table A-2. Maximum Emissions for Criteria and Other Regulated Pollutants for the Osprey Energy Center Project
Siemens-Westinghouse 501F, Dry Low NOx Combustor, Natural Gas, 100 % Load including Power Augmentation (PA) and Duct Burner (DB)

Parameter	Ambient/Compressor Inlet Temperature 32 °F Case 9	59 °F Case 6	95 °F Case 3	95 °F Case 2	95 °F Case 1 (PA)	DUCT BURNER (Ambient Temperature) 59 °F Case 6 (DB)	95 °F Case 3 (DB)	95 °F Case 2 (DB)	95 °F Case 1 (DB&PA)
Hours of Operation	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760
Particulate from CT and SCR									
Particulate from CT= Emission rate (lb/hr) from CT manufacturer (front- and back-half)									
Basis, lb/hr - provided (a)	16.6	15.8	14.1	14.4	14.4	17.8	16.1	16.4	16.4
Particulate from SCR= Sulfur trioxide (formed from conversion of SO_2) converts to ammonium sulfate (=PM10)									
Particulate from conversion of SO_2= SO_2 emissions (lb/hr) x Conversion SO_2 to SO_3 x lb SO_3/lb SO_2 x Conversion of SO_3 x lb SO_3 to $(NH_4)_2SO_4$ x $(NH_4)_2SO_4$/ lb SO_3									
SO_2 emission rate (lb/hr)- calculated	11.0	10.4	9.4	9.8	10.4	11.8	10.8	11.2	11.8
Conversion (%) from SO_2 to SO_3	25	25	25	25	25	25	25	25	25
MW SO_3/ SO_2 (80/64)	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Conversion (%) from SO_3 to $(NH_4)_2(SO_4)$	100	100	100	100	100	100	100	100	100
MW $(NH_4)_2SO_4$/ SO_3 (132/80)	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
Particulate (lb/hr)- calculated	5.68	5.35	4.86	5.03	5.36	6.07	5.58	5.76	6.09
Particulate (lb/hr) from CT + SCR	22.3	21.1	19.0	19.5	19.8	23.8	21.7	22.2	22.5
(TPY)	97.6	92.4	83.2	85.3	86.6	104.3	95.1	97.3	98.5
Sulfur Dioxide (lb/hr)= Natural gas (cf/hr) x sulfur content(gr/100 cf) x 1 lb/7000 gr x (lb SO_2/lb S) /100									
Fuel use (cf/hr)	1,926,087	1,814,130	1,648,913	1,708,696	1,820,652	2,058,841	1,893,624	1,953,406	2,065,363
Sulfur content (grains/ 100 cf) - assumed (b)	2	2	2	2	2	2	2	2	2
lb SO_2/lb S (64/32)	2	2	2	2	2	2	2	2	2
Emission rate (lb/hr)- calculated	11.0	10.4	9.4	9.8	10.4	11.8	10.8	11.2	11.8
(lb/hr)- provided (0.2 gr/100 cf) (not used)	1.2	1.1	1.0	1.1	1.1	1.1	1.0	1.1	1.1
(TPY)	48.2	45.4	41.3	42.8	45.6	51.5	47.4	48.9	51.7
Nitrogen Oxides (lb/hr)= NOx(ppm) x {[20.9 x (1 - Moisture(%)/100)] - Oxygen(%)} x 2116.8 x Volume flow (acfm) x 46 (mole. wgt NOx) x 60 min/hr / [1545 x (CT temp.(°F) + 460°F) x 5.9 x 1,000,000 (adj. for ppm)]									
Basis, ppmvd @15% O_2 (a) (d)	4	4	4	4	4	4	4	4	4
Moisture (%)	7.92	8.44	10.62	11.08	15.81	9.40	11.65	12.08	16.73
Oxygen (%)	12.53	12.51	12.13	11.97	10.90	11.45	10.97	10.85	9.85
Volume Flow (acfm)	2,509,194	2,417,049	2,264,224	2,317,426	2,438,907	2,429,103	2,276,513	2,329,668	2,451,140
Temperature (°F)	1,088	1,102	1,133	1,126	1,125	1,102	1,133	1,126	1,125
Emission rate (lb/hr)- calculated	27.9	26.3	23.9	24.8	26.4	29.8	27.4	28.3	30.0
(lb/hr)- provided	29.5	27.7	25.2	26.1	27.9	31.3	28.8	29.7	31.4
(TPY)	129.0	121.5	110.5	114.5	122.1	130.7	120.2	124.1	131.2
[Ratio lb/hr provided/calculated]	1.056	1.056	1.056	1.056	1.056	1.049	1.049	1.049	1.049
Carbon Monoxide (lb/hr)= CO(ppm) x {[20.9 x (1 - Moisture(%)/100)] - Oxygen(%)} x 2116.8 lb/ft2 x Volume flow (acfm) x 28 (mole. wgt CO) x 60 min/hr / [1545 x (CT temp.(°F) + 460°F) x 1,000,000 (adj. for ppm)]									
Basis, ppmvd- calculated	12.4	12.3	12.4	12.6	42	21.6	22.8	22.8	44.0
Basis, ppmvd @ 15% O2- calculated	10	10	10	10	31	15	16	16	29
- provided (a)	10	10	10	10	25	-	-	-	-
Moisture (%)	7.92	8.44	10.62	11.08	15.81	9.40	11.65	12.08	16.73
Oxygen (%)	12.53	12.51	12.13	11.97	10.90	11.45	10.97	10.85	9.85
Volume Flow (acfm)	2,509,194	2,417,049	2,264,224	2,317,426	2,438,907	2,429,103	2,276,513	2,329,668	2,451,140

Table A-2. Maximum Emissions for Criteria and Other Regulated Pollutants for the Osprey Energy Center Project
Siemens-Westinghouse 501F, Dry Low NOx Combustor, Natural Gas, 100 % Load Including Power Augmentation (PA) and Duct Burner (DB)

Parameter	Ambient/Compressor Inlet Temperature					DUCT BURNER (Ambient Temperature)			
	32 °F Case 9	59 °F Case 6	95 °F Case 3	95 °F Case 2	95 °F Case 1 (PA)	59 °F Case 6 (DB)	95 °F Case 3 (DB)	95 °F Case 2 (DB)	95 °F Case 1 (DB&PA)
Temperature (°F)	1,088	1,102	1,133	1,126	1,125	1,102	1,133	1,126	1,125
Emission rate (lb/hr)- calculated from given ppmvd	42.4	40.0	36.3	37.7	100.4	70.0	66.3	67.7	130.4
(lb/hr)- provided	45.0	43.0	39.0	40.0	106.0	73.0	69.0	70.0	136.0
(TPY)	197.1	188.3	170.8	175.2	464.3	306.5	290.6	296.4	571.2
[Ratio lb/hr provided/calculated]	1.060	1.076	1.073	1.062	1.056	1.043	1.040	1.034	1.043
VOCs (lb/hr)= VOC(ppm) x [1 - Moisture(%)/ 100] x 2116.8 lb/ft2 x Volume flow (acfm) x 16 (mole. wgt as methane) x 60 min/hr / [1545 x (CT temp.(°F) + 460°F) x 1,000,000 (adj. for ppm)]									
Basis, ppmvd (as CH_4)- calculated	2.8	2.8	2.8	2.8	3.0	6.1	6.6	6.5	6.7
Basis, ppmvd @ 15% O2- calculated	2.3	2.3	2.3	2.3	2.3	4.4	4.6	4.5	4.4
- provided (a) (e)	2.3	2.3	2.3	2.3	2.3	-	-	-	-
Moisture (%)	7.92	8.44	10.62	11.08	15.81	9.40	11.65	12.08	16.73
Oxygen (%)	12.53	12.51	12.13	11.97	10.90	11.45	10.97	10.85	9.85
Volume Flow (acfm)	2,509,194	2,417,049	2,264,224	2,317,426	2,438,907	2,429,103	2,276,513	2,329,668	2,451,140
Temperature (°F)	1,088	1,102	1,133	1,126	1,125	1,102	1,133	1,126	1,125
Emission rate (lb/hr)- calculated	5.5	5.1	4.7	4.8	5.2	11.4	10.9	11.1	11.4
(lb/hr)- provided	5.8	5.4	4.9	5.1	5.5	11.7	11.2	11.4	11.7
(TPY)	25.2	23.8	21.6	22.4	23.9	49.9	47.8	48.6	50.0
[Ratio lb/hr provided/calculated]	1.056	1.056	1.056	1.056	1.056	1.025	1.024	1.024	1.025
Lead (lb/hr)= NA									
Emission Rate Basis	NA	NA	NA	NA	NA	NA	NA	NA	NA
Emission rate (lb/hr)	NA	NA	NA	NA	NA	NA	NA	NA	NA
(TPY)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu									
Basis, lb/10^{12} Btu (c)	8.00E-04	8.00E-04	8.00E-04	8.00E-04	8.00E-04	8.00E-04	8.00E-04	8.00E-04	8.00E-04
Heat Input Rate (MMBtu/hr), HHV- CT	1,968	1,853	1,684	1,746	1,860	1,853	1,684	1,746	1,860
- Duct Burner	0	0	0	0	0	250	250	250	250
Total	1,968	1,853	1,684	1,746	1,860	2,103	1,934	1,996	2,110
Emission Rate (lb/hr)	1.57E-06	1.48E-06	1.35E-06	1.40E-06	1.49E-06	1.68E-06	1.55E-06	1.60E-06	1.69E-06
(TPY)	6.90E-06	6.49E-06	5.90E-06	6.12E-06	6.52E-06	7.37E-06	6.78E-06	6.99E-06	7.39E-06
Sulfuric Acid Mist = SO2 emission rate (lb/hr) x conversion rate of SO2 to H_2SO_4 (%) x MW H_2SO_4 /MW SO_2 (98/64)									
SO2 emission rate (lb/hr)	11.0	10.4	9.4	9.8	10.4	11.8	10.8	11.2	11.8
lb H_2SO_4 /lb SO_2 (98/64)	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53
Conversion to H_2SO_4 (%) (b)	10	10	10	10	10	10	10	10	10
Emission Rate (lb/hr)	1.69	1.59	1.44	1.50	1.59	1.80	1.66	1.71	1.81
(TPY)	7.38	6.95	6.32	6.55	6.98	7.89	7.26	7.49	7.92

Source: (a) Siemens-Westinghouse 1999.
(b) Golder Associates Inc. 1999 .
(c) Electric Power Research Institute (EPRI), Electric Utility Trace Substances Report, 1994 (Table B-12) .
(d) For NOx emissions, data originally provided at 25 ppmvd at 15% oxygen.
(e) For VOC emissions, data originally provided at 1.5 ppmvd at 15% oxygen.

Note: ppmvd = parts per million, volume dry; O2= oxygen.

Table A-3. Maximum Emissions for Other Regulated PSD Pollutants for the Osprey Energy Center Project
Siemens-Westinghouse 501F, Dry Low NOx Combustor, Natural Gas, 100 % Load including Power Augmentation (PA) and Duct Burner (DB)

Parameter	Ambient/Compressor Inlet Temperature					DUCT BURNER (Ambient Temperature)			
	32 °F Case 9	59 °F Case 6	95 °F Case 3	95 °F Case 2	95 °F Case 1 (PA)	59 °F Case 6 (DB)	95 °F Case 3 (DB)	95 °F Case 2 (DB)	95 °F Case 1 (DB&PA)
Hours of Operation	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760
Heat Input Rate (MMBtu/hr), HHV- CT	1,968	1,853	1,684	1,746	1,860	1,853	1,684	1,746	1,860
Duct burner	0	0	0	0	0	278	278	278	278
Total	1,968	1,853	1,684	1,746	1,860	2,131	1,962	2,024	2,138
2,3,7,8 TCDD Equivalents (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu									
Basis, lb/10^{12} Btu	1.20E-06	1.20E-06	1.20E-06	1.20E-06	1.20E-06	1.20E-06	1.20E-06	1.20E-06	1.20E-06
Heat Input Rate (MMBtu/hr)	1,968	1,853	1,684	1,746	1,860	2,131	1,962	2,024	2,138
Emission Rate (lb/hr)	2.36E-09	2.22E-09	2.02E-09	2.10E-09	2.23E-09	2.56E-09	2.35E-09	2.43E-09	2.57E-09
(TPY)	1.03E-08	9.74E-09	8.85E-09	9.18E-09	9.78E-09	1.12E-08	1.03E-08	1.06E-08	1.12E-08
Beryllium (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu									
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,968	1,853	1,684	1,746	1,860	2,131	1,962	2,024	2,138
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoride (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu									
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,968	1,853	1,684	1,746	1,860	2,131	1,962	2,024	2,138
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Source: Electric Power Research Institute (EPRI), Electric Utility Trace Substances Report, 1994 (Table B-12) .
Emission factors for metals are questionable and not used .

Note: No emission factors for hydrogen chloride (HCl) from natural gas-firing.

Table A-4. Maximum Emissions for Hazardous Air Pollutants for the Osprey Energy Center Project
Siemens-Westinghouse 501F, Dry Low NOx Combustor, Natural Gas, 100 % Load including Power Augmentation (PA) and Duct Burner (DB)

Parameter	Ambient/Compressor Inlet Temperature 32 °F Case 9	59 °F Case 6	95 °F Case 3		95 °F Case 1 (PA)	DUCT BURNER (Ambient Temperature) 59 °F Case 6 (DB)	95 °F Case 3 (DB)	95 °F Case 2 (DB)	95 °F Case 1 (DB&PA)
Hours of Operation	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760
Heat Input Rate (MMBtu/hr), HHV- CT	1,968	1,853	1,684	1,746	1,860	1,853	1,684	1,746	1,860
Duct burner	0	0	0	0	0	278	278	278	278
Total	1,968	1,853	1,684	1,746	1,860	2,131	1,962	2,024	2,138
Antimony (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu									
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,968	1,853	1,684	1,746	1,860	2,131	1,962	2,024	2,138
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzene (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu									
Basis, lb/10^{12} Btu	8.00E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01
Heat Input Rate (MMBtu/hr)	1,968	1,853	1,684	1,746	1,860	2,131	1,962	2,024	2,138
Emission Rate (lb/hr)	1.57E-03	1.48E-03	1.35E-03	1.40E-03	1.49E-03	1.70E-03	1.57E-03	1.62E-03	1.71E-03
(TPY)	6.90E-03	6.49E-03	5.90E-03	6.12E-03	6.52E-03	7.47E-03	6.87E-03	7.09E-03	7.49E-03
Cadmium (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu									
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,968	1,853	1,684	1,746	1,860	2,131	1,962	2,024	2,138
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu									
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,968	1,853	1,684	1,746	1,860	2,131	1,962	2,024	2,138
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Formaldehyde (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu									
Basis, lb/10^{12} Btu	3.40E+01	3.40E+01	3.40E+01	3.40E+01	3.40E+01	3.40E+01	3.40E+01	3.40E+01	3.40E+01
Heat Input Rate (MMBtu/hr)	1,968	1,853	1,684	1,746	1,860	2,131	1,962	2,024	2,138
Emission Rate (lb/hr)	6.69E-02	6.30E-02	5.73E-02	5.94E-02	6.32E-02	7.24E-02	6.67E-02	6.88E-02	7.27E-02
(TPY)	2.93E-01	2.76E-01	2.51E-01	2.60E-01	2.77E-01	3.17E-01	2.92E-01	3.01E-01	3.18E-01
Cobalt (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu									
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,968	1,853	1,684	1,746	1,860	2,131	1,962	2,024	2,138
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu									
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,968	1,853	1,684	1,746	1,860	2,131	1,962	2,024	2,138
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nickel (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu									
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,968	1,853	1,684	1,746	1,860	2,131	1,962	2,024	2,138
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phosphorous (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu									
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,968	1,853	1,684	1,746	1,860	2,131	1,962	2,024	2,138
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu									
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,968	1,853	1,684	1,746	1,860	2,131	1,962	2,024	2,138
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Toluene (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu									
Basis, lb/10^{12} Btu	1.00E+01	1.00E+01	1.00E+01	1.00E+01	1.00E+01	1.00E+01	1.00E+01	1.00E+01	1.00E+01
Heat Input Rate (MMBtu/hr)	1,968	1,853	1,684	1,746	1,860	2,131	1,962	2,024	2,138
Emission Rate (lb/hr)	1.97E-02	1.85E-02	1.68E-02	1.75E-02	1.86E-02	2.13E-02	1.96E-02	2.02E-02	2.14E-02
(TPY)	8.62E-02	8.12E-02	7.38E-02	7.65E-02	8.15E-02	9.33E-02	8.59E-02	8.86E-02	9.36E-02

Source: Electric Power Research Institute (EPRI), Electric Utility Trace Substances Report, 1994 (Table B-12).
Emission factors for metals are questionable and not used.

Table A-5. Design Information and Stack Parameters for the Osprey Energy Center Project
Siemens-Westinghouse 501F, Dry Low NOx Combustor, Natural Gas, 75 % Load

Parameter	Ambient/Compressor Inlet Temperature 32 °F Case 10	59 °F Case 7	95 °F Case 4
Combustion Turbine Performance			
Evaporative cooler status/ efficiency (%)	Off	Off	Off
Ambient Relative Humidity (%)	60	60	60
Gross power output (MW)	145.82	135.46	119.26
Gross heat rate (Btu/kWh, LHV)	9,475	9,670	10,200
(Btu/kWh, HHV)	10,515	10,735	11,325
Heat Input (MMBtu/hr, LHV)- calculated	1,382	1,310	1,216
- provided	1,381	1,310	1,216
(MMBtu/hr, HHV) - provided	1,534	1,454	1,351
(HHV/LHV)	1.110	1.110	1.110
Fuel heating value (Btu/lb, LHV)	20,981	20,981	20,981
(Btu/lb, HHV)	23,299	23,299	23,299
(HHV/LHV)	1.110	1.110	1.110
CT Exhaust Flow			
Mass Flow (lb/hr)	3,308,649	3,183,096	2,998,950
Temperature (°F)	998	1,013	1,045
Moisture (% Vol.)	7.12	7.64	9.76
Oxygen (% Vol.)	13.42	13.41	13.10
Molecular Weight - calculated	28.49	28.43	28.19
- provided	28.49	28.43	28.19
Volume Flow (acfm)= [(Mass Flow (lb/hr) x 1,545 x (Temp. (°F)+ 460°F)] / [Molecular weight x 2116.8] / 60 min/hr			
Mass flow (lb/hr)	3,308,649	3,183,096	2,998,950
Temperature (°F)	998	1,013	1,045
Molecular weight	28.49	28.43	28.19
Volume flow (acfm)- calculated	2,058,955	2,005,603	1,947,155
- provided			
Fuel Usage			
Fuel usage (lb/hr)= Heat Input (MMBtu/hr) x 1,000,000 Btu/MMBtu (Fuel Heat Content, Btu/lb (LHV))			
Heat input (MMBtu/hr, LHV)	1,381	1,310	1,216
Heat content (Btu/lb, LHV)	20,981	20,981	20,981
Fuel usage (lb/hr)- calculated	65,826	62,424	57,965
- provided	65,830	62,420	57,960
Heat content (Btu/cf, LHV)	920	920	920
Fuel density (lb/ft^3)	0.0438	0.0438	0.0438
Fuel usage (cf/hr)- calculated	1,501,214	1,423,626	1,321,928
Stack and Exit Gas Conditions- HRSG			
Stack height (ft)	135	135	135
Diameter (ft)	19.0	19.0	19.0
Temperature (°F)	200	200	200
HRSG- Volume flow (acfm)= CT Volume flow (acfm) x [(HRSG Temp. (°F) + 460 K) / (CT Temp. (°F) + 460)]			
CT Volume flow (acfm)	2,058,955	2,005,603	1,947,155
CT Temperature (°F)	998	1,013	1,045
HRSG Temperature (°F)	200	200	200
HRSG Volume flow (acfm)	932,338	898,917	854,092
Velocity (ft/sec)= Volume flow (acfm) / [((diameter)^2 /4) x 3.14159] / 60 sec/min			
Volume flow (acfm)	932,338	898,917	854,092
Diameter (ft)	19.0	19.0	19.0
Velocity (ft/sec)- calculated	54.8	52.8	50.2
Velocity (m/sec)- calculated	16.70	16.11	15.30

Source: Siemens-Westinghouse, 1999 (CTT-1939, Revision 0, 10/19/99).

Note: Universal gas constant= 1,545 ft-lb(force)/°R; atmospheric pressure= 2,116.8 lb(force)/ft^2

NSPS Calculation:

Heat Rate at 59oF

9,670 Btu/kWh (LHV)
10.20185 kJ/W
14.4 kJ/W (NSPS)
75 ppmvd @ 15% O2
105.86 ppmvd @ 15% O2

Table A-6. Maximum Emissions for Criteria and Other Regulated Pollutants for the Osprey Energy Center Project
Siemens-Westinghouse 501F, Dry Low NOx Combustor, Natural Gas, 75 % Load

Parameter	Ambient/Compressor Inlet Temperature 32 °F Case 10	59 °F Case 7	95 °F Case 4
Hours of Operation	8,760	8,760	8,760
Particulate from CT and SCR			
Particulate (lb/hr)= Emission rate (lb/hr) from manufacturer (front- and back-half)			
Basis, lb/hr - provided (a)	14.6	14.0	13.0
Particulate from SCR= Sulfur trioxide (formed from conversion of SO_2) converts to ammonium sulfate (=PM10)			
Particulate from conversion of SO_2= SO_2 emissions (lb/hr) x Conversion SO_2 to SO_3 x lb SO_3/lb SO_2 x Conversion of SO_3 x lb SO_3 to $(NH_4)_2SO_4$ x $(NH_4)_2SO_4$/ lb SO_3			
SO_2 emission rate (lb/hr)- calculated	8.6	8.1	7.6
Conversion (%) from SO_2 to SO_3	25	25	25
MW SO_3/ SO_2 (80/64)	1.3	1.3	1.3
Conversion (%) from SO_3 to $(NH_4)_2(SO_4)$	100	100	100
MW $(NH_4)_2SO_4$/ SO_3 (132/80)	1.7	1.7	1.7
Particulate (lb/hr)- calculated	4.42	4.19	3.89
Particulate (lb/hr) from CT + SCR	19.0	18.2	16.9
(TPY)	83.3	79.7	73.9
Sulfur Dioxide (lb/hr)= Natural gas (cf/hr) x sulfur content(gr/100 cf) x 1 lb/7000 gr x (lb SO_2 /lb S) /100			
Fuel use (cf/hr)	1,501,214	1,423,626	1,321,928
Sulfur content (grains/ 100 cf) - assumed (b)	2	2	2
lb SO_2 /lb S (64/32)	2	2	2
Emission rate (lb/hr)- calculated	8.6	8.1	7.6
(lb/hr)- provided (0.2 gr/100 cf) (not used	0.93	0.89	0.82
(TPY)	37.6	35.6	33.1
Nitrogen Oxides (lb/hr)= NOx(ppm) x {[20.9 x (1 - Moisture(%)/100)] - Oxygen(%)) x 2116.8 x Volume flow (acfm) x 46 (mole. wgt NOx) x 60 min/hr / [1545 x (CT temp.(°F) + 460°F) x 5.9 x 1,000,000 (adj. for ppm)]			
Basis, ppmvd @15% O_2 (a) (d)	4	4	4
Moisture (%)	7.12	7.64	9.76
Oxygen (%)	13.42	13.41	13.10
Volume Flow (acfm)	2,058,955	2,005,603	1,947,155
Temperature (°F)	998	1,013	1,045
Emission rate (lb/hr)- calculated	21.7	20.6	19.1
(lb/hr)- provided	22.9	21.7	20.2
(TPY)	100.4	95.2	88.5
[Ratio lb/hr provided/calculated]	1.056	1.056	1.056
Carbon Monoxide (lb/hr)= CO(ppm) x {[20.9 x (1 - Moisture(%)/100)] - Oxygen(%)) x 2116.8 lb/ft2 x Volume flow (acfm) x 28 (mole. wgt CO) x 60 min/hr / [1545 x (CT temp.(°F) + 460°F) x 1,000,000 (adj. for ppm)]			
Basis, ppmvd- calculated	10.9	10.8	10.8
Basis, ppmvd @ 15% O2- calculated	10	10	10
- provided (a)	10	10	10
Moisture (%)	7.12	7.64	9.76
Oxygen (%)	13.42	13.41	13.10
Volume Flow (acfm)	2,058,955	2,005,603	1,947,155
Temperature (°F)	998	1,013	1,045
Emission rate (lb/hr)- calculated from given pp	33.0	31.3	29.1
(lb/hr)- provided	35.0	33.0	31.0
(TPY)	153.3	144.5	135.8
[Ratio lb/hr provided/calculated]	1.059	1.053	1.065
VOCs (lb/hr)= VOC(ppm) x [1 - Moisture(%)/ 100] x 2116.8 lb/ft2 x Volume flow (acfm) x 16 (mole. wgt as methane) x 60 min/hr / [1545 x (CT temp.(°F) + 460°F) x 1,000,000 (adj. for ppm)]			
Basis, ppmvd (as CH_4)- calculated	4.6	4.5	4.5
Basis, ppmvd @ 15% O2- calculated	4.2	4.2	4.2
- provided (a) (e)	4.2	4.2	4.2
Moisture (%)	7.12	7.64	9.76
Oxygen (%)	13.42	13.41	13.10

Table A-6. Maximum Emissions for Criteria and Other Regulated Pollutants for the Osprey Energy Center Project
Siemens-Westinghouse 501F, Dry Low NOx Combustor, Natural Gas, 75 % Load

Parameter	Ambient/Compressor Inlet Temperature 32 °F Case 10	59 °F Case 7	95 °F Case 4
Volume Flow (acfm)	2,058,955	2,005,603	1,947,155
Temperature (°F)	998	1,013	1,045
Emission rate (lb/hr)- calculated	7.9	7.5	7.0
(lb/hr)- provided	8.4	7.9	7.4
(TPY)	36.7	34.8	32.3
[Ratio lb/hr provided/calculated]	1.056	1.056	1.056
Lead (lb/hr)= NA			
Emission Rate Basis	NA	NA	NA
Emission rate (lb/hr)	NA	NA	NA
(TPY)	NA	NA	NA
Mercury (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu (c)	8.00E-04	8.00E-04	8.00E-04
Heat Input Rate (MMBtu/hr)	1,534	1,454	1,351
Emission Rate (lb/hr)	1.23E-06	1.16E-06	1.08E-06
(TPY).	5.37E-06	5.10E-06	4.73E-06
Sulfuric Acid Mist = SO2 emission rate (lb/hr) x conversion rate of SO2 to H_2SO_4 (%) x MW H_2SO_4 /MW SO_2 (98/64)			
SO2 emission rate (lb/hr)	8.6	8.1	7.6
lb H_2SO_4 /lb SO_2 (98/64)	1.53	1.53	1.53
Conversion to H_2SO_4 (%) (b)	10	10	10
Emission Rate (lb/hr)	1.31	1.25	1.16
(TPY)	5.75	5.46	5.07

Source: (a) Siemens-Westinghouse 1999.
(b) Golder Associates Inc. 1999 .
(c) Electric Power Research Institute (EPRI), Electric Utility Trace Substances Report, 1994 (Table B-12) .
(d) For NOx emissions, data originally provided at 25 ppmvd at 15% oxygen.
(e) For VOC emissions, data originally provided at 2.8 ppmvd at 15% oxygen.

Note: ppmvd= parts per million, volume dry; O2= oxygen.

Table A-7. Maximum Emissions for Other Regulated PSD Pollutants for the Osprey Energy Center Project
Siemens-Westinghouse 501F, Dry Low NOx Combustor, Natural Gas, 75 % Load

Parameter	Ambient/Compressor Inlet Temperature 32 °F Case 10	59 °F Case 7	95 °F Case 4
Hours of Operation	8,760	8,760	8,760
2,3,7,8 TCDD Equivalents (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	1.20E-06	1.20E-06	1.20E-06
Heat Input Rate (MMBtu/hr)	1,534	1,454	1,351
Emission Rate (lb/hr)	1.84E-09	1.75E-09	1.62E-09
(TPY)	8.06E-09	7.64E-09	7.10E-09
Beryllium (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	0.00E+00	0	0
Heat Input Rate (MMBtu/hr)	1,534	1,454	1,351
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00
Fluoride (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	0.00E+00	0	0
Heat Input Rate (MMBtu/hr)	1,534	1,454	1,351
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00

Source: Electric Power Research Institute (EPRI), Electric Utility Trace Substances Report, 1994 (Table B-12).
Emission factors for metals are questionable and not used.

Note: No emission factors for hydrogen chloride (HCl) from natural gas-firing.

Table A-8. Maximum Emissions for Hazardous Air Pollutants for the Osprey Energy Center Project
Siemens-Westinghouse 501F, Dry Low NOx Combustor, Natural Gas, 75 % Load

Parameter	Ambient/Compressor Inlet Temperature 32 °F Case 10	59 °F Case 7	95 °F Case 4
Hours of Operation	8,760	8,760	8,760
Antimony (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,534	1,454	1,351
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00
Benzene (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	8.00E-01	8.00E-01	8.00E-01
Heat Input Rate (MMBtu/hr)	1,534	1,454	1,351
Emission Rate (lb/hr)	1.23E-03	1.16E-03	1.08E-03
(TPY)	5.37E-03	5.10E-03	4.73E-03
Cadmium (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,534	1,454	1,351
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00
Chromium (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,534	1,454	1,351
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00
Formaldehyde (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	3.40E+01	3.40E+01	3.40E+01
Heat Input Rate (MMBtu/hr)	1,534	1,454	1,351
Emission Rate (lb/hr)	5.21E-02	4.94E-02	4.59E-02
(TPY)	2.28E-01	2.17E-01	2.01E-01
Cobalt (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,534	1,454	1,351
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00
Manganese (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,534	1,454	1,351
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00
Nickel (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,534	1,454	1,351
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00

Table A-8. Maximum Emissions for Hazardous Air Pollutants for the Osprey Energy Center Project
Siemens-Westinghouse 501F, Dry Low NOx Combustor, Natural Gas, 75 % Load

Parameter	Ambient/Compressor Inlet Temperature 32 °F Case 10	59 °F Case 7	95 °F Case 4
Phosphorous (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,534	1,454	1,351
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00
Selenium (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,534	1,454	1,351
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00
Toluene (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	1.00E+01	1.00E+01	1.00E+01
Heat Input Rate (MMBtu/hr)	1,534	1,454	1,351
Emission Rate (lb/hr)	1.53E-02	1.45E-02	1.35E-02
(TPY)	6.72E-02	6.37E-02	5.92E-02

Source: Electric Power Research Institute (EPRI), Electric Utility Trace Substances Report, 1994 (Table B-12).
Emission factors for metals are questionable and not used.

Table A-9. Design Information and Stack Parameters for the Osprey Energy Center Project
Siemens-Westinghouse 501F, Dry Low NOx Combustor, Natural Gas, 60 % Load

Parameter	Ambient/Compressor Inlet Temperature 32 °F Case 11	59 °F Case 8	95 °F Case 5
Combustion Turbine Performance			
Evaporative cooler status/ efficiency (%)	Off	Off	Off
Ambient Relative Humidity (%)	60	60	60
Gross power output (MW)	116.38	108.07	95.10
Gross heat rate (Btu/kWh, LHV)	10,295	10,660	10,995
(Btu/kWh, HHV)	11,430	11,830	12,210
Heat Input (MMBtu/hr, LHV)- calculated	1,198	1,152	1,046
- provided	1,199	1,153	1,047
(MMBtu/hr, HHV) - provided	1,332	1,280	1,162
(HHV/LHV)	1.110	1.110	1.110
Fuel heating value (Btu/lb, LHV)	20,981	20,981	20,981
(Btu/lb, HHV)	23,299	23,299	23,299
(HHV/LHV)	1.110	1.110	1.110
CT Exhaust Flow			
Mass Flow (lb/hr)	2,769,960	2,677,136	2,540,918
Temperature (°F)	1,076	1,107	1,094
Moisture (% Vol.)	7.36	7.94	9.86
Oxygen (% Vol.)	13.15	13.07	12.99
Molecular Weight - calculated	28.48	28.41	28.18
- provided	28.47	28.41	28.18
Volume Flow (acfm)= [(Mass Flow (lb/hr) x 1,545 x (Temp. (°F)+ 460°F)] / [Molecular weight x 2116.8] / 60 min/hr			
Mass flow (lb/hr)	2,769,960	2,677,136	2,540,918
Temperature (°F)	1,076	1,107	1,094
Molecular weight	28.48	28.41	28.18
Volume flow (acfm)- calculated	1,817,013	1,795,882	1,703,893
- provided			
Fuel Usage			
Fuel usage (lb/hr)= Heat Input (MMBtu/hr) x 1,000,000 Btu/MMBtu (Fuel Heat Content, Btu/lb (LHV))			
Heat input (MMBtu/hr, LHV)	1,199	1,153	1,047
Heat content (Btu/lb, LHV)	20,981	20,981	20,981
Fuel usage (lb/hr)- calculated	57,153	54,942	49,889
- provided	57,150	54,940	49,890
Heat content (Btu/cf, LHV)	920	920	920
Fuel density (lb/ft^3)	0.0438	0.0438	0.0438
Fuel usage (cf/hr)- calculated	1,303,411	1,252,999	1,137,756
Stack and Exit Gas Conditions- HRSG			
Stack height (ft)	135	135	135
Diameter (ft)	19.0	19.0	19.0
Temperature (°F)	200	200	200
HRSG- Volume flow (acfm)= CT Volume flow (acfm) x [(HRSG Temp. (°F) + 460 K) / (CT Temp. (°F) + 460)]			
CT Volume flow (acfm)	1,817,013	1,795,882	1,703,893
CT Temperature (°F)	1,076	1,107	1,094
HRSG Temperature (°F)	200	200	200
HRSG Volume flow (acfm)	780,971	756,547	723,804
Velocity (ft/sec)= Volume flow (acfm) / [((diameter)^2 /4) x 3.14159] / 60 sec/min			
Volume flow (acfm)	780,971	756,547	723,804
Diameter (ft)	19.0	19.0	19.0
Velocity (ft/sec)- calculated	45.9	44.5	42.5
Velocity (m/sec)- calculated	13.99	13.56	12.97

Source: Siemens-Westinghouse, 1999 (CTT-1939, Revision 0, 10/19/99).

Note: Universal gas constant = 1,545 ft-lb(force)/°R; atmospheric pressure = 2,116.8 lb(force)/ft^2

NSPS Calculation:

Heat Rate at 59oF	10,660 Btu/kWh (LHV)
	11.2463 kJ/W
	14.4 kJ/W (NSPS)
	75 ppmvd @ 15% O2
	96.03 ppmvd @ 15% O2

Table A-10. Maximum Emissions for Criteria and Other Regulated Pollutants for the Osprey Energy Center Project
Siemens-Westinghouse 501F, Dry Low NOx Combustor, Natural Gas, 60 % Load

Parameter	Ambient/Compressor Inlet Temperature 32 °F Case 11	59 °F Case 8	95 °F Case 5
Hours of Operation	8,760	8,760	8,760
Particulate from CT and SCR			
Particulate (lb/hr)= Emission rate (lb/hr) from manufacturer (front- and back-half)			
Basis, lb/hr (a)	12.2	11.7	11.0
Particulate from SCR= Sulfur trioxide (formed from conversion of SO_2) converts to ammonium sulfate (=PM10)			
Particulate from conversion of SO_2= SO_2 emissions (lb/hr) x Conversion SO_2 to SO_3 x lb SO_3/lb SO_2 x Conversion of SO_3 x lb SO_3 to $(NH_4)_2SO_4$ x ($NH_4)_2SO_4$/lb SO_3			
SO_2 emission rate (lb/hr)- calculated	7.4	7.2	6.5
Conversion (%) from SO_2 to SO_3	25	25	25
MW SO_3/SO_2 (80/64)	1.3	1.3	1.3
	100	100	100
MW $(NH_4)_2SO_4$/SO_3 (132/80)	1.7	1.7	1.7
Particulate (lb/hr)- calculated	3.84	3.69	3.35
Particulate (lb/hr) from CT + SCR	16.0	15.4	14.3
(TPY)	70.2	67.6	62.8
Sulfur Dioxide (lb/hr)= Natural gas (cf/hr) x sulfur content(gr/100 cf) x 1 lb/7000 gr x (lb SO_2/lb S) /100			
Fuel use (cf/hr)	1,303,411	1,252,999	1,137,756
Sulfur content (grains/ 100 cf) - assumed (b)	2	2	2
lb SO_2/lb S (64/32)	2	2	2
Emission rate (lb/hr)- calculated	7.4	7.2	6.5
(lb/hr)- provided (0.2 gr/100 cf) (not used)	0.81	0.78	0.71
(TPY)	32.6	31.4	28.5
Nitrogen Oxides (lb/hr)= NOx(ppm) x ([20.9 x (1 - Moisture(%)/100)] - Oxygen(%)) x 2116.8 x Volume flow (acfm) x 46 (mole. wgt NOx) x 60 min/hr / [1545 x (CT temp.(°F) + 460°F) x 5.9 x 1,000,000 (adj. for ppm)]			
Basis, ppmvd @15% O_2 (a) (d)	4	4	4
Moisture (%)	7.36	7.94	9.86
Oxygen (%)	13.15	13.07	12.99
Volume Flow (acfm)	1,817,013	1,795,882	1,703,893
Temperature (°F)	1,076	1,107	1,094
Emission rate (lb/hr)- calculated	18.9	18.1	16.5
(lb/hr)- provided	19.9	19.1	17.4
(TPY)	87.2	83.9	76.1
[Ratio lb/hr provided/calculated]	1.056	1.056	1.056
Carbon Monoxide (lb/hr)= CO(ppm) x ([20.9 x (1 - Moisture(%)/100)] - Oxygen(%)) x 2116.8 lb/ft2 x Volume flow (acfm) x 28 (mole. wgt CO) x 60 min/hr / [1545 x (CT temp.(°F) + 460°F) x 1,000,000 (adj. for ppm)]			
Basis, ppmvd- calculated	56.8	56.8	55.0
Basis, ppmvd @ 15% O2- calculated	50	50	50
- provided (a)	50	50	50
Moisture (%)	7.36	7.94	9.86
Oxygen (%)	13.15	13.07	12.99
Volume Flow (acfm)	1,817,013	1,795,882	1,703,893
Temperature (°F)	1,076	1,107	1,094
Emission rate (lb/hr)- calculated from given ppm	143.4	137.9	125.2
(lb/hr)- provided	152.0	146.0	133.0
(TPY)	665.8	639.5	582.5
[Ratio lb/hr provided/calculated]	1.060	1.058	1.062
VOCs (lb/hr)= VOC(ppm) x [1 - Moisture(%)/ 100] x 2116.8 lb/ft2 x Volume flow (acfm) x 16 (mole. wgt as methane) x 60 min/hr / [1545 x (CT temp.(°F) + 460°F) x 1,000,000 (adj. for ppm)]			
Basis, ppmvd (as CH_4)- calculated	4.8	4.8	4.6
Basis, ppmvd @ 15% O2- calculated	4.2	4.2	4.2
- provided (a) (c)	4.2	4.2	4.2
Moisture (%)	7.36	7.94	9.86
Oxygen (%)	13.15	13.07	12.99
Volume Flow (acfm)	1,817,013	1,795,882	1,703,893
Temperature (°F)	1,076	1,107	1,094
Emission rate (lb/hr)- calculated	6.9	6.6	6.0
(lb/hr)- provided	7.3	7.0	6.3
(TPY)	31.8	30.6	27.8
[Ratio lb/hr provided/calculated]	1.056	1.056	1.056
Lead (lb/hr)= NA			
Emission Rate Basis	NA	NA	NA
Emission rate (lb/hr)	NA	NA	NA
(TPY)	NA	NA	NA
Mercury (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu (c)	8.00E-04	8.00E-04	8.00E-04
Heat Input Rate (MMBtu/hr)	1,332	1,280	1,162
Emission Rate (lb/hr)	1.07E-06	1.02E-06	9.30E-07
(TPY)	4.67E-06	4.47E-06	4.07E-06
Sulfuric Acid Mist = SO2 emission rate (lb/hr) x conversion rate of SO2 to H_2SO_4 (%) x MW H_2SO_4/MW SO_2 (98/64)			
SO2 emission rate (lb/hr)	7.4	7.2	6.5
lb H_2SO_4/lb SO_2 (98/64)	1.53	1.53	1.53
Conversion to H_2SO_4 (%) (b)	10	10	10
Emission Rate (lb/hr)	1.14	1.10	1.00
(TPY)	5.00	4.80	4.36

Source: (a) Siemens-Westinghouse 1999.
(b) Golder Associates Inc. 1999 .
(c) Electric Power Research Institute (EPRI), Electric Utility Trace Substances Report, 1994 (Table B-12) .
(d) For NOx emissions, data originally provided at 25 ppmvd at 15% oxygen.
(e) For VOC emissions, data originally provided at 2.8 ppmvd at 15% oxygen.

Table A-11. Maximum Emissions for Other Regulated PSD Pollutants for the Osprey Energy Center Project
Siemens-Westinghouse 501F, Dry Low NOx Combustor, Natural Gas, 60 % Load

Parameter	Ambient/Compressor Inlet Temperature 32 °F Case 11	59 °F Case 8	95 °F Case 5
Hours of Operation	8,760	8,760	8,760
2,3,7,8 TCDD Equivalents (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	1.20E-06	1.20E-06	1.20E-06
Heat Input Rate (MMBtu/hr)	1,332	1,280	1,162
Emission Rate (lb/hr)	1.60E-09	1.54E-09	1.39E-09
(TPY)	7.00E-09	6.73E-09	6.11E-09
Beryllium (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,332	1,280	1,162
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00
Fluoride (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,332	1,280	1,162
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00

Source: Electric Power Research Institute (EPRI), Electric Utility Trace Substances Report, 1994 (Table B-12).
Emission factors for metals are questionable and not used.

Table A-12. Maximum Emissions for Hazardous Air Pollutants for the Osprey Energy Center Project
Siemens-Westinghouse 501F, Dry Low NOx Combustor, Natural Gas, 60 % Load

Parameter	Ambient/Compressor Inlet Temperature 32 °F Case 11	59 °F Case 8	95 °F Case 5
Hours of Operation	8,760	8,760	8,760
Antimony (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,332	1,280	1,162
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00
Benzene (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	8.00E-01	8.00E-01	8.00E-01
Heat Input Rate (MMBtu/hr)	1,332	1,280	1,162
Emission Rate (lb/hr)	1.07E-03	1.02E-03	9.30E-04
(TPY)	4.67E-03	4.49E-03	4.07E-03
Cadmium (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,332	1,280	1,162
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00
Chromium (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,332	1,280	1,162
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00
Formaldehyde (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	3.40E+01	3.40E+01	3.40E+01
Heat Input Rate (MMBtu/hr)	1,332	1,280	1,162
Emission Rate (lb/hr)	4.53E-02	4.35E-02	3.95E-02
(TPY)	1.98E-01	1.91E-01	1.73E-01
Cobalt (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,332	1,280	1,162
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00
Manganese (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,332	1,280	1,162
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00
Nickel (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,332	1,280	1,162
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00
Phosphorous (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,332	1,280	1,162
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00
Selenium (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	0.00E+00	0.00E+00	0.00E+00
Heat Input Rate (MMBtu/hr)	1,332	1,280	1,162
Emission Rate (lb/hr)	0.00E+00	0.00E+00	0.00E+00
(TPY)	0.00E+00	0.00E+00	0.00E+00
Toluene (lb/hr) = Basis (lb/10^{12} Btu) x Heat Input (MMBtu/hr) / 1,000,000 MMBtu/10^{12} Btu			
Basis, lb/10^{12} Btu	1.00E+01	1.00E+01	1.00E+01
Heat Input Rate (MMBtu/hr)	1,332	1,280	1,162
Emission Rate (lb/hr)	1.33E-02	1.28E-02	1.16E-02
(TPY)	5.83E-02	5.61E-02	5.09E-02

Source: Electric Power Research Institute (EPRI), Electric Utility Trace Substances Report, 1994 (Table B-12).
Emission factors for metals are questionable and not used.

APPENDIX B
TECHNICAL SUPPORT INFORMATION FOR BEST AVAILABLE CONTROL TECHNOLOGY

B.1 NEW SOURCE PERFORMANCE STANDARDS

BACT is a case-by-case emission limitation for each applicable pollutant, based on the maximum degree of emission reduction after taking into account the energy, environmental and economic impacts, and other costs. The BACT cannot be any less stringent than any applicable new source performance standards (NSPS) and consideration must be given to the applicable NSPS in the determination of BACT [Rule 62-212.400(6) F.A.C.]. This requirement also applies for any applicable National Emission Standard for Hazardous Air Pollutants promulgated under 40 CFR Part 61. For combustion turbines the applicable NSPS is 40 CFR Part 60, Subpart GG Standards of Performance for Stationary Gas Turbines.

B.1.1 SUBPART GG

The NSPS regulations (40 CFR, Subpart GG) applicable to gas turbines apply to:

1. Electric utility stationary gas turbines with a heat input at peak load of greater than 100×10^6 Btu/hr [40 CFR 60.332 (b)];
2. Stationary gas turbines with a heat input at peak load between 10 and 100×10^6 Btu/hr [40 CFR 60.332 (c)]; or
3. Stationary gas turbines with a manufacturer's rate base load at ISO conditions of 30 MW or less [40 CFR 60.332 (d)].

The electric utility stationary gas turbine provisions apply to stationary gas turbines constructed for the purpose of supplying more than one-third of their potential electric output capacity for sale to any utility power distribution system [40 CFR 60.331 (q)]. The requirements for electric utility stationary gas turbines are applicable to the 501FD turbines proposed for the project and are the most stringent provision of the NSPS. These requirements are summarized in Table B-1 and were considered in the BACT analysis.

As noted from Table B-1, the NSPS NO_x emission limit can be adjusted upward to allow for fuel-bound nitrogen (FBN). For a fuel-bound nitrogen concentration of 0.015 percent or less, no increase in the NSPS is provided; for a fuel-bound nitrogen concentration of 0.03 percent, the NSPS is increased by 0.0012 percent or 12 parts per million (ppm). The NSPS NO_x emission limit adjustment is not affected by natural gas combustion.

B.1.2 SUBPART DA

The applicable NSPS for duct firing are codified in 40 CFR 60, Subpart Da and apply to fossil-fuel fired steam generators with a heat input of more than 250 mmBtu/hr. On September 16, 1998, these NSPS were updated to include generally more stringent emission limitations for NO_x. These revised NSPS apply to any affected facility, which commenced construction after July 9, 1997. The applicable NOx NSPS limit for firing coal, oil or natural gas, or a mixture of these, or any other fuels, is 1.6 lb/MW [40 CFR 60.44a(d)(1)]. The proposal NO_x emission limit for the Project of 4 ppmvd corrected to 15-percent oxygen is equivalent to about 0.10 lb/MW, which is much lower than the NSPS.

B.2 BEST AVAILABLE CONTROL TECHNOLOGY

The "top-down" analysis for determining BACT, as provided for in EPA's Draft 1990 New Source Review Workshop Manual, is used by the FDEP in determining BACT under Rule 62-212.400(5)(c) F.A.C. The procedure involves 5 steps: identification of control technologies, elimination of technically infeasible control technologies, a ranking of the feasible control technologies, an evaluation of the effective control technologies and the selection of BACT.

The identification of control technologies is developed from the information obtained from BACT/LAER Information System (BLIS) database maintained at EPA's National Computer Center located at Research Triangle Park, North Carolina.

The elimination of infeasible technologies is based on those engineering aspects that would preclude a technology's use due to physical, chemical or other engineering consideration. Control technologies that are technically feasible are ranked by control effectiveness, with determination of the environmental, economic and energy costs and benefits of the control technologies. This information forms the basis for the case-by-case consideration of environmental, energy and economic impacts. The "top" feasible control alterable is selected unless it can be rejected based on economic, environmental or energy considerations.

B.2.1 NITROGEN OXIDES

NO_x emissions from combustion of fossil fuels consist of thermal NO_x and fuel-bound NO_x. Thermal NO_x is formed from the reaction of oxygen and nitrogen in the combustion air at

combustion temperatures. Formation of thermal NO_x depends on the flame temperature, residence time, combustion pressure, and air-to-fuel ratios in the primary combustion zone. The design and operation of the combustion chamber dictates these conditions. Fuel-bound NO_x is created by the oxidation of volatilized nitrogen in the fuel. Nitrogen content in the fuel is the primary factor in its formation. Natural gas has negligible amounts of fuel-bound nitrogen.

Identification of NO_x Control Technologies

Table B-2 presents a listing of the lowest achievable emission rates/best available control technology (LAER/BACT) decisions made by state environmental agencies and EPA regional offices for gas turbines including duct firing. This table was developed from the information obtained from BACT/LAER Information System (BLIS) database maintained at EPA's National Computer Center located at Research Triangle Park, North Carolina.

Historically, the most stringent NO_x controls for CTs firing natural gas established as LAER/BACT by state agencies were combustion controls with selective catalytic reduction (SCR) and combustion controls alone. SCR is a post-combustion control, while advanced dry low-NO_x combustors minimize the formation of NO_x in the combustion process. When SCR has been employed, dry low-NO_x combustion technology are used initially to reduce NO_x emissions when combusting natural gas.

The dry low-NO_x combustion technology has been developed and made available since the early 1990s for gas turbines. NO_x emission levels of 25 ppmvd corrected to 15 percent O_2 and less can currently be achieved with dry low-NO_x combustion technology.

SCR has been installed or permitted in over 100 projects. The majority of these projects (more than 90 percent) were initially cogeneration facilities with capacities of 50 MW or less. Many of these projects that initially installed SCR were located in the Southern California NO_2 nonattainment area, where SCR was initially required not as BACT but as LAER, a more stringent requirement. As noted previously, there are distinct regulatory and policy differences between LAER and BACT. As discussed in Section 3.0, BACT

involves an evaluation of the economic, environmental, and energy impacts of alternative control technologies. In contrast, LAER only considers the technical aspects of control.

The initial SCR projects in California used natural gas as the primary fuel, and less than 15 percent of the SCR applications had distillate fuel as backup.

More recently, projects with SCR have been installed throughout the US including the states of Vermont, Massachusetts, Connecticut, New Jersey, New York, Rhode Island, Virginia, Georgia and Florida. The size of these projects ranges from 22 MW to over 500 MW.

Reported and permitted NO_x removal efficiencies of SCR range from 40 to over 80 percent of NO_x in the exhaust gas stream. The most common emission limiting standards associated with SCR are 9 ppmvd corrected to 15 percent O_2 or less for natural gas firing. More recently, facilities have been permitted with BACT emission limits of 3.5 ppm and less.

Other control technologies under development for controlling NO_x emissions from combustion turbines for include SCONO$_x$™ and XONON™. SCONO$_x$™ is an add-on control using absorption and chemical conversion to remove NO_x formed from combustion, while XONON™ is a catalytic combustion system integral to the turbine. Other potential technologies used in combustion processes for NO_x removal includes: NO_xOUT, Thermal DeNO$_x$, and NSCR.

Technology Descriptions and Feasibility

Dry Low-NO_x Combustor

In the past several years, CT manufacturers have offered and installed machines with dry low-NO_x combustors. These combustors, which are offered on conventional machines manufactured by General Electric (GE), Siemens/Westinghouse, and ABB, have demonstrated NO_x concentrations of 25 ppmvd or less when firing natural gas. GE and Siemens/Westinghouse have offered dry low-NO_x combustors on advanced heavy-duty industrial machines. Thermal NO_x formation is inhibited by using combustion techniques where the natural gas and combustion air are premixed before ignition. For the CT being considered for the project, the combustion chamber design includes the use of dry low-NO_x

combustor technology. The NO_x emission level when firing natural gas at baseload conditions is 25 ppmvd (corrected to 15 percent O_2), a level which is guaranteed by the selected vendor (Siemens/Westinghouse) for the project.

Selective Catalytic Reduction (SCR)

Selective Catalytic Reduction (SCR) uses ammonia (NH_3) to react with NO_x in the gas stream in the presence of a catalyst. NH_3, which is diluted with air to about 5 percent by volume, is introduced into the gas stream at reaction temperatures between 600°F and 750°F. The reactions are as follows:

$$4NH_3 + 4NO + O_2 = 4N_2 + 6H_2O$$

$$4NH_3 + 2NO_2 + O_2 = 3N_2 + 6H_2O$$

SCR operating experience, as applied to gas turbines, consists primarily of baseload natural-gas-fired installations either of cogeneration or combined cycle configuration. All recent SCR applications on combined cycle units have the catalyst placed in the HRSG to achieve proper reaction conditions. This allows a relatively constant temperature for the reaction of NH_3 and NO_x on the catalyst surface.

For combined cycle units, SCR is an available, technically feasible and demonstrated technology.

SCONO$_x$™

SCONO$_x$™ is a NO_x and CO control system exclusively offered by Goal Line Environmental Technologies (GLET). GLET is a partnership formed by Sunlaw Energy Corporation and Advanced Catalyst Systems, Inc. In 1998, ABB acquired the exclusive license for the technology in the United States for control applications larger than 100 MW.

The SCONO$_x$™ system employs a single catalyst to simultaneously oxidize CO to CO_2 and NO to NO_2. NO_2 formed by the oxidation of NO is subsequently absorbed onto the catalyst surface through the use of a potassium carbonate absorber coating. The SCONO$_x$™ oxidation/absorption cycle reactions are:

$$CO + \tfrac{1}{2} O_2 \rightarrow CO_2 \quad (1)$$

$$NO + \tfrac{1}{2} O_2 \rightarrow NO_2 \quad (2)$$

$$2NO_2 + K_2CO_3 \rightarrow CO_2 + KNO_2 + KNO_3 \quad (3)$$

CO_2 produced by reaction (1) and (2) is released to the atmosphere as part of the CT/HRSG exhaust gas stream.

As shown in Reaction (3), the potassium carbonate catalyst coating reacts with NO_2 to form potassium nitrites and nitrates. Prior to saturation of the potassium carbonate coating, the catalyst must be regenerated. This regeneration is accomplished by passing a dilute hydrogen-reducing gas across the surface of the catalyst in the absence of O_2. Hydrogen in the reducing gas reacts with the nitrites and nitrates to form water and elemental nitrogen. CO_2 in the regeneration gas reacts with potassium nitrites and nitrates to form potassium carbonate; this compound is the catalyst absorber coating present on the surface of the catalyst at the start of the oxidation/absorption cycle. The SCONO$_x$™ regeneration cycle reaction is:

$$KNO_2 + KNO_3 + 4\,H_2 + CO_2 \rightarrow K_2CO_3 + 4\,H_2O_{(g)}) + N_2 \quad (4)$$

Water vapor and elemental nitrogen are released to the atmosphere as part of the CT/HRSG exhaust stream. Following regeneration, the SCONO$_x$™ catalyst has a regenerated layer of potassium carbonate, allowing the oxidation/absorption cycle to begin again. There is no reported net gain or loss of potassium carbonate after both the oxidation/absorption and regeneration cycles have been completed.

Since the regeneration cycle must take place in an oxygen-free environment, the section of catalyst undergoing regeneration is isolated from the exhaust gas stream using a set of louvers. Each catalyst section is equipped with a set of upstream and downstream louvers. During the regeneration cycle, these louvers close and valves open allowing fresh regeneration gas to enter and spent regeneration gas to exit the catalyst section being regenerated. At any given time, 75 percent of the catalyst sections will be in the oxida-

tion/absorption cycle, while 25 percent will be in regeneration mode. A regeneration cycle is typically set to last for 3 to 5 minutes.

Regeneration gas is produced by reacting natural gas with O_2 present in ambient air. The SCONO$_x$™ system uses a gas generator produced by Surface Combustion. This unit uses a two-stage process to produce hydrogen and carbon dioxide. In the first stage, natural gas and ambient air are reacted across a partial oxidation catalyst at 1,900°F to form CO and hydrogen. Steam is added and the gas mixture is then passed across a low temperature shift catalyst, forming CO_2 and additional hydrogen. The resulting gas stream is diluted to less than 4 percent hydrogen using steam or another inert gas. The regeneration gas reactions are:

$$CH_4 + \tfrac{1}{2} O_2 + 1.88\, N_2 \rightarrow CO + 2\, H_2 + 1.88\, N_2 \quad (5)$$

$$CO + 2\, H_2 + H_2O + 1.88\, N2_2 \rightarrow CO_2 + 3\, H_2 + 1.88\, N_2 \quad (6)$$

The SCONO$_x$™ operates at a temperature range of 300 to 700°F and, therefore, must be installed in the appropriate temperature section of a HRSG. For SCONO$_x$™ systems installed in locations of the HRSG above 500°F, a separate regeneration gas generator is not required. Instead, regeneration gas is produced by introducing natural gas directly across the SCONO$_x$™ catalyst that reforms the natural gas.

The SCONO$_x$™ system catalyst is subject to reduced performance and deactivation due to exposure to sulfur oxides. For this reason, an additional catalytic oxidation/absorption system (SCOSO$_x$™) to remove sulfur compounds is installed upstream of the SCONO$_x$™ catalyst. During regeneration of the SCOSO$_x$™ catalyst, either hydrogen sulfide or SO_2 is released to the atmosphere as part of the CT/HRSG exhaust gas stream. The absorption portion of the SCOSO$_x$™ process is proprietary. SCOSO$_x$™ oxidation/absorption and regeneration reactions are:

$$CO + \tfrac{1}{2} O_2 \rightarrow CO_2 \quad (7)$$

$$SO_2 + \tfrac{1}{2} O_2 \rightarrow SO_3 \quad (8)$$

$$SO_3 + \text{SORBER} \rightarrow [SO_3 + \text{SORBER}] \quad (9)$$

$$[SO_3 + SORBER] + 4\,H_2 \rightarrow H_2S + 3\,H_2O \qquad (10)$$

Utility materials needed for the operation of the SCONO$_x$™ control system include ambient air, natural gas, water, steam, and electricity. The primary utility material is natural gas used for regeneration gas production. Steam is used as the carrier/dilution gas for the regeneration gas. Electricity is required to operate the computer control system, control valves, and louver actuators.

Commercial experience to date with the SCONO$_x$™ control system is limited to one small combined cycle (CC) power plant located in Los Angeles (the federal facility). This power plant, owned by GLET partner Sunlaw Energy Corporation, utilizes a GE LM2500 turbine (30 MW size) equipped with water injection to control NO_x emissions to approximately 25 ppmvd. The SCONO$_x$™ control system was installed at the Sunlaw Energy facility in December 1996 and has achieved a NO_x exhaust concentration of 3.5 ppmv resulting in an approximate 85 percent NO_x removal efficiency.

A second SCONO$_x$™ system was installed at the Genetics Institute Facility in Andover, Massachusetts in late 1998. The system is installed on a 5-MW Caterpillar Solar Turbine with a Deltak boiler. The NO_x emission limit is 2.5 ppmvd at 15-percent O_2. ABB Environmental reports that the system is operating successfully, although there have been incidents of high NO_x emissions that ABB Environmental attributes to combustion control problems and not to the SCONO$_x$™ system.

The SCONO$_x$™ control technology is not considered to be technically feasible because it has not been commercially demonstrated on large CTs. The CTs planned for the project, Siemens-Westinghouse 501F units, each have a nominal generating capacity of 180 MW which are approximately seven times larger than the nominal 25-MW GE LM2500 utilized at the Sunlaw Energy Corporation federal facility. Technical issues associated with scale-up of the SCONO$_x$™ technology given the large differences in machine flow rates may be significant.

XONON™ Catalytic Combustor

Catalytic combustors are being developed for low emission applications on turbines where the catalyst is internal to the combustion system. The XONON™ Combustion System is a catalytic combustion system developed by Catalytica Combustion Systems, Inc. which can achieve low emission levels of NO_x, CO and VOC. The XONON™ system combusts the fuel over a catalyst, reducing the temperature of combustion and providing for more complete combustion of the fuel. The system is referred to as "flameless combustion", where combustion temperatures are at conditions where limited NO_x formation occurs. However, the exhaust temperatures from a combustion turbine standpoint are still sufficient for the expansion of the gases through the turbine for power generation. Emission levels of NO_x at less than 2 ppm have been reported for the 1.5 MW Kawasaki gas turbine located at Sun Valley Power. Recently, this technology has been proposed for a 750 MW combined cycle facility. This facility, the Pastoria Energy Facility, is a project proposed by affiliates of Enron Corporation, which has a 15 percent interest in Catalytica Combustion Systems, Inc. Commercial operation is scheduled for the summer of 2003. Catalytica is currently working in collaboration with several gas turbine manufacturers including General Electric, Pratt & Whitney, Rolls Royce Allison and Solar. XONON™ is not considered technically feasible based on the lack of operating experience with "F" Class turbines.

NO_xOUT Process

The NO_xOUT process originated from the initial research by the Electric Power Research Institute (EPRI) in 1976 on the use of urea to reduce NO_x. EPRI licensed the proprietary process to Fuel Tech, Inc., for commercialization. In the NO_xOUT process, aqueous urea is injected into the flue gas stream ideally within a temperature range of 1,600°F to 1,900°F. In the presence of oxygen, the following reaction results:

$$CO(NH_2)_2 + 2NO + \tfrac{1}{2} O_2 \rightarrow 2N_2 + CO_2 + 2H_2O$$

The amount of urea required is most cost-effective when the treatment rate is 0.5 to 2 moles of urea per mole of NO_x. In addition to the original EPRI urea patents, Fuel Tech claims to have a number of proprietary catalysts capable of expanding the effective temperature range of the reaction to between 1,600°F and 1,950°F. Advantages of the system are as follows:

1. Low capital and operating costs as a result of use of urea injection, and
2. The proprietary catalysts used are nontoxic and nonhazardous, thus eliminating potential disposal problems.

Disadvantages of the system are as follows:

1. Formation of ammonia from excess urea treatment rates and/or improper use of reagent catalysts, and
2. Sulfur trioxide (SO_3), if present, will react with ammonia created from the urea to form ammonium bisulfate, potentially plugging the cold end equipment downstream.

Commercial application of the NO_xOUT system is limited and the NO_xOUT system has not been demonstrated on any combustion turbine/HRSG unit.

The NO_xOUT process is not technically feasible for the proposed project because of the high application temperature of 1,600°F to 1,950°F. The maximum exhaust gas temperature of the Siemens-Westinghouse 501F CT is about 1,100°F. Raising the exhaust temperature the required amount essentially would require installation of a heater. This would be economically prohibitive and would result in an increase in fuel consumption, an increase in the volume of gases that must be treated by the control system, and an increase in uncontrolled air emissions, including NO_x.

Thermal DeNO$_x$

Thermal DeNO$_x$ is Exxon Research and Engineering Company's patented process for NO_x reduction. The process is a high temperature selective noncatalytic reduction (SNCR) of NO_x using ammonia as the reducing agent. Thermal DeNO$_x$ requires the exhaust gas temperature to be above 1,800°F. However, use of ammonia plus hydrogen lowers the temperature requirement to about 1,000°F. For some applications, this must be achieved by additional firing in the exhaust stream before ammonia injection.

The only known commercial applications of Thermal DeNO$_x$ are on heavy industrial boilers, large furnaces, and incinerators that consistently produce exhaust gas temperatures above

1,800°F. There are no known applications on or experience with CTs. Temperatures of 1,800°F require alloy materials constructed with very large piping and components since the exhaust gas volume would be increased by several times. As with the NO_xOUT process, high capital, operating, and maintenance costs are expected because of material requirements, an additional duct burner system, and fuel consumption. Uncontrolled emissions would increase because of the additional fuel burning.

Thus, the Thermal DeNO_x process will not be considered for the proposed project since its high application temperature makes it technically infeasible. The maximum exhaust gas temperature of a 501 F combustion turbine is typically 1,100°F; the cost to raise the exhaust gas to such a high temperature is prohibitively expensive.

Nonselective Catalytic Reduction

Certain manufacturers, such as Engelhard, market a nonselective catalytic reduction system (NSCR) for NO_x control on reciprocating engines. The NSCR process requires low oxygen content in the exhaust gas stream and high temperature (700°F to 1,400°F) in order to be effective. CTs have the required temperature but also have high oxygen levels (greater than 12 percent) and, therefore, cannot use the NSCR process. As a result, NSCR is not a technically feasible add-on NO_x control device for CTs.

Technology Feasibility and Ranking

The combustion technology using dry-low NO_x combustors is available, demonstrated and technically feasible for combustion turbines in combined cycle configuration. The advanced dry low-NO_x combustion technology alone can achieve 25 ppm (corrected to 15 percent O_2 dry conditions) when firing natural gas.

The technical evaluation of post-combustion gas controls that include NO_xOUT, Thermal DeNO_x, and NSCR, and indicate that these processes have not been applied to combined cycle combustion turbines and are technically infeasible for the project because of process constraints (e.g., temperature). SCONO_x™ is potentially feasible; however, there is currently no commercially demonstrated application of SCONO_x™ in a large combined cycle unit (i.e., 170 MW). While the XONON™ catalytic combustion system is potentially feasible,

application to a large combined cycle unit has also not been demonstrated. For these reasons, the SCONO$_x$™ and XONON™ are still considered in the commercial demonstration stage. SCR is commercially available, technically feasible and demonstrated for combined cycle units.

For proposed project, the combination of dry low-NO$_x$ combustion technology with SCR is a technically feasible and demonstrated alternative that can achieve a maximum degree of emission reduction. The combined technology is capable of achieving a NO$_x$ emission level of 4 ppm when firing natural gas (corrected to 15 percent O_2 dry conditions.

Below is a summary of the ranking for technical availability, demonstration and feasibility for the proposed project.

Technology Summary

Technology	Status
Selective Catalytic Reduction	Available, Demonstrated and Feasible
Dry Low-NO$_x$ Combustors	Available, Demonstrated and Feasible for Gas Firing
SCONO$_x$	Available, Potentially Feasible, Not Yet Demonstrated on "F" Class CTs
XOXON™	Available, Potentially Feasible, Not Yet Demonstrated on "F" Class CTs
Thermal De NO$_x$	Not Available or Feasible
NO$_x$ Out	Not Available or Feasible
NSCR	Not Available or Feasible

SCR Cost Estimates

Tables B-3 and B-4 present the total capital and annualized cost for SCR applied to combined cycle operation, respectively. The costs were developed using EPA Cost Control Manual (EPA, 1990 & 1993). Vendor based estimates were used for the SCR system. Standard EPA recommended cost factors were used. A capital recovery period of 15 years was used for the capital costs.

Comparison of Economic, Environmental and Energy Impacts

Tables B-5 present a comparison of the economic, environmental and energy impacts associated with the top control alternatives for one combined cycle unit (CT and HRSG).

Table B-6 presents the potential emissions resulting from the formation of ammonium salts (i.e., particulate matter), ammonia slip and secondary emissions. The latter results from generation lost due to the back pressure of the SCR system.

Proposed BACT and Rationale – The proposed BACT for the Project is DLN combustion with selective catalytic reduction (SCR) for the combustion turbines firing natural gas. This "top-level" of control cannot be rejected as BACT based on economic, environmental, or energy inputs. The proposed BACT for the natural gas fired duct burners is low NO_x combustion and SCR. The proposed NO_x emissions level using the technologies described above is 4.0 ppmvd (corrected to 15-percent O_2) when firing natural gas under base load conditions for the combustion turbine and natural gas-fired duct burner. Although this emission level is slightly higher than several recent BACT determinations in the southeastern United States, it reflects the highest proposed NO_x removal efficiency in the region. The emission level proposed is equivalent to about 0.10 lb/MW which is over 10 times lower than the recently promulgated EPA new source performance standards (NSPS) for steam electric units. This new NSPS has a NO_x limit for new sources of 1.6 lb/MW of gross energy output (September 16, 1998; 63FR179).

B.2.2 CARBON MONOXIDE

Identification of CO Control Technologies

CO emissions are a result of incomplete or partial combustion of fossil fuel. Combustion design and catalytic oxidation are the control alternatives that are viable for the project. Table B-7 presents a listing of LAER/BACT decisions for CO emissions from combustion turbines. Good combustion practice is the most common control technique used in CTs. Sufficient time, temperature, and turbulence is maintained within the combustion zone to maximize combustion efficiency and minimize the emissions of CO. For the CTs being evaluated, CO emissions will not exceed 10 and 25 ppmvd, corrected to 15 percent O_2, dry conditions base load (100- to 70-percent load) conditions, power augmentation mode, respectively. For duct firing and duct firing with power augmentation, CO emissions will not exceed 16 and 30 ppmvd, corrected to 15 percent O_2, dry conditions, respectively. CO emissions will not exceed 50 ppmvd, corrected to 15 percent O_2, dry conditions during low-load (i.e., 70 to 60 percent) conditions.

Technology Description

In an oxidation catalyst control system, CO emissions are reduced by allowing unburned CO to react with oxygen at the surface of a precious metal catalyst, such as platinum. Combustion of CO starts at about 300°F, with removal efficiencies above 90 percent occurring at temperatures above 600°F. Catalytic oxidation occurs at temperatures 50 percent lower than that of thermal oxidation, which reduces the amount of thermal energy required.

For CTs, the oxidation catalyst can be located directly after the CT. Catalyst size depends upon the exhaust flow, temperature, and desired efficiency. The existing oxidation catalyst applications primarily have been limited to smaller cogeneration facilities burning natural gas, although larger units have been recently installed with oxidation catalysts.

SCONO$_x$™ also provides CO removal; however, it was not quantitatively evaluated because, as discussed with the NOx BACT information, it is not demonstrated on "F" Class turbines.

Combustrols are inherent in the design of the combustor to minimize the formation of CO while reducing NO$_x$ emissions.

Technical Feasibility and Ranking

Both an oxidation catalyst and combustion controls are technically feasible for the project. SCONO$_x$™ is not considered technically feasible.

For CTs, the oxidation catalyst can be located directly after the CT. Catalyst size depends upon the exhaust flow, temperature, and desired efficiency. The existing oxidation catalyst applications primarily have been limited to smaller cogeneration facilities burning natural gas, although larger units have been recently installed with oxidation catalysts.

Oxidation Catalyst Costs

Tables B-8 and B-9 present the capital and annualized cost for an oxidation catalyst applied one combined cycle unit. The maximum CO impacts are less than 0.1 percent of the

applicable ambient air quality standards. There would also be no secondary benefits, such as reducing acidic deposition, to reducing CO.

Comparison of Economic, Environmental and Energy Impacts

Tables B-10 present a comparison of the economic, environmental and energy impacts associated with the top control alternatives for a combined cycle unit. Table B-11 presents the potential emissions resulting from the formation of ammonium salts (i.e., particulate matter), ammonia slip and secondary emissions. The latter results from generation lost due to the back pressure of the oxidation catalyst.

Proposed BACT and Rationale

Emission limitations (see Table 4-1) consistent with good combustion practices are proposed as BACT. The energy, environmental and economic consequences of using catalytic oxidation on CTs is unreasonable as BACT. The proposed BACT emission rates for CO will not exceed 10 ppmvd (corrected to 15-percent O_2) at loads from 100 to 70 percent, 16 ppmvd (corrected to 15-percent O_2) for duct firing and 30 ppmvd while operating during power augmentation and duct firing. CO emission under low load operation (i.e., loads from 70 to 60 percent) will not exceed 50 ppmvd (corrected to 15-percent O_2). Catalytic oxidation is considered unreasonable for the following reasons:

1. Catalytic oxidation will not produce measurable reductions in the air quality impacts;
2. The economic impacts are significant (i.e., the capital cost is about $1.68 million per unit, with an annualized cost of $710,000 per year per unit;
3. Recent projects in Florida have been authorized with BACT emission limits of 12 ppmvd at base load on gas, and 30 ppmvd when duct firing; and
4. The added back pressure on the turbine will result in additional fuel consumption and lost energy.

Combustion design is proposed as BACT as a result of the technical and economic consequences of using catalytic oxidation on CTs. Catalytic oxidation is considered unreasonable since it will not produce a measurable reduction in the air quality impacts. In addition, the cost of an oxidation catalyst would be significant and not be cost effective given

the maximum proposed emission limits. Moreover, recent tests on a Siemens-Westinghouse "F" Class turbine with DLN found concentrations much less than 10 ppmvd. This actual experience suggests that CO concentrations when operation will be lower than that evaluated; thus, the economic impact analysis is conservative.

Table B-1. Federal NSPS for Electric Utility Stationary Gas Turbines

Pollutant	Emission Limitation[a]
Nitrogen Oxides[b]	0.0075 percent by volume (75 ppm) at 15 percent O_2 on a dry basis adjusted for heat rate and fuel nitrogen

[a] Applicable to electric utility gas turbines with a heat input at peak load of greater than 100 x 10^6 Btu/hr.

[b] Standard is multiplied by 14.4/Y; where Y is the manufacturer's rated heat rate in kilojoules per watt at rated load or actual measured heat rate based on the lower heating value of fuel measured at actual peak load; Y cannot be greater than 14.4. Standard is adjusted upward (additive) by the percent of nitrogen in the fuel:

Fuel-Bound Nitrogen (percent by weight)	Allowed Increase NO_x Percent by Volume
$N \leq 0.015$	0
$0.015 < N \leq 0.1$	0.04(N)
$0.1 < N \leq 0.25$	0.004+0.0067(N-0.1)
$N > 0.25$	0.005

where: N = the nitrogen content of the fuel (percent by weight).

Source: 40 CFR 60 Subpart GG.

Best Availble Control Technology (BACT) Determinations for Nitrogen Oxide (NO_x) Emissions for Combustion Turbines Including Duct Firing

	State	Permit Number	Permit Issue Date	Unit/Process Description	Capacity (size)	NO_x Emission Limit	Control Method
S AUTHORITY	FL	PSD-FL-254	12/16/99	TURBINE, COMBUSTION	260.00 MW	9.0000 PPMVD	GE DLNOX 2.6
SOMYRNA BEACH POWER CO. LP	FL	PSD-FL-257	10/15/99	TURBINE-GAS, COMBINED CYCLE	500.00 MW (2 UNITS)	9.0000 PPM @ 15% O2	DLN GE DLN2.6 BURNERS
)MPANY (TEC)	FL	PSD-FL-263	10/15/99	TURBINE, COMBUSTION, SIMPLE CYCLE	165.00 MW	10.5000 PPM @ 15% O2	DLN GE DLN2.6
PROJECT	FL	PSD-FL-258	10/1/99	TURBINE-GAS, COMBINED CYCLE	190.00 MW	9.0000 PPM @ 15% 02	DLN 2.6 GE ADVANCED DRY LOW NOX BURNERS
RD LLC	CT	105-0068	4/16/99	TURBINE, COMBUSTION, ABB GT-24, #1 WITH 2 CHILLERS	1.97 MMCF/H	2.0000 PPMV @ 15% O2 GAS	SCR WITH AMMONIA INJECTION
RD LLC	CT	105-0069	4/16/99	TURBINE, COMBUSTION, ABB GT-24E,#2 WITH 2 CHILLERS	1.97 MMCF/H	2.0000 PPMV @ 15% O2 GAS	SCR WITH AMMONIA INJECTION
OMPANY - THEODORE COGENERATION	AL	503-8073	3/16/99	TURBINE, WITH DUCT BURNER	170.00 MW	0.0130 LB/MMBTU	DLN COMBUSTOR IN CT, LNB IN DUCT BURNER, SCR
:Y	MI	279-98	2/8/99	TURBINE, COMBINED-CYCLE, POWER PLANT	500.00 MW	4.5000 PPM	SCR
C	AL	503-8066	1/5/99	TURBINE, GAS, COMBINED CYCLE	168.00 MW	0.0190 LB/MMBTU	SCR & DLN COMBUSTORS DURING GAS FIRING. STEAM/WATER INJECTION DURING OIL FIRING
S UTILITIES	CO	0410030	1/4/99	TURBINE, COMBINE, NATURAL GAS FIRED	30.00 MW EACH	15.0000 PPMVD ABOVE 70% LOAD	POLLUTION PREVENTION BUILT INTO EQUIPMENT.
PARTNERS, L.P.	GA	4-11-149-0004-P-01-0	12/18/98	TURBINE, COMBUSTION, SIMPLE CYCLE, 6	160.00 MW EA	15.0000 PPMVD @ 15% O2	USING 15% EXCESS AIR. NOX EMISSION IS BECAUSE OF NATURAL GAS.
PARTNERS, L.P.	GA	4-11-149-0004-P-01-0	12/18/98	TURBINE, COMBUSTION, SIMPLE CYCLE, 6	160.00 MW EA	42.0000 PPMVD @ 15% O2	USING 15% EXCESS AIR. NOX EMISSION IS BECAUSE OF FUEL OIL.
L LLC	ME	A-743-71-A-N	12/4/98	TURBINE, COMBINED-CYCLE, TWO	528.00 MW TOTAL	2.5000 PPM @15% O2	SELECTIVE CATALYTIC REDUCTION AND DRY LOW NOX BUR-NERS.
IMITED PARTNERSHIP	ME	A-735	12/4/98	TURBINE, COMBINED CYCLE	900.00 MW TOTAL	2.5000 PPM @ 15% O2 (NAT G)	SELECTIVE CATALYTIC REDUCTION. EMISSION IS FROM EACH 300 MW SYSTEM.
Y LLC	FL	PSD-FL 253	12/4/98	TURBINE, COMBUSTION, NATURAL GAS	241.00 MW	9.8000 PPM@15%O2 DB ON	DRY LOW NOX BURNER
VE, L.P.	MN	16300087-001	11/10/98	GENERATOR, COMBUSTION TURBINE & DUCT BURNER	1988.00 MMBTU/H (CTG)	4.5000 PPMDV @15%O2 (NG)	SELECTIVE CATALYTIC REDUCTION (SCR) WITH A NOX CEM AND A NOX PEM.
ATL CORP. & CHAMP. CLEAN ENERGY	ME	A-32-71-N-A	9/14/98	TURBINE, COMBINED CYCLE, NATURAL GAS	175.00 MW	9.0000 PPMVD @15% O2 GAS	DRY LOW NOX BURNER 1 OPTION IS CONSIDERED FOR OIL AND IS SELECTED.
ANT BARRY	AL	503-1001	8/7/98	TURBINES, COMBUSTION, NATURAL GAS	510.00 MW(TOTAL)	0.0130 LB/MMBTU	NATURAL GAS, CT-DLN COMBUSTORS, DUCTBURNER, LOW NOX BURNER, COMBINED STACK SCR
RMERLY TX-NM POWER CO.)	NM	PSD-NM-90-M2	8/7/98	GAS TURBINES	375.00 MMBTU/H	15.0000 PPM	WATER INJECTION FOLLOWED BY SELECTIVE CATALYTIC REDUCTION (SCR)
'CO	ME	A-728	7/13/98	TURBINE, COMBINED-CYCLE, NATURAL GAS, TWO	170.00 MW EACH	3.5000 PPM @15% O2	SELECTIVE CATALYTIC REDUCTION
ELECTRIC AND WATER UTILITIES	FL	PSD-FL-245	7/10/98	TURBINE, COMBUSTION, GAS FIRED W/ FUEL OIL ALSO	2174.00 MMBTU/H	25.0000 PPM @ 15% O2	DRY LOW NOX BURNERS FOR SIMPLE CYCLE, SCR WHEN COMBINED CYCLE
S UTILITIES-NIXON POWER PLANT	CO	94EP132	6/30/98	SIMPLE CYCLE TURBINE, NATURAL GAS	1122.00 MM BTU/HR	25.0000 PPM @ 15% O2	DRY LOW NOX COMBUSTION
Y, LLC	CT	0150190 & 0150191	6/29/98	TURBINES, COMBUSTION MODEL V84.3A, 2 SIEMES	260.00 MW/HRSG PER TURBINE	6.0000 PPM NAT. GAS	DRY LOW NOX BURNER WITH SCR
EE UTILITY SERVICES	FL	PSD-FL-239	5/29/98	TURBINE, COMBINED CYCLE, MULTIPLE FUELS	1468.00 MMBTU/H	0.0000 SEE P2 DESCRIPTION	DLN BURNERS VERSION 2.6 BY GE
PLASTICS	AL	207-0008-X016	5/27/98	COMBINED CYCLE (TURBINE AND DUCT BURNER)	0.00	0.0760 LBS/MBTU COMBINED	DRY LOW NOX BURNER ON TURBINE AND LOW NOX BURNER ON DUCT BURNER
SSOCIATES	ME	A-724-71-A-N	5/1/98	TURBINE GENERATOR, COMBUSTION, NATURAL GAS	1906.00 MMBTU/H	3.5000 PPM @ 15% O2	SCR AMMONIA INJECTION SYSTEM AND CATALYTIC REACTORTO REDUCE NOX.
ERGY LIMITED	ME	A-718-71-A-N	3/31/98	GAS TURBINES, COGEN, W/DUCT BURNERS	675.00 MMBTU/H TURBINE	6.0000 PPM @ 15% O2 NG	LOW NOX BURNERS. LOW NOX COMBUSTORS. SCR DURING GAS FIRING ONLY.
ERGY LIMITED	ME	A-718-71-A-N	3/31/98	GAS TURBINES, COGEN, W/DUCT BURNERS	675.00 MMBTU/H TURBINE	42.0000 PPM @ 15% O2 NG OIL	LOW NOX COMBUSTORS, LOW NOX BURNERS, WATER INJECTION DURING OIL FIRING.
	DE	APC-97/0503-CONST.(LAER)/NSPS	3/30/98	TURBINES, COMBINED CYCLE, 2	826.60 MMBTU/H	16.0000 PPM @ 15% O2 SYN GAS	NITROGEN INJECTION WHILE FIRING SYNGAS AND STEAM INJECTION WHILE FIRING LSDF
	DE	APC-97/0503-CONST.(LAER)/NSPS	3/30/98	TURBINES, COMBINED CYCLE, 2	826.60 MMBTU/H	42.0000 PPM @ 15% O2, DIESEL	NITROGEN INJECTION WHILE FIRING SYNGAS AND STEAM INJECTION WHILE FIRING LSDF
L GAS	AL	412-0013-X001 AND -X002	3/4/98	2-9160 HP GE MODEL MS3002G NATURAL GAS TURBINES	9160.00 HP	53.0000 LB/HR	
L GAS	AL	206-0021-X001 AND -X002	3/2/98	9160 HP GE MODEL MS3002G NATURAL GAS FIRED TURBINE	9160.00 HP	53.0000 LB/HR	
ON PARTNERS, LIMITED PARTNERSHIP	WY	CT-1352	2/27/98	TURBINE, STATIONARY	33.30 MW	25.0000 PPM @ 15% O2	DRY LOW NOX BURNERS
CA CORPORATION	LA	PSD-LA-622	2/13/98	TURBINE GAS, GE, 7ME 7	966.00 MMBTU/H	9.0000 PPMV	DRY LOW NOX TO LIMIT NOX EMISSION TO 9PPMV
SSOCIATES	RI	RI-PSD-5	2/13/98	COMBUSTION TURBINE, NATURAL GAS	265.00 MW	3.5000 PPM @ 15% O2	SCR
R PARTNER, LP	MA	130921	2/2/98	TURBINE, COMBUSTION, WESTINGHOUSE MODEL 501G	2534.00 MMBTU/H	0.0130 LB/MMBTU	DRY LOW-NOX COMBUSTION TECHNOLOGY IN CONJUNCTION WITH SCR ADD-ON NOX CONTROLS.
I	LA	PSD-LA-613	12/30/97	TURBINE, COGEN UNIT 2, GE FRAME 6	42.40 MW	8.0000 PPMV NAT. GAS	STEAM INJECTION AND SCR TO LIMIT NOX TO 8 PPM FOR NATURAL GAS AND 25 PPM FOR WASTE GAS (80% H2)
OMPANY	AL	108-0018-X001 AND -X002	12/17/97	COMBUSTION TURBINE W/ DUCT BURNER (COMBINED CYCLE)	100.00 MW	15.0000 PPM	DRY LOW NOX BURNERS
ITY	PA	60-0001A	11/26/97	NG FIRED TURBINE, SOLAR TAURUS T-73005	5.00 MW	25.0000 PPMV@15%O2	SOLONOX BURNER: LOW NOX BURNER
SSOCIATE, LP	MA	4896096	10/6/97	TURBINE, COMBUSTION, ABB GT11N2	1327.00 MMBTU/H	17.1200 LB/H	DRY LOW NOX COMBUSTION TECHNOLOGY WITH SCR ADD-ON NOX CONTROL.
NIA POWER AGENCY	CA	N-583-1-1	10/2/97	GE FRAME 5 GAS TURBINE	325.00 MMBTU/HR	25.0000 PPMVD @ 15% O2	DRY LOW NOX BURNERS
ORP. - RK SPRINGS COMPRESSOR COM	WY	MD-333	9/25/97	TURBINE COMPRESSOR ENGINE, NATURAL GAS FIRED, 2EA	1001.00 HP	2.8000 G/B-HP-H	
EVELOPMENT, INC.	MA	1-X-95-093	9/22/97	ENGINES, CHILLER, NATURAL GAS-FIRED, TWO	23.40 MMBTU/H	0.7000 LB/H	DRY LOW NOX COMBUSTION TECHNOLOGY WITH SCR ADD-ON NOX CONTROL.
EVELOPMENT, INC.	MA	1-X-95-093	9/22/97	TURBINE, COMBUSTION, ABB GT24	1792.00 MMBTU/H	20.3000 LB/H	DRY LOW NOX COMBUSTION TECHNOLOGY WITH SCR ADD-ON NOX CONTROL.
ICINE & DENTISTRY OF NEW JERSEY	NJ	087427/28/29 (3)	6/26/97	COMBUSTION TURBINE COGENERATION UNITS, 3	56.00 MMBTU/H	0.1670 LB/MMBTU NAT.GAS	
	NM	PSD-NM-1975	6/18/97	TURBINE, NATURAL GAS-FIRED, ELEC. GEN.	100.00 MW	74.4000 LBS/HR	DRY LOW-NOX TECHNOLOGY WHICH ADOPTS STAGED OR SCHEDULED COMBUSTION.
NIA GAS COMPANY	CA	S-1792-5-3	5/14/97	VARIABLE LOAD NATURAL GAS FIRED TURBINE COMPRESSOR	50.10 MMBTU/HR	25.0000 PPMVD @ 15% O2	DRY LOW NOX COMBUSTOR
NERS- BRUSH COGEN FAC	CO	91MR933	3/27/97	COGEN TURBINES W/ DUCT BURNERS & BOILERS	385.00 MM BTU/HR	42.0000 PPM @ 15% O2	LOW NOX COMBUSTION RETROFIT AND WATER INJECTION
RD, INC.	AL	211-0004	3/12/97	COMBINED CYCLE TURBINE (25 MW)	568.00 MMBTU/HR	25.0000 PPMVD@ 15% O2 (GAS)	F.O. OIL SULFUR CONTENT <=0.05% BY WT DLN NOX FIRING GAS WITH WATER INJECTION FIRING OIL
CORPORATION, BATON ROUGE PLANT	LA	PSD-LA-560 (M-2)	3/7/97	TURBINE/HSRG, GAS COGENERATION	450.00 MM BTU/HR	9.0000 PPMV	DRY LOW NOX BURNER/COMBUSTION DESIGN AND CONSTRUCTION.
OMPANY OF ARKANSAS	AR	800-AOP-RO	3/4/97	BOILER, COGENERATION/WASTE HEAT RECOVERY	68.00 MMBTU/H	25.0000 PPM @ 15% O2	LOW NOX COMBUSTORS
BLIC SERVICE COMPANY/CUNNINGHAM STA	NM	PSD-NM-622-M-2	2/15/97	COMBUSTION TURBINE, NATURAL GAS	100.00 MW	0.0000 SEE FACILITY NOTES	DRY LOW NOX COMBUSTION
	CA	S-1543-5-3 AND 6-3	1/10/97	SOLAR MODEL 1100 SATURN GAS TURBINE	13.60 MMBTU/HR	69.0000 PPMVD @15% O2	NO CONTROL
	CA	S-995-5-0	12/31/96	GAS TURBINE COGENERATION UNIT	0.00	0.1090 LB/MMBTU	LOW-NOX COMBUSTOR
L GAS COMPANY	MS	1300-00031	12/17/96	TURBINE, NATURAL GAS-FIRED	9160.00 HORSEPOWER	110.0000 PPMV @ 15% O2, DRY	PROPER TURBINE DESIGN AND OPERATION
BLIC SERVICE CO/CUNNINGHAM STATION	NM	PSD-NM-622-M-1	11/4/96	COMBUSTION TURBINE, NATURAL GAS	100.00 MW	15.0000 PPM; SEE FAC. NOTES	DRY LOW NOX COMBUSTION
	PR	PR-0102	10/1/96	TURBINES, COMBINED-CYCLE COGENERATION	461.00 MW	73.0000 LB/HR	STEAM/WATER INJECTION AND SELECTIVE CATALYTIC REDUCTION (SCR).
	PR	PR-0102	10/1/96	TURBINES, COMBINED-CYCLE COGENERATION	461.00 MW	60.0000 LB/HR	STEAM/WATER INJECTION AND SELECTIVE CATALYTIC REDUCTION (SCR).
RPORATION SVCS OF N.A.	IN	CP-051-5391-00037	8/9/96	PLANTWIDE COMBUSTION UNITS	1680.00 MMBTU/HP.	0.1300 LB/MMBTU	FUEL SPEC: USE OF NATURAL GAS AS FUEL.
WER, LP	PA	09-328-009	7/31/96	COMBUSTION TURBINE WITH HEAT RECOVERY BOILER	153.00 MW	4.0000 PPM @ 15% O2	DRY LNB WITH SCR, WATER INJECTION FOR OIL FIRING. OIL FIRING LIMITS SET TO 8.4 PPM @15% O2
Y	CO	95PB013	6/14/96	SIMPLE CYCLE TURBINE, NATURAL GAS	218.50 MW	15.0000 PPM @ 15% O2 (@>75%)	DLN NOX . COMMITMENT TO UPGRADE THE DLN TO NEW VERSIONS EMITTING LOWER NOXAS THEY BECOME AVAILABLE.
COLO.-FORT ST VRAIN	CO	94WE609	5/1/96	COMBINED CYCLE TURBINES (2), NATURAL	471.00 MW	15.0000 PPMVD, SMPL CY	DRY LOW NOX COMBUSTION SYSTEMS FOR TURBINES AND DUCT BURNERS
LIGHT	NC	1812	4/1/96	COMBUSTION TURBINE, 4 EACH	1907.60 MMBTU/HR	512.3000 LB/HR	WATER INJECTION; FUEL SPEC: 0.04% N FUEL OIL
LIGHT	NC	1812	4/1/96	COMBUSTION TURBINE, 4 EACH	1907.60 MMBTU/HR	158.0000 LB/HR	WATER INJECTION
N.	GA	4911-076-11753	4/3/96	COMBUSTION TURBINE (2), NATURAL GAS	116.00 MW	9.0000 PPMVD	DRY LOW NOX BURNER WITH SCR
N.	GA	4911-076-11753	4/3/96	COMBUSTION TURBINE (2), FUEL OIL	116.00 MW	20.0000 PPMVD	WATER INJECTION WITH SCR
PORATION	LA	PSD-LA-592	3/26/96	GENERATOR, NATURAL GAS FIRED TURBINE	1123.00 MM BTU/HR	25.0000 PPMV-CORR. TO 15%O2	CONTROL NOX USING STEAM INJECTION
UNIT 3	FL	PA-89-25RA / PSD-FL-214	1/1/96	COMBINED CYCLE COMBUSTION TURBINE	140.00 MW	15.0000 PPM @ 15% O2	DRY LNB STAGED COMBUSTION
NE	AZ	95-0241	11/12/95	ENGINES, COGENERATION (4)	800.00 KW	99.0000 TPY	AIR/FUEL CONTROLLER ADJUSTED TO OBTAIN LOW NOX
TRIC SYSTEM	FL	AC44-245399 / PSD-FL-210	9/28/95	TURBINE, EXISTING CT RELOCATION TO A NEW PLANT	23.00 MW	75.0000 PPM @ 15% O2	WATER INJECTION
RPORATION	LA	PSD-LA-590	9/22/95	GENERATOR, GAS TURBINE	1313.00 MM BTU/HR	25.0000 PPMV CORR. TO 15% O2	DRY LOW NOX COMBUSTOR
TRIC POWER AUTHORITY (PREPA)	PR	PR-0100	7/31/95	COMBUSTION TURBINES (3), 83 MW SIMPLE-CYCLE EACH	248.00 MW	35.0000 LB/HR AS NO2	STEAM INJECTION PLUS SCR SYSTEM. USE OF NO. 2 F.O. NITROGEN CONTENT NOT TO EXCEED 0.10% BY WEIGHT.
ICIPAL POWER FACILITY	MO	0795-0023	7/27/95	ADD OF A DUAL FUEL FIRED TWIN-PAC TURBINE	49.10 MW	42.0000 PPM BY VOL 1 HR AVG	CONTROLS TO REGULATE THE FUEL CONSUMPTION AND THE RATIO OF WATER TO FUEL BEING FIRED IN THE TURBINES
ICIPAL POWER FACILITY	MO	0795-0023	7/27/95	ADD OF A DUAL FUEL FIRED TWIN-PAC TURBINE	49.10 MW	75.0000 PPM BY VOL 1 HR AVG	CONTROLS TO REGULATE THE FUEL CONSUMPTION AND THE RATIO OF WATER TO FUEL BEING FIRED IN THE TURBINES
ARD COGENERATION PARTNERS L.P.	NY	2-6101-00185/00002-9	6/6/95	TURBINE, OIL FIRED	240.00 MW	10.0000 PPM @ 15% O2	SCR
ARD COGENERATION PARTNERS L.P.	NY	2-6101-00185/00002-9	6/6/95	TURBINE, NATURAL GAS FIRED	240.00 MW	3.5000 PPM @ 15% O2	SCR
L.P.	FL	AC53-251898/PSD-FL-216	6/1/95	COMBINED CYCLE COMBUSTION TURBINE (TOTAL 115MW)	75.00 MW	15.0000 PPM @ 15% O2	DRY LOW NOX BURNER
BLE PAPER PRODUCTS CO (CHARMIN)	PA	66-0001	5/31/95	TURBINE, NATURAL GAS	580.00 MMBTU/HR	55.0000 PPM @ 15% O2	STEAM INJECTION
E, NUTLEY COGEN FACILITY	NJ	SEE FACILITY NOTES	5/8/95	TURBINE, GM LM500	86.60 MMBTU/H	0.3400 LB/MMBTU	
NAL UTILITIES	FL	PSD-FL-212	4/1/95	SIMPLE CYCLE COMBUSTION TURBINE, GAS/NO 2 OIL B-UP	74.00 MW	15.0000 PPM AT 15% OXYGEN	DRY LOW NOX BURNERS GE FRAME UNIT, CAN ANNULAR COMBUSTORS
NAL UTILITIES	FL	PSD-FL-212	4/1/95	OIL FIRED COMBUSTION TURBINE	74.00 MW	42.0000 PPM AT 15% OXYGEN	WATER INJECTION
ANSMISSION COMPANY	NJ	LOG# 94-0079	3/31/95	TURBINES COMBUSTION, TWO SOLAR CENTAUR	3.10 MW EACH	0.0000 NOT APPLICABLE	GOOD COMBUSTION PRACTICE
ANSMISSION COMPANY	NJ	LOG# 94-0079	3/31/95	TURBINES COMBUSTION, TWO SOLAR CENTAUR	3.10 MW EACH	43.3800 LB/H	
CORPORATION, LOUISIANA	LA	PSD-LA-560 (M-1)	3/2/95	TURBINE/HRSG, GAS COGENERATION	450.00 MM BTU/HR	9.0000 PPMV	DRY LOW NOX BURNER/COMBUSTION DESIGN AND CONTROL
E, L.P.	MN	16300087-001	3/1/95	COMBUSTION TURBINEGENERATOR	1970.00 MMBTU/HR	4.5000 PPM @ 15% O2 GAS	SELECTIVE CATALYTIC REDUCTION (SCR)
ECTRIC CO.	MO	0395-015	2/28/95	INSTALL TWO NEW SIMPLE-CYCLE TURBINES	86.77 MW	360.0000 TPY	WATER INJECTION.
- INDIAN BASIN N.G. PLAN	NM	PSD-NM-295-M-2	1/11/95	TURBINES, NATURAL GAS (2)	5000.00 HP	7.4000 LBS/HR	LEAN-PREMIXED COMBUSTION TECHNOLOGY. DRY/LOW NOX
YRACUSE LP	NY	313201 2010/00001-00007	12/10/94	SIEMENS V64.3 GAS TURBINE (EP #00001)	650.00 MMBTU/HR	25.0000 PPM	WATER INJECTION
NERGY CENTER	NY	351200 0211 00001	10/6/94	GE FRAME 6 GAS TURBINE	533.00 LB/MMBTU	42.0000 PPM, 75.00 LB/HR	STEAM INJECTION
	CA	10863	10/5/94	TURBINE, GAS COMBINED CYCLE GE MODEL 7	920.00 MMBTU/H	2.6000 PPM @ 15% O2	SELECTIVE CATALYTIC REDUCTION AND DRY LOW NOX COMBUSTION
NT	NY	350400 0221 00001	9/15/94	GE LM5000 GAS TURBINE	500.00 MMBTU/HR	36.0000 PPM, 65 LB/HR	WATER INJECTION
ND LIGHT	SC	0820-0033	8/31/94	STATIONARY GAS TURBINE	1520.00 MMBTU/H	62.0000 PPMDV @ 15% O2	WATER INJECTION
ND LIGHT	SC	0820-0033	8/31/94	STATIONARY GAS TURBINE	1520.00 MMBTU/H	25.0000 PPMDV @ 15% O2	WATER INJECTION

Best Available Control Technology (BACT) Determinations for Nitrogen Oxide (NO_x) Emissions for Combustion Turbines Including Duct Firing

	State	Permit Number	Permit Issue Date	Unit/Process Description	Capacity (size)	NO_x Emission Limit	Control Method
)R AUTHORITY CAMPBELL SOUP	CA	11456	8/19/94	TURBINE GAS, COMBINE CYCLE SIEMENS V84.2	1257.00 MMBTU/H	3.0000 PPM @ 15% O2	SELECTIVE CATALYTIC REDUCTION AND DRY LOW NOX COMBUSTION
MITED	CA	S-2049-1-0	8/19/94	TURBINE, GE, COGENERATION, 48 MW	48.00 MW	3.6000 PPMVD @ 15% O2	STEAM INJECTION AND SELECTIVE CATALYTIC REDUCTION
NERATION AUTHORITY P&G	CA	11459	8/19/94	TURBINE, SIMPLE CYCLE LM6000 GAS	421.40 MMBTU/H	5.0000 PPM @ 15% O2	SELECTIVE CATALYTIC REDUCTION AND WATER INJECTION
NERATION AUTHORITY P&G	CA	11436	8/19/94	TURBINE, GAS, COMBINED CYCLE LM6000	421.40 MMBTU/H	5.0000 PPM @ 15% O2	SELECTIVE CATAYTIC REDUCTION AND WATER INJECTION
NERATION AUTHORITY P&G	CA	11436	8/19/94	TURBINE, GAS, COMBINED CYCLE LM6000	421.40 MMBTU/H	3.0000 PPM @ 15% 02	SELECTIVE CATALYTIC REDUCTION AND WATER INJECTION
)R AUTHORITY CAMPBELL SOUP	CA	11456	8/19/94	TURBINE, GAS , COMBINED CYCLE, SIEMENS V84.2	1257.00 MMBTU/H	3.0000 PPMVD @ 15% O2	SELECTIVE CATALYTIC REDUCTION AND DRY LOW NOX COMBUSTION
\TING CO.	OR	30-0113	7/7/94	TURBINES, NATURAL GAS (2)	1696.00 MMBTU/H	4.5000 PPM @ 15% O2	SCR
	NV	A0113	6/10/94	COMBUSTION TURBINE, DIESEL & NATURAL GAS	140.00 MEGAWATT	303.0000 LB/HR	LOW NOX BURNER
	NV	A0116	6/10/94	COMBUSTION TURBINE, DIESEL & NATURAL GAS	140.00 MEGAWATT	273.0000 LB/HR	DRY LOW NOX COMBUSTOR
L ELECTRIC CO.	OR	25-0031	5/31/94	TURBINES, NATURAL GAS (2)	1720.00 MMBTU	4.5000 PPM @ 15% O2	SCR
ECTRIC CO.	MO	0594-035	5/17/94	INSTALL TWO NEW SIMPLE-CYCLE TURBINES	1345.00 MMBTU/HR	25.0000 PPM BY VOL 1 HR AVG.	LOW NOX BURNERS, AND WATER INJECTION
ECTRIC CO.	MO	0594-035	5/17/94	INSTALL TWO NEW SIMPLE-CYCLE TURBINES	1345.00 MMBTU/HR	1135.0000 TPY	LOW NOX BURNERS, AND WATER INJECTION
MPANY, ROBINS TURBINE PROJECT	GA	4911-076-11348	5/13/94	TURBINE, COMBUSTION, NATURAL GAS	80.00 MW	25.0000 PPM	WATER INJECTION, FUEL SPEC: NATURAL GAS
NERATION COMPANY	TX	23962/PSD-TX-837	5/2/94	GAS TURBINES	75.30 MW (TOTAL POWER)	200.0000 TPY	INTERNAL COMBUSTION CONTROLS
JERATION ASSOCIATES	PA	06-328-001	4/22/94	NG TURBINE (GE LM6000) WITH WASTE HEAT BOILER	560.00 MMBTU/HR	21.0000 LB/HR	SCR WITH LOW NOX COMBUSTORS
RPORATION POLK COUNTY SITE	FL	PSD-FL-195	3/25/94	TURBINE, NATURAL GAS (2)	1510.00 MMBTU/H	12.0000 PPMVD @15 % O2	DRY LOW NOX COMBUSTOR
RPORATION POLK COUNTY SITE	FL	PSD-FL-195	3/25/94	TURBINE, FUEL OIL (2)	1730.00 MMBTU/H	42.0400 PPMVD @ 15 %O2	WATER INJECTION
PER	LA	PSD-LA-93(M-3)	3/24/94	TURBINE/HRSG, GAS COGEN	238.00 MM BTU/HR TURBINE	25.0000 PPMV 15% O2 TURBINE	DRY LOW NOX COMBUSTOR/COMBUSTION CONTROL
STATION	FL	PSD-FL-194	3/24/94	TURBINE, SYNGAS (COAL GASIFICATION)	1755.00 MMBTU/H	25.0000 PPMVD @ 15 % O2	DRY LOW NOX COMBUSTOR
STATION	FL	PSD-FL-194	3/24/94	TURBINE, FUEL OIL	1765.00 MMBTU/H	42.0000 PPMVD @ 15 % O2	WET INJECTION
6ATHACE L.F.	NY	226091 0203 00001	1/18/94	GE FRAME 6 GAS TURBINE	491.00 BTU/HR	42.0000 PPM, 76.8 LB/HR	STEAM INJECTION
DERAL COLD STORAGE COGENERATION)	CA	RECLAIM 55711	1/15/94	TURBINE, NATURAL GAS FIRED, COMBINED CYCLE AND COG.	28.00 MW	186417.0000 LB/YR	WATER INJECTION AND SCONOX (MOD 2) CATALYST SYSTEM IS INSTALLED AFTER THE HRSG.
TION LP	FL	PSD-FL-206	12/20/93	TURBINE, NATURAL GAS, 2	268.30 MMBTU/H	15.0000 PPM @ 15% O2	DRY LOW NOX COMBUSTOR
SSOCIATES	NY	311500 2015 00001	12/1/93	GE LM-5000 GAS TURBINE	250.00 MMBTU/HR	25.0000 PPM, 47 LB/HR	STEAM INJECTION, FUEL SPEC; NATURAL GAS ONLY
VICES CO. - EL CEDRO COMPRESSOR	NM	PSD-NM-340(M3)	10/29/93	TURBINE, GAS-FIRED	11257.00 HP	42.0000 PPM @ 15% O2	SOLONOX COMBUSTOR, DRY LOW NOX TECHNOLOGY
RATION - C&H SUGAR	CA	S-301	10/5/93	TRUBINE, GAS, CENERAL ELECTRIC MODEL PG7221(FA)	240.00 MW	5.0000 PPMVD @ 15% O2	DRY LOW-NOX COMBUSTERS AND A MITSUBISHI HEAVY INDUSTRIES AMERICAN SELECTIVE CATALYTIC REDUCTION CATA
MISSION	FL	FL-PSD-202	9/27/93	TURBINE, GAS	131.59 MMBTU/H	25.0000 PPM @ 15% O2	DRY LOW NOX COMBUSTOR
R PARTNERS, LIMITED PARTNERSHIP	VA	71975	9/15/93	TURBINE, COMBUSTION, SIEMENS MODEL V84.2, 3	10.20 X109 SCF/YR NAT GAS	121.0000 LB/HR(GAS), 339 OIL	DRY LOW NOX COMBUSTOR; DESIGN, WATER INJECTION
MISSION COMPANY "	AL	503-3028-X005	8/5/93	TURBINE, NATURAL GAS	12600.00 BHP	0.5800 GAMP HR	AIR-TO-FUEL RATIO CONTROL, DRY LOW NOX COMBUSTION
OUP & CENTRAL VALLEY FINANCING AUT	CA	11012	7/23/93	TURBINE, GAS, COMBINED CYCLE, GE LM6000	450.00 MMBTU/H	5.0000 PPMVD @ 15% O2	SCR AND WATER INJECTION ALSO HAS CARBON ABSORPTION SYSTEM IN DIGESTER TO REMOVE ORGANSILOXANES
OUP & CENTRAL VALLEY FINANCING AUT	CA	11013	7/23/93	TURBINE, GAS, SIMPLE CYCLE, GE LM6000	450.00 MMBTU/H	5.0000 PPMVD @ 15% O2	SELECTIVE CATAYLTIC REDUCTION AND WATER INJECTION
ACILITY	NY	292600 0446/00001-00007	7/14/93	(6) GE FRAME 6 TURBINES (EP #5 00001-00006)	423.90 MMBTU/HR	42.0000 PPM	STEAM INJECTION
4T	NY	030200 0451	7/7/93	GE LM5000 COMBINED CYCLE GAS TURBINE EP #00001	451.00 MMBTU/HR	25.0000 PPM, 41 LB/HR	NO CONTROLS
OS ANGELES DATA CENTER	CA	A/N 272850	6/24/93	TURBINE, DIESEL & GENERATOR (SEE NOTES)	0.00	163.0000 PPM @ 15% O2	FUEL SPEC: LOW NOX DIESEL FUEL (SEE NOTES)
VERATION PARTNERSHIP, L.P.	NJ	01-92-5231 TO 01-92-5261	6/9/93	TURBINES, COMBUSTION, NATURAL GAS-FIRED (2)	617.00 MMBTU/HR (EACH)	8.3000 PPMDV	SCR
JERATION PARTNERSHIP, L.P.	NJ	01-92-5231 TO 01-92-5261	6/9/93	TURBINES, COMBUSTION, KEROSENE-FIRED (2)	640.00 MMBTU/H (EACH)	16.0000 PPMDV	SCR
	FL	PSD-FL-190	5/17/93	TURBINE, GAS	1614.80 MMBTU/H	15.0000 PPM @ 15% O2	DRY LOW NOX COMBUSTOR
	FL	PSD-FL-190	5/17/93	TURBINE, OIL	1849.90 MMBTU/H	42.0000 PPM @ 15% O2	WATER INJECTION
MPANY	NY	563203 0099	5/12/93	GE FRAME 6 GAS TURBINE EP #00001	491.00 MMBTU/HR	32.0000 PPM	STEAM INJECTION
RTNERS	CO	92WE0357	5/11/93	TURBINE (NATURAL GAS)	311.00 MMBTU/HR	22.0000 PPM @ 15% O2	DRY LOW NOX COMBUSTION
	NY	472200 5378	5/10/93	(3) GE FRAME 7 TURBINES (EP #5 00007-9)	850.00 MMBTU/HR	25.0000 PPM +FBN & HEAT RATE	WATER INJECTION
LD	NY	282089 4163 00004	4/16/93	GE FRAME 6 GAS TURBINE	424.70 MMBTU/HR	60.0000 PPM, 90 LB/HR	STEAM INJECTION
UTHORITY	FL	FL-PSD-182	4/7/93	TURBINE, NATURAL GAS	869.00 MMBTU/H	15.0000 PPM @ 15% O2	DRY LOW NOX COMBUSTOR
UTHORITY	FL	FL-PSD-182	4/7/93	TURBINE, NATURAL GAS	367.00 MMBTU/H	15.0000 PPM @ 15% O2	DRY LOW NOX COMBUSTOR
UTHORITY	FL	FL-PSD-182	4/7/93	TURBINE, FUEL OIL	928.00 MMBTU/H	42.0000 PPM @ 15% O2	WATER INJECTION
UTHORITY	FL	FL-PSD-182	4/7/93	TURBINE, FUEL OIL	371.00 MMBTU/H	42.0000 PPM @ 15% O2	WATER INJECTION
WER COOPERATIVE	KY	C-93-045	3/24/93	TURBINES (5), #2 FUEL OIL AND NAT. GAS FIRED	1492.00 MMBTU/H (EACH)	42.0000 PPM @ 15% O2 (OIL)	WATER INJECTION
WER CO. RIVERDALE MILL	AL	104-0003-X026	1/13/93	TURBINE, STATIONARY (GAS-FIRED) WITH DUCT BURNER	63.00 MW	0.0800 LB/MMBTU (GAS)	LOW NOX BURNERS (ON THE DUCT BURNER) STEAM INJECTION INTO THE TURBINE
PAL POWER AUTHORITY	OK	92-016-C (PSD)	12/17/92	TURBINE, COMBUSTION	58.00 MW	65.0000 PPM @ 15% O2	COMBUSTION CONTROLS
PAL POWER AUTHORITY	OK	92-016-C (PSD)	12/17/92	TURBINE, COMBUSTION	58.00 MW	25.0000 PPM @ 15% O2	COMBUSTION CONTROLS
R PARTNERS, LP	FL	PSD-FL-165	12/14/92	TURBINE,GAS	1216.00 MMBTU/H	15.0000 PPMVD @ 15 % O2	DRY LOW NOX COMBUSTOR
R PARTNERS, LP	FL	PSD-FL-165	12/14/92	TURBINE, OIL	1170.00 MMBTU/H	42.0000 PPMVD @ 15 % 02	STEAM INJECTION
:B POWER PARTNERS	NY	7-3556-00040-00007-9	11/24/92	TURBINES, COMBUSTION (4) (NATURAL GAS) (1012 MW)	2133.00 MMBTU/HR (EACH)	4.3000 PPM	SCR AND DRY LOW NOX
EAVER FALLS COGENERATION FACILITY	NY	6-2320-00018/00001-0	11/9/92	TURBINE, COMBUSTION (NAT. GAS & OIL FUEL) (79MW)	650.00 MMBTU/HR	50.0000 PPM	DRY LOW NOX OR SCR
EAVER FALLS COGENERATION FACILITY	NY	6-2320-00018/00001-0	11/9/92	TURBINE, COMBUSTION (NAT. GAS & OIL FUEL) (79MW)	650.00 MMBTU/HR	9.0000 PPM	DRY LOW NOX OR SCR
ORNING L.P.	NY	8-4638-00022/01-0	11/5/92	TURBINE, COMBUSTION (79 MW)	653.00 MMBTU/HR	9.0000 PPM	DRY LOW NOX OR SCR
NERATION PARTNERSHIP	PA	92181 TO 92184	11/4/92	TURBINE (NATURAL GAS & OIL)	1150.00 MMBTU	9.0000 PPMVD (NAT. GAS)*	DRY LOW NOX BURNER; COMBUSTION CONTROL
OE	CA	911504	11/3/92	TURBINE, COMBUSTION (NATURAL GAS) (42.4 MW)	386.00 MMBTU/HR	5.0000 PPMVD @ 15% OXYGEN	WATER INJECTION & SCR W/ AUTOMATIC AMMONIA INJECT.
COMPANY, L.P.	VA	50840	10/30/92	TURBINE, COMBUSTION GAS	474.00 X10(6) BTU/HR N. GAS	9.0000 PPM	SELECTIVE CATALYTIC REDUCTION (SCR)
COMPANY, L.P.	VA	50840	10/30/92	TURBINE, COMBUSTION GAS	468.00 X10(6) BTU/HR #2 OIL	15.0000 PPM	SCR
COMPANY, L.P.	VA	50840	10/30/92	TURBINE, COMBUSTION GAS (TOTAL)	0.00	69.7000 TPY	SCR
RGY L.P.	VA	REGISTRATION # 40808	9/25/92	TURBINE FACILITY, GAS	1331.13 X10(7) SCF/Y NAT GAS	245.0000 TOTAL TPY	SELECTIVE CATALYTIC REDUCTION (SCR) W/ WATER INJEC
RGY L.P.	VA	REGISTRATION # 40808	9/25/92	TURBINE FACILITY, GAS	7.44 X10(7) GPY FUEL OIL	245.0000 TOTAL TPY	SELECTIVE CATALYTIC REDUCTION (SCR)
RGY L.P.	VA	REGISTRATION # 40808	9/25/92	TURBINES (2) (EACH WITH A SF)	1.51 X10(9) BTU/HR N.GAS	9.0000 PPMDV/UNIT @ 15% 02	SCR WITH WATER INJECTION
RGY L.P.	VA	REGISTRATION # 40808	9/25/92	TURBINES (2) (EACH WITH A SF)	1.36 X10(9) BTU/H #2 OIL	66.0000 LBS/HR/UNIT	WATER INJECTION AND SCR
MPANY, HARRY ALLEN PEAKING PLANT	NV	A533	9/18/92	COMBUSTION TURBINE ELECTRIC POWER GENERATION	600.00 MW @ UNITS 75 EACH	88.6000 TPY (EACH TURBINE)	LOW NOX COMBUSTOR
HS FALLS COGEN CO	NY	414401 0212 00001	9/10/92	GE FRAME 6 GAS TURBINE	498.00 MMBTU/HR	42.0000 PPM, 76.6 LB/HR	WATER INJECTION
'OWER COMPANY	SD	NONE	9/2/92	TURBINE, SIMPLE CYCLE, 4 EACH	129.00 MW	24.0000 PPM @ 15% O2 GAS	WATER INJECTION FOR GAS & DISTILLATION
COMBINED CYCLE PLANT	NY	1-4722-00926/00001-9	9/1/92	TURBINE, COMBUSTION GAS (150 MW)	1146.00 MMBTU/HR (GAS)*	42.0000 PPM	WATER INJECTOR
COMBINED CYCLE PLANT	NY	1-4722-00926/00001-9	9/1/92	TURBINE, COMBUSTION GAS (150 MW)	1146.00 MMBTU/HR (GAS)*	9.0000 PPM	DRY LOW NOX
COMBINED CYCLE PLANT	NY	1-4722-00926/00001-9	9/1/92	GENERATOR, EMERGENCY (NATURAL GAS)	1.50 MMBTU/HR	1.3000 LB/MMBTU	LEAN BURN ENGINE
	WI	91-RV-043	8/28/92	TURBINES, COMBUSTION (4)	0.00	65.0000 PPM @ 15% O2	GOOD COMBUSTION PRACTICES
	WI	91-RV-043	8/28/92	TURBINES, COMBUSTION (4)	0.00	25.0000 PPM @ 15% O2	GOOD COMBUSTION PRACTICES
RPORATION	FL	FL-PSD-180	8/17/92	TURBINE, OIL	1029.00 MMBTU/H	42.0000 PPMVD @ 15 % O2	WET INJECTION
RPORATION	FL	FL-PSD-180	8/17/92	TURBINE, OIL	1666.00 MMBTU/H	42.0000 PPMVD @ 15 % O2	WET INJECTION
4E COMPANY	WA	92-4	8/13/92	TURBINE, GAS-FIRED	12100.00 HP	196.0000 PPM @ 15% O2	ADVANCED DRY LOW NOX COMBUSTOR (BY 07/01/95)
	OH	91-3870	8/12/92	TURBINE (NATURAL GAS) (3)	5500.00 HP (EACH)	1.6000 GM/P-HR*	LOW NOX COMBUSTION
OMPANY	NY	5-0942-00106/00001-9	7/31/92	TURBINES, COMBUSTION (2) (NATURAL GAS)	1123.00 MMBTU/HR (EACH)	9.0000 PPM	SCR
LIMITED PARTNERSHIP	GA	4911-073-10941	7/28/92	TURBINE, GAS FIRED (2 EACH)	1817.00 M BTU/HR	25.0000 PPM @ 15% O2	MAXIMUM WATER INJECTION
LIMITED PARTNERSHIP	GA	4911-073-10941	7/28/92	TURBINE, OIL FIRED (2 EACH)	1840.00 M BTU/HR	25.0000 PPMVD, FUEL N AFLOW	MAXIMUM WATER INJECTION
MPANY, LTD/MAALAEA GENERATING STA	HI	HI 90-08	7/28/92	TURBINE, COMBINED-CYCLE COMBUSTION	28.00 MW	42.3000 LB/HR	WATER INJECTION
RGY SERVICES	NY	146400 0133	6/24/92	GE FRAME 6 GAS TURBINE (EP #00001)	432.20 MMBTU/HR	42.0000 PPM, 74 LB/HR	STEAM INJECTION
TION PARTNERS, L.P.	NY	4-0122-00078/00002-9	6/18/92	COMBUSTION TURBINES (2) (252 MW)	1173.00 MMBTU/HR (EACH)	9.0000 PPM GAS	STEAM INJECTION AND SCR
TION PARTNERS, L.P.	NY	4-0122-00078/00002-9	6/18/92	COMBUSTION TURBINE (79 MW)	1173.00 MMBTU/HR	25.0000 PPM GAS	STEAM INJECTION
TON PARTNERS, L.P.	WA	91-04	5/29/92	COGENERATION PLANT, COMBINED CYCLE	1.83 MMBTU/HR	7.0000 PPM @ 15% O2 (GAS)	STAGED LOW NOX DUCT BURNERS, STEAM INJECTION, SELECTIVE CATALYTIC REDUCTION (SCR)
GE CORPORATION	CO	91LP792(1-2) MOD. #1	5/29/92	TURBINE, SOLAR TAURUS	45.00 MMBTU/HR	90.0000 PPMVD (UNTIL 11/98)	DRY LOW NOX COMBUSTOR (BY 11/01/98)
CTRIC/NEW ENGLAND POWER CO.	RI	RI-PSD-4	4/13/92	TURBINE, GAS AND DUCT BURNER	1360.00 MMBTU/H EACH	9.0000 PPM @ 15% O2, GAS	SCR
S COMPANY	KY	C-92-005	3/19/92	TURBINE, #2 FUEL OIL/NATURAL GAS (8)	1500.00 MM BTU/HR (EACH)	42.0000 PPM @ 15% O2, N. GAS	WATER INJECTION
) ENERGY LIMITED PARTNERSHIP	VA	51020	3/3/92	TURBINE, COMBUSTION	1175.00 MMBTU/H NAT. GAS	9.0000 PPM @ 15% O2	SCR, STEAM INJECTION
) ENERGY LIMITED PARTNERSHIP	VA	51020	3/3/92	TURBINE, COMBUSTION	1117.00 MMBTU/H NO2 FUEL OIL	15.0000 PPM @ 15% O2	SCR, STEAM INJ.
) ENERGY LIMITED PARTNERSHIP	VA	51020	3/3/92	TURBINE, COMBUSTION, 2	0.00	191.1000 T/YEAR/UNIT	
S, LTD.	CO	91WE0457(1-5)	2/19/92	TURBINE, GAS FIRED, 5 EACH	246.00 MMBTU/H	25.0000 PPM @ 15% O2	DRY LOW NOX TECH.
C AND POWER CO.	CA	4911-051-8029	2/12/92	TURBINES, 8	1032.00 MMBTU/H, NAT GAS	25.0000 PPM @ 15% O2	MAX WATER INJECTION
C AND POWER CO.	GA	4911-051-8029	2/12/92	TURBINES, 8	972.00 MMBTU/H, #2 OIL	0.0000 SEE NOTES	MAX WATER INJECTION
CHT CO., INC.	HI	HI 90-04	2/12/92	TURBINE, FUEL OIL #2	20.00 MW	42.3000 LB/HR	COMBUSTOR WATER INJECTOR, WATER INJECTION
TION TECHNOLOGY	NJ		1/21/92	TURBINE, NATURAL GAS FIRED	58.00 X E12 BTU/YR	33.8000 LB/HR	STEAM INJECTION AND SCR
EVICE COMPANY	AK	9136-AA012	1/17/92	SOLAR CENTAUR, 3	800.00 KW	150.0000 PPMVD @ 15% O2	LOW NOX BURNERS

Best Available Control Technology (BACT) Determinations for Nitrogen Oxide (NO_x) Emissions for Combustion Turbines Including Duct Firing

	State	Permit Number	Permit Issue Date	Unit/Process Description	Capacity (size)	NO_x Emission Limit	Control Method
ATURAL DAM LP	NY	404089 0305 00001	12/31/91	GE FRAME 6 GAS TURBINE	500.00 MMBTU/HR	42.0000 PPM, 80.1 LB/HR	STEAM INJECTION
NCOLN COMBUSTION TURBINE STATION	NC	7171	12/20/91	TURBINE, COMBUSTION	1313.00 MM BTU/HR	119.0000 LB/HR	MULTINOZZLE COMBUSTOR, MAXIMUM WATER INJECTION
NCOLN COMBUSTION TURBINE STATION	NC	7171	12/20/91	TURBINE, COMBUSTION	1347.00 MM BTU/HR	287.0000 LB/HR	MULTINOZZLE COMBUSTOR, MAXIMUM WATER INJECTION
MPANY, LTD.	HI	HI-90-02	12/3/91	TURBINE, FUEL OIL #2	28.00 MW	42.0000 PPM	WATER INJECTION
R LIMITED	MI	1234-90	12/3/91	TURBINE, GAS-FIRED, 3; W/ WASTE HEAT BOILERS	1805.90 MMBTU/H	15.0000 PPMV	DRY LOW NOX TURBINES
ID	FL	PSD-FL-176	11/20/91	TURBINE, GAS, 2 EACH	42.00 MW	25.0000 PPM @ 15% O2	COMBUSTION CONTROL
ID	FL	PSD-FL-176	11/20/91	TURBINE, OIL, 2 EACH	42.00 MW	42.0000 PPM @ 15% O2	COMBUSTION CONTROL
COMMISSION	FL	PSD-FL-173	11/5/91	TURBINE, GAS, 4 EACH	35.00 MW	42.0000 PPM @ 15% O2	WET INJECTION
COMMISSION	FL	PSD-FL-173	11/5/91	TURBINE, OIL, 4 EACH	35.00 MW	65.0000 PPM @ 15% O2	WET INJECTION
INIA GAS	CA	2046009-011	10/29/91	TURBINE, GAS-FIRED	47.64 MMBTU/H	8.0000 PPMVD @ 15% O2	HIGH TEMPERATURE SELECTIVE CATALYTIC REDUCTION
INIA GAS	CA	2046009-011	10/28/91	TURBINE, GAS FIRED, SOLAR MODEL H	5500.00 HP	8.0000 PPM @ 15% O2	HIGH TEMP SELECT. CAT. REDUCTION
AS	AZ		10/25/91	TURBINE, GAS, SOLAR CENTAUR H	3500.00 HP	84.9000 PPM @ 15% O2	LEAN BURN
AS	AZ		10/25/91	TURBINE, GAS, SOLAR CENTAUR H	3500.00 HP	42.0000 PPM @ 15% O2	DRY LOW NOX COMBUSTOR
AS	AZ		10/25/91	TURBINE, GAS, SOLAR CENTAUR H	5500.00 HP	85.1000 PPM @ 15% O2	FUEL SPEC: LEAN FUEL MIX
AS	AZ		10/25/91	TURBINE, GAS, SOLAR CENTAUR H	5500.00 HP	42.0000 PPM @ 15% O2	DRY LOW NOX COMBUSTOR
NERATION	FL	PSD-FL-167	10/16/91	TURBINE, OIL, 6 EACH	92.90 MW	42.0000 PPM @ 15% O2	WET INJECTION
AS	AZ		10/18/91	TURBINE, NAT. GAS TRANSM., GE FRAME 3	12000.00 HP	225.0000 PPM @ 15% O2	LEAN BURN
AS	AZ		10/18/91	TURBINE, NAT. GAS TRANSM., GE FRAME 3	12000.00 HP	42.0000 PPM @ 15% O2	DRY LOW NOX COMBUSTOR
S, ENCOGEN NW COGENERATION PROJECT	CA	4131003	10/8/91	GENERATOR, STEAM, GAS FIRED	62.30 MMBTU/H	0.0430 LB/MMBTU	LOW NOX BURNER AND FLUE GAS RECIRCULATION*
	WA	91-02	9/26/91	TURBINES, COMBINED CYCLE COGEN, GE FRAME 6	123.00 MW	7.0000 PPMDV@15%O2 NG	STEAM INJECTION AND SCR
ND LIGHT CO.	SC	0920-0033-CA TO CC	9/23/91	TURBINE, I.C.	80.00 MW	292.0000 LB/H	WATER INJECTION
ENERGY COMPANY	LA	PSD-LA-569	8/5/91	TURBINE, GAS, 2	39.10 MMBTU/H	40.0000 PPM @ 15% O2	H2O INJECT 0.67 LB/LB
ANSMISSION CO.	RI	1126-1127	7/31/91	TURBINE, GAS, 2	49.00 MMBTU/H	100.0000 PPM @ 15% O2	LOW NOX COMBUSTION
WER PLANT	FL	PSD-FL-166	7/25/91	TURBINE, GAS, 1 EACH	83.00 MW	25.0000 PPM @ 15% O2	WET INJECTION
WER PLANT	FL	PSD-FL-166	7/25/91	TURBINE, OIL, 1 EACH	80.00 MW	42.0000 PPM @ 15% O2	WET INJECTION
	WA		6/25/91	TURBINE, NATURAL GAS	88.00 MW	6.0000 PPM @ 15% O2	SCR
MPANY	NV	A393	6/17/91	COMBUSTION TURBINE GENERATOR	34.50 MW	16.9000 PPH (WINTER)	SELECTIVE CATALYTIC REDUCTION (SCR)
D LIGHT	FL	PSD-FL-146	6/5/91	TURBINE, GAS, 4 EACH	400.00 MW	25.0000 PPM @ 15% O2	LOW NOX COMBUSTORS
D LIGHT	FL	PSD-FL-146	6/5/91	TURBINE, CG, 4 EACH	400.00 MW	42.0000 PPM @ 15% O2	LOW NOX COMBUSTORS
D LIGHT	FL	PSD-FL-146	6/5/91	TURBINE, OIL, 2 EACH	400.00 MW	65.0000 PPM @ 15% O2	LOW NOX COMBUSTORS
TED	CA	4216001	5/6/91	TURBINE, GAS, ELECTRIC GENERATION	460.90 MMBTU/H*	3.5000 PPMVD @ 15% O2	SCR, STEAM INJECTION
EDATED POWER	PA	25-328-001	5/3/91	TURBINES, GAS, 3	34.60 KW EACH	25.0000 PPM @ 15% O2	STEAM INJECTION/+SCR IN 1997
ERATION, L.P.	NJ	SEVERAL; SEE NOTES	4/1/91	TURBINES (NATURAL GAS) (2)	1190.00 MMBTU/HR (EACH)	0.0330 LB/MMBTU	SCR, DRY LOW NOX BURNER
ERATION, L.P.	NJ	SEVERAL; SEE NOTES	4/1/91	TURBINES (#2 FUEL OIL) (2)	1190.00 MMBTU/HR (EACH)	0.0850 LB/MMBTU	SCR AND WATER INJECTION
AL	CO	90WE438	3/25/91	TURBINE #1, GE FRAME 6	33.00 MW	25.0000 PPM @ 15% O2	WATER INJECTION
AL	CO	90WE438	3/25/91	TURBINE #2, GE FRAME 6	33.00 MW	9.0000 PPM @ 15% O2	SCR
E CORPORATION	FL	PSD-FL-157	3/12/91	TURBINE, GAS	26.00 MW	9.0000 PPM @ 15% O2	SCR
D LIGHT	FL	PSD-FL-145	3/14/91	TURBINE, GAS, 4 EACH	240.00 MW	42.0000 PPM @ 15% O2	COMBUSTION CONTROL
D LIGHT	FL	PSD-FL-145	3/14/91	TURBINE, OIL, 4 EACH	0.00	65.0000 PPM @ 15% O2	COMBUSTION CONTROL
TION ASSOCIATES #2	NV	A391	1/17/91	COMBINED-CYCLE POWER GENERATION	85.00 MW POWER OUTPUT	61.2600 LB/HR	SELECTIVE CATALYTIC SYSTEM ON ONE UNIT
TION ASSOCIATES #1	NV	A360	1/17/91	COMBINED-CYCLE POWER GENERATION	85.00 MW TOTAL OUTPUT	61.2600 LB/HR	SELECTIVE CATALYTIC SYSTEM ON ONE UNIT
ERATION PARTNERSHIP	NJ		11/1/90	TURBINE, KEROSENE FIRED	580.00 MMBTU/HR	0.0630 LB/MMBTU	STEAM INJECTION AND SCR
ERATION PARTNERSHIP	NJ		11/1/90	TURBINE, NATURAL GAS FIRED	580.00 MMBTU/HR	0.0330 LB/MMBTU	STEAM INJECTION AND SCR
ERATION PLANT	NY	292400 5705 00001	8/5/90	GE LM2500 GAS TURBINE	314.90 MMBTU/HR	75.0000 PPM + FBN CORRECTION	WATER INJECTION
T PLANT	MD		6/25/90	TURBINE, 105 MW OIL FIRED ELECTRIC	105.00 MW	25.0000 PPM @ 15% O2	DRY PREMIX BURNER
T PLANT	MD		6/25/90	TURBINE, 84 MW OIL FIRED ELECTRIC	84.00 MW	58.0000 PPM @ 15% O2	QUIET COMBUSTION AND WATER INJECTION
T PLANT	MD		6/25/90	TURBINE, 105 MW NATURAL GAS FIRED ELECTRIC	105.00 MW	77.0000 PPM @ 15% O2	DRY PREMIX AND WATER INJECTION
T PLANT	MD		6/25/90	TURBINE, 84 MW NATURAL GAS FIRED ELECTRIC	84.00 MW	25.0000 PPM @ 15% O2	QUIET COMBUSTION AND WATER INJECTION
SSION COMPANY	OR	18-0026	6/19/90	TURBINE GAS, COMPRESSOR STATION	110.00 MMBTU/HR	199.0000 PPM @ 15% O2	LOW NOX BURNER DESIGN
	MD		5/31/90	TURBINE, 126 MW OIL FIRED	125.00 MW	77.0000 PPM @ 15% O2	WATER INJECTION
	MD		5/31/90	TURBINE, 126 MW NATURAL GAS FIRED	126.00 MW	42.0000 PPM @ 15% O2	WATER INJECTION
ENERATION LIMITED PARTNERSHIP	NJ		3/23/90	TURBINE, NATURAL GAS FIRED	1000.00 MMBTU/HR	0.0440 LB/MMBTU	STEAM INJECTION AND SCR
S COMPANY - HAGOOD STATION	SC	0560-0029	12/1/89	INTERNAL COMBUSTION TURBINE	110.00 MEGAWATTS	308.0000 LBS/HR	WATER INJECTION
L LIGHT PLANT	MA	MBR-89-COM-032	11/30/89	TURBINE, 38 MW OIL FIRED	412.00 MMBTU/HR	40.0000 PPM @ 15% O2	WATER INJECTION
L LIGHT PLANT	MA	MBR-89-COM-032	11/30/89	TURBINE, 38 MW NATURAL FAS FIRED	412.00 MMBTU/HR	25.0000 PPM @ 15% O2	WATER INJECTION
ITION	OR	16-0026	11/3/89	TURBINE, NAT. GAS	14600.00 HP	42.0000 PPM @ 15% O2	LOW NOX BURNERS
ND ELECTRIC COOPERATIVE (SMECO)	MD		10/1/89	TURBINE, OIL FIRED ELECTRIC	90.00 MW	400.0000 LB/HR	WATER INJECTION
ND ELECTRIC COOPERATIVE (SMECO)	MD		10/1/89	TURBINE, NATURAL GAS FIRED ELECTRIC	90.00 MW	199.0000 LB/HR	WATER INJECTION
SYSTEMS	CA	3040230101	9/28/89	TURBINE, NATURAL GAS FIRED, DUCT BURNER	34.50 MW	6.0000 PPM @ 15% O2	SCR, STEAM INJECTION
OCIATES, INC	NY	402201 0295 00001	8/5/89	GE LM5000-N COMBINED CYCLE GAS TURBINE	401.00 LB/MMBTU	42.0000 PPMDV @ 15% O2	WATER INJECTION
D	CA	A/N 146294 AND 146295	7/18/89	TURBINE, GAS (SEE NOTES)	0.00	9.0000 PPM @ 15% O2	SELECTIVE CATALYTIC REDUCTION (SCR), WATER INJECTN
	CA	5-1120-1-7	11/4/86	TURBINE, GAS, GENERAL ELECTRIC LM-2500	25.00 MW	96.9600 LB/D	WATER INJECTION AND SELECTIVE CATALYTIC REDUCTION
NUFACTURING U.S.A. INC	KY	C-86-117	7/17/86	COMBUSTION, NATURAL GAS	0.00	0.1000 LB/MMBTU	
	MO	0579-014 TO 0579-015	5/8/79	CONSTRUCTION OF A NEW OIL FIRED COMBUSTION TURBINE	422.00 MM BTU/HR	5242.0000 TPY	WATER INJECTION FOR NOX EMISSIONS
NTER	NY	472800 2254		(2) WESTINGHOUSE W501DS TURBINES (EP #S 00001&2)	1400.00 MMBTU/HR	4.5000 PPM, 23.6 LB/HR	STEAM INJECTION FOLLOWED BY SCR
KIES	NY	192400 0095		(2) GAS TURBINES (EP #'S 00101&102)	110.00 MMBTU/HR	42.0000 PPM, 18 LB/HR	STEAM INJECTION
ON PARTNERSHIP	CO	91MR034I		TURBINE	350.00 MMBTU/H	25.0000 PPM @ 15% O2	DRY LOW NOX BURNER
PARTNERSHIP	CO	91MR033J-2		TURBINES, 2 NAT GAS & 2 DUCT BURNERS	385.00 MMBTU/H EACH TURBINE	42.0000 PPM @ 15% O2	WATER INJECTION
FIELD SERVICE	NM	PSD-NM-459-M-4		TURBINE/COGEN, NATURAL GAS (2)	900.00 MMCF/DAY	9.0000 PPM @ 15% O2	DRY LOW NOX (GENERAL ELECTRIC MODEL PG6541B)
ECTRIC - PERRYMAN PLANT	MD			TURBINE, 140 MW OIL FIRED ELECTRIC	140.00 MW	65.0000 PPM @ 15% O2	WATER INJECTION
ECTRIC - PERRYMAN PLANT	MD			TURBINE, 140 MW NATURAL GAS FIRED ELECTRIC	140.00 MW	15.0000 PPM @ 15% O2	DRY BURN LOW NOX BURNERS
MPANY - THEODORE COGENERATION	AL	503-8073	3/16/99	TURBINE, WITH DUCT BURNER	170.00 MW	0.0130 LB/MMBTU	DLN COMBUSTOR IN CT, LNB IN DUCT BURNER, SCR
E, L.P.	MN	16300087-001	11/16/98	GENERATOR, COMBUSTION TURBINE & DUCT BURNER	1988.00 MMBTU/H (CTG)	4.5000 PPMDV @15%O2 (NG)	SELECTIVE CATALYTIC REDUCTION (SCR) WITH A NOX CEM AND A NOX PEM.
PLASTICS	AL	207-0008-X016	5/27/98	COMBINED CYCLE (TURBINE AND DUCT BURNER)	0.00	0.0700 LB/MMBTU COMBINED	DRY LOW NOX BURNER ON TURBINE AND LOW NOX BURNER ON DUCT BURNER
ERGY LIMITED	ME	A-718-71-A-N	5/31/98	GAS TURBINES, COGEN, W/DUCT BURNERS	675.00 MMBTU/H TURBINE	4.0000 PPM @ 15% O2 NG	LOW NOX BURNERS, LOW NOX COMBUSTORS. SCR DURING GAS FIRING ONLY.
ERGY LIMITED	ME	A-718-71-A-N	5/31/98	GAS TURBINES, COGEN, W/DUCT BURNERS	675.00 MMBTU/H TURBINE	42.0000 PPM @ 15% O2 NG OIL	LOW NOX COMBUSTORS, LOW NOX BURNERS, WATER INJECTION DURING OIL FIRING.
A CORPORATION	LA	PSD-LA-622	2/13/98	DUCT BURNER	426.00 MMBTU/H	0.1000 LB/MMBTU	LOW NOX BURNERS
	LA	PSD-LA-613	12/08/97	DUCT BURNER, COGEN UNIT NO. 2	0.40 MMLB/H STEAM	8.0000 PPMV NAT. GAS	LOW NOX BURNERS AND SCR TO LIMIT NOX TO 8 PPM FOR NATURAL GAS AND 25 PPM FOR WASTE GAS (60% H2)
MPANY	AL	108-0018-X001 AND -X002	12/17/97	COMBUSTION TURBINE W/ DUCT BURNER (COMBINED CYCLE)	100.00 MW	15.0000 PPM	DRY LOW NOX BURNERS
ERS- BRUSH COGEN FAC	CO	91MR033	5/27/97	COGEN TURBINES W/ DUCT BURNERS & BOILERS	385.00 MM BTU/HR	42.0000 PPM @ 15% O2	LOW NOX COMBUSTION RETROFIT AND WATER INJECTION+
D, INC.	AL	211-0004	3/13/97	DUCT BURNERS	170.00 MMBTU/HR	0.1000 LB/MMBTU (GAS)	THE PRIMARY FUEL FOR BURNER OPERATION IS NATURAL GAS. EFFICIENT BURNER OPERATION
PORATION	LA	PSD-LA-590	9/22/95	DUCT BURNER	710.00 MM BTU/HR	0.1000 LB/MM BTU	LOW NOX BURNERS
RACUSE LP	NY	313201 2010/00001-00007	12/10/94	DUCT BURNER (EP #00001)	90.00 MMBTU/HR	0.1000 LB/MMBTU	NO CONTROLS
ERGY CENTER	NY	351200 0211 00001	10/6/94	DUCT BURNER	30.00 MMBTU/HR	0.1170 LB/MMBTU, 3.51 LB/HR	FUEL SPEC: NATURAL GAS ONLY
SOCIATES	NY	311500 2015 00001	12/1/93	STACK (TURBINE AND DUCT BURNER)	715.00 MMBTU/HR	26.0000 PPM, 69 LB/HR	NO CONTROLS FOR NOX ON STACK *SEE TURBINE NOX DATA
ACILITY	NY	292600 0446/00001-00007	7/14/93	(3) DUCT BURNER (EP #'S 00001-00003)	94.10 MMBTU/H EA	0.2000 LB/MMBTU, 18.8 LB/HR	FUEL SPEC; NATURAL GAS ONLY
T	NY	030200 0451	7/7/93	DUCT BURNER EP #00001	70.00 MMBTU/H EA	0.1000 LB/MMBTU, 7.0 LB/HR	ZINK LOW NOX DUCT BURNER
	FL	PSD-FL-190	5/17/93	DUCT BURNER, GAS	100.00 MMBTU/H	0.1000 LB/MMBTU	GOOD COMBUSTION PRACTICES
MPANY	NY	563203 0099	5/13/93	DUCT BURNER EP #00001	100.00 MMBTU/H EA	0.1000 LB/MMBTU, 8.5 LB/HR	FUEL SPEC: NATURAL GAS ONLY
LD	NY	282089 4163 00004	4/14/93	DUCT BURNER	199.30 MMBTU/HR	0.2000 LB/MMBTU, 16.2 LB/HR	NO CONTROLS
ER CO. RIVERDALE MILL	AL	104-0003-X026	1/11/93	TURBINE, STATIONARY (GAS-FIRED) WITH DUCT BURNER	60.00 MW	0.0800 LB/MMBTU (GAS)	LOW NOX BURNERS (ON THE DUCT BURNER) STEAM INJECTION INTO THE TURBINE
SAVER FALLS COGENERATION FACILITY	NY	6-2320-00018/00001-0	11/9/92	BURNER, DUCT	90.00 MMBTU/HR	0.1800 LB/MMBTU	LOW NOX BURNER
SAVER FALLS COGENERATION FACILITY	NY	6-2320-00018/00001-0	11/9/92	BURNER, DUCT	90.00 MMBTU/HR	0.1000 LB/MMBTU	LOW NOX BURNER
ORNING L.P.	NY	8-4638-00022/01-0	11/5/92	BURNER, DUCT	90.00 MMBTU/HR	0.1000 LB/MMBTU	LOW NOX BURNER

Best Available Control Technology (BACT) Determinations for Nitrogen Oxide (NO_x) Emissions for Combustion Turbines Including Duct Firing

	State	Permit Number	Permit Issue Date	Unit/Process Description	Capacity (size)	NO_x Emission Limit	Control Method
:OMPANY, L.P.	VA	50840	10/30/92	BURNER, DUCT	129.00 X10(6) BTU/HR N. GAS	9.0000 PPM	SCR
:OMPANY, L.P.	VA	50840	10/30/92	BURNER, DUCT	136.00 X10(6) BTU/HR #2 OIL	15.0000 PPM	SCR
:OMPANY, L.P.	VA	50840	10/30/92	BURNER, DUCT (TOTAL)	129.00 X10(6) BTU/HR	20.4000 TPY	SCR
4S FALLS COGEN CO	NY	414401 0212 00001	9/10/92	DUCT BURNER (SEE NOTE #3)	44.00 MMBTU/HR	42.0000 PPM, 87.4 LB/HR	NO CONTROLS
MPANY	NY	5-0942-00106/00001-9	7/31/92	BURNERS, DUCT (2)	353.00 MMBTU/HR EACH	0.0800 LB/MMBTU	SCR
GY SERVICES	NY	146400 0133	6/24/92	DUCT BURNER (EP #00001)	28.00 MMBTU/HR	0.1100 LB/MMBTU, 2.2 LB/HR	FUEL SPEC; NATURAL GAS ONLY
ION PARTNERS, L.P.	NY	4-0122-00078/00002-9	6/18/92	DUCT BURNERS (2)	206.00 MMBTU/HR (EACH)	0.0181 LB/MMBTU GAS	LOW NOX BURNER AND SCR
ION PARTNERS, L.P.	NY	4-0122-00078/00002-9	6/18/92	DUCT BURNER	123.00 MMBTU/HR	0.0910 LB/MMBTU, GAS	LOW NOX BURNER
TRIC/NEW ENGLAND POWER CO.	RI	RI-PSD-4	4/13/92	TURBINE, GAS AND DUCT BURNER	1360.00 MMBTU/H EACH	9.0000 PPM @ 15% O2, GAS	SCR
ENERGY LIMITED PARTNERSHIP	VA	51020	3/3/92	BURNER, DUCT	197.00 MMBTU/H NAT. GAS	9.0000 PPMVD @ 15% O2	SCR, STEAM INJ.
ENERGY LIMITED PARTNERSHIP	VA	51020	3/3/92	BURNER, DUCT	189.00 MMBTU/H NO2 FUEL OIL	15.0000 PPMVD @ 15% O2	SCR, STEAM INJ.
ENERGY LIMITED PARTNERSHIP	VA	51020	3/3/92	BURNER, DUCT	0.00	33.3000 T/YR/UNIT	
TURAL DAM LP	NY	404089 0305 00001	12/31/91	DUCT BURNER	90.00 MMBTU/HR	0.1000 LB/MMBTU, 9 LB/HR	NO CONTROLS
)	FL	PSD-FL-176	11/20/91	DUCT BURNER, GAS	150.00 MMBTU/H	0.1000 LB/MMBTU	NOT REQUIRED
RATION PLANT	NY	282400 5709 00001	8/5/90	COEN DUCT BURNER	161.80 MMBTU/HR	0.2000 LB/MMBTU	FUEL SPEC: NATURAL GAS ONLY
SYSTEMS	CA	304023-0101	9/28/89	TURBINE, NATURAL GAS FIRED, DUCT BURNER	34.50 MW	6.0000 PPM @ 15% O2	SCR, STEAM INJECTION
CIATES, INC	NY	402201 0295 00001	8/5/89	COEN DUCT BURNER	40.00 MMBTU/HR	0.1000 LB/MMBTU	FUEL SPEC: NATURAL GAS ONLY
TES	NY	392400 0095		(2) DUCT BURNERS (EP #'S 00101& 102)	99.00 MMBTU/HR	0.4000 LB/MMBTU, 36.3 LB/HR	
ITER	NY	472800 2054		(2) DUCT BURNER (EP #'S 00001&2)	214.10 MMBTU/HR	0.0120 LB/MMBTU	FUEL SPEC; NATURAL GAS ONLY
ARTNERSHIP	CO	95MR033.1-2		TURBINES, 2 NAT GAS & 2 DUCT BURNERS	385.00 MMBTU/H EACH TURBINE	42.0000 PPM @ 15% O2	WATER INJECTION

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Table B-3. Capital Cost for Selective Catalytic Reduction for the Siemens Westinghouse 501FD Combined Cycle Combustion Turbine

Cost Component	Costs	Basis of Cost Component
Direct Capital Costs		
SCR Associated Equipment	$1,418,000	Vendor Estimate
Ammonia Storage Tank	$137,529	$35 per 1,000 lb mass flow developed from vendor quotes
Flue Gas Ductwork	$44,505	Vatavauk,1990
Instrumentation	$50,000	Additional NO_x Monitor and System
Taxes	$85,080	6% of SCR Associated Equipment and Catalyst
Freight	$70,900	5% of SCR Associated Equipment
Total Direct Capital Costs (TDCC)	$1,806,014	
Direct Installation Costs		
Foundation and supports	$144,481	8% of TDCC and RCC;OAQPS Cost Control Manual
Handling & Erection	$252,842	14% of TDCC and RCC;OAQPS Cost Control Manual
Electrical	$72,241	4% of TDCC and RCC;OAQPS Cost Control Manual
Piping	$36,120	2% of TDCC and RCC;OAQPS Cost Control Manual
Insulation for ductwork	$18,060	1% of TDCC and RCC;OAQPS Cost Control Manual
Painting	$18,060	1% of TDCC and RCC;OAQPS Cost Control Manual
Site Preparation	$5,000	Engineering Estimate
Buildings	$15,000	Engineering Estimate
Total Direct Installation Costs (TDIC)	$561,804	
Total Capital Costs (TCC)	$2,367,819	Sum of TDCC, TDIC and RCC
Indirect Costs		
Engineering	$236,782	10% of Total Capital Costs; OAQPS Cost Control Manual
PSM/RMP Plan	$50,000	Engineering Estimate
Construction and Field Expense	$118,391	5% of Total Capital Costs; OAQPS Cost Control Manual
Contractor Fees	$236,782	10% of Total Capital Costs; OAQPS Cost Control Manual
Start-up	$47,356	2% of Total Capital Costs; OAQPS Cost Control Manual
Performance Tests	$23,678	1% of Total Capital Costs; OAQPS Cost Control Manual
Contingencies	$71,035	3% of Total Capital Costs; OAQPS Cost Control Manual
Total Indirect Capital Cost (TInCC)	$784,024	
Total Direct, Indirect and Capital Costs (TDICC)	$3,151,842	Sum of TCC and TInCC
Mass Flow of Combustion Turbine		
	3,929,400 lb/hr	"F"
	3,600,000 lb/hr	"501FD"

Table B-4. Annualized Cost for Selective Catalytic Reduction for the Siemens-Westinghouse 501FD Combined Cycle Operation

Cost Component	Costs	Basis of Cost Component
Direct Annual Costs		
Operating Personnel	$18,720	24 hours/week at $15/hr
Supervision	$2,808	15% of Operating Personnel;OAQPS Cost Control Manual
Ammonia	$292,870	$300 per ton for Aqueous NH_3
PSM/RMP Update	$15,000	Engineering Estimate
Inventory Cost	$34,404	Capital Recovery (10.98%) for 1/3 catalyst
Catalyst Cost	$313,333	3 years catalyst life; Based on Vendor Budget Estimate
Contingency	$20,314	3% of Direct Annual Costs
Total Direct Annual Costs (TDAC)	$697,449	
Energy Costs		
Electrical	$28,032	80kW/h for SCR @ $0.04/kWh times Capacity Factor
MW Loss and Heat Rate Penalty	$336,358	0.3% of MW output; EPA, 1993 (Page 6-20)
Total Energy Costs (TEC)	$364,390	
Indirect Annual Costs		
Overhead	$188,639	60% of Operating/Supervision Labor and Ammonia
Property Taxes	$31,518	1% of Total Capital Costs
Insurance	$31,518	1% of Total Capital Costs
Annualized Total Direct Capital	$346,072	10.98% Capital Recovery Factor of 7% over 15 years times sum of TDICC
Total Indirect Annual Costs (TIAC)	$597,748	
Total Annualized Costs	$1,659,587	Sum of TDAC, TEC and TIAC
Cost Effectiveness	$2,468	per ton of NO_x Removed
	$3,078	per ton of Net Emission Reduction

Table B-5. Comparison of Alternative BACT Control Technologies for NO_x on One Combined Cycle Unit (CT & HRSG)

	Alternative BACT Control Technologies	
	DLN Only	DLN/WI with SCR
Technical Assessment	Feasible	Available, Feasible and Demonstrated
Economic Impacts[a]		
Capital Costs	included	$3,151,842
Annualized Costs	included	$1,659,587
Cost Effectiveness		
NO_x Removed (per ton of NO_x)	NA	$2,468
NO_x Removed (per ton of total pollutants)	NA	$3,078
Environmental Impacts[b]		
Total NO_x (TPY)	799	126
NO_x Reduction (TPY)	NA	(674)
Ammonia Emissions (TPY)	0	112.2
PM Emissions (TPY)	0	15.0
Secondary Emissions (TPY)	0	6.0
Net Emission Reduction (TPY)	NA	(539)
Energy Impacts[c]		
Energy Use (kWh/yr)	0	5,457,480
Energy Use (mmBtu/yr) at 10,000 Btu/kWh	0	52,856
Energy Use (mmcf/yr) at 1,000 Btu/cf for natural gas	0	53

[a] See Tables B-4 and B-5 for detailed development of capital costs (including recurring costs) and annualized costs.

[b] See emission data presented in Table B-6.

[c] Energy impacts are estimated due to the lost energy from heat rate penalty and electrical usage for the SCR operation at 8,760 hours per year. Lost energy is based on 0.3 percent of 181 MW. SCR electrical usage is based on 0.080 MWh per SCR system.

Table B-6. Maximum Potential Incremental Emissions (TPY) with Selective Catalytic Reduction

Pollutants	Incremental Emissions (tons/year) of SCR		
	Primary	Secondary	Total
Particulate	14.97	0.19	15.16
Sulfur Dioxide		0.07	0.07
Nitrogen Oxides	-672.40	3.52	-668.88
Carbon Monoxide		2.11	2.11
Volatile Organic Compounds		0.14	0.14
Ammonia	112.18		
Total:	-545.25	6.04	-539.21
Carbon Dioxide (additonal from gas firing)		3,347.53	3,347.53

Basis:

Lost Energy (mmBtu/year)	52,856
Secondary Emissions (lb/mmBtu): Assumes natural gas firing in NOx controlled steam unit.	
Particulate	0.0072
Sulfur Dioxide	0.0027
Nitrogen Oxides w/LNB	0.1333
Carbon Monoxide	0.0800
Volatile Organic Compounds	0.0052

Reference: Table 1.4-1 and 1.4-2, AP-42, Version 2/98

st Availble Control Technology (BACT) Determinations for CO Emissions for Combustion Turbines Including Duct Firing

	State	Permit Number	Permit Issue Date	Unit/Process Description	Capacity (size)	CO Emission Limit	Control Method
UTHORITY	FL	PSD-FL-254	12/16/99	TURBINE, COMBUSTION	250.00 MW	12.0000 PPM	GOOD COMBUSTION
MYRNA BEACH POWER CO. LP	FL	PSD-FL-257	10/15/99	TURBINE-GAS, COMBINED CYCLE	500.00 MW (2 UNITS)	12.0000 PPM	GOOD COMBUSTION
)JECT	FL	PSD-FL-258	10/1/99	TURBINE-GAS, COMBINED CYCLE	190.00 MW	12.0000 PPM @ 15% O2	GOOD COMBUSTION
LLC	CT	105-0068	4/16/99	TURBINE, COMBUSTION, ABB GT-24, #1 WITH 2 CHILLE	1.97 MMCF/H	13.0000 LB/H NAT GAS	OXIDATION CATALYST
LLC	CT	105-0069	4/16/99	TURBINE, COMBUSTION, ABB GT-24E,#2 WITH 2 CHILL	1.97 MMCF/H	13.0000 LB/H NAT GAS	OXIDATION CATALYST
IPANY - THEODORE COGENERATION	AL	503-8073	3/16/99	TURBINE, WITH DUCT BURNER	170.00 MW	0.0860 LB/MMBTU	EFFICIENT COMBUSTION
	MI	279-98	2/8/99	TURBINE, COMBINED CYCLE, POWER PLANT	500.00 MW	3.0000 PPM	CATALYTIC OXIDIZER
	AL	503-8066	1/5/99	TURBINE, GAS, COMBINED CYCLE	168.00 MW	0.0400 LB/MMBTU	GOOD COMBUSTION PRACTICES
RTNERS, L.P.	GA	4-11-149-0004-P-01-0	12/18/98	TURBINE, COMBUSTION, SIMPLE CYCLE, 6	160.00 MW EA	15.0000 PPMVD @ 15% O2	USING 15% EXCESS AIR. CO EMISSION IS BECAUSE OF NATURAL GAS.
RTNERS, L.P.	GA	4-11-149-0004-P-01-0	12/18/98	TURBINE, COMBUSTION, SIMPLE CYCLE, 6	160.00 MW EA	33.0000 PPMVD	CO EMISSION IS BECAUSE OF FUEL OIL. WHEN OUTPUT ISBELOW 123 MW LIMIT IS 33 PPMVD AND AB
LC	ME	A-743-71-A-N	12/4/98	TURBINE, COMBINED CYCLE, TWO	528.00 MW TOTAL	15.0000 PPM @15% O2	USING 15 % EXCESS AIR.
ITED PARTNERSHIP	ME	A-735	12/4/98	TURBINE, COMBINED CYCLE	930.00 MW TOTAL	5.0000 PPM @ 15% O2 (NAT G)	0.05% SULFUR DISTILLATE OIL #2 IS USED. EMISSION IS FROM EACH 300 MW SYSTEM.
LC	FL	PSD-FL 253	12/4/98	TURBINE, COMBUSTION, NATURAL GAS	241.00 MW	0.0000	DRY LOW NOX BURNER GOOD COMBUSTION PRACTICE
L CORP. & CHAMP. CLEAN ENERGY	ME	A-22-71-N-A	9/14/98	TURBINE, COMBINED CYCLE, NATURAL GAS	175.00 MW	9.0000 PPMVD @15% O2 GAS	
NT BARRY	AL	503-1001	8/7/98	TURBINES, COMBUSTION, NATURAL GAS	510.00 MW(TOTAL)	0.0570 LB/MMBTU	EFFICIENT COMBUSTION
(EERLY TX-NM POWER CO.)	NM	PSD-NM-90-M2	8/7/98	GAS TURBINES	575.00 MMBTU/H	18.0000 PPM	GOOD COMBUSTION PRACTICES
)	ME	A-728	7/13/98	TURBINE, COMBINED CYCLE, NATURAL GAS, TWO	170.00 MW EACH	20.0000 PPM @ 15% O2	15% EXCESS AIR.
ECTRIC AND WATER UTILITIES	FL	PSD-FL-243	7/10/98	TURBINE, COMBUSTION, GAS FIRED W/ FUEL OIL ALS	2174.00 MMBTU/H	25.0000 PPM	GOOD COMBUSTION WITH DRY LOW NOX BURNERS OXIDATION CATALYST MAY BE USED
TILITIES-NIXON POWER PLANT	CO	94EP132	6/30/98	SIMPLE CYCLE TURBINE, NATURAL GAS	1122.00 MM BTU/HR	0.8000 DRE	CATALYTIC OXIDATION
LLC	CT	0150190 & 0150191	6/29/98	TURBINES, COMBUSTION MODEL V84.3A, 2 SIEMES	240.00 MW/HRSG PER TURBINE	10.0000 PPM GAS & OIL	PRE-MIX FUEL FAIR TO OPTIMIZE EFFICIENCY ACTUAL EMISSIONS EXPECTED BETWEEN 5-7PPM
	HI	0243-01-C	6/8/98	TURBINES, COMBUSTION, 2 EA	23.00 MW	57.5000 PPMVD @ 15% O2	GOOD COMBUSTION DESIGN AND OPERATION.
UTILITY SERVICES	FL	PSD-FL-239	5/29/98	TURBINE, COMBIND CYCLE, MULTIPLE FUELS	1468.00 MMBTU/H	0.0000 SEE P2 DESCRIPTION	GOOD COMBUSTION OF CLEAN FUELS
ASTICS	AL	207-0008-X016	5/27/98	COMBINED CYCLE (TURBINE AND DUCT BURNER)	0.00	0.0800 LBS/MMBTU	PROPER COMBUSTION
CIATES	ME	A-724-71-A-N	5/1/98	TURBINE GENERATOR, COMBUSTION, NATURAL GAS	1906.00 MMBTU/H	15.0000 PPM @ 15% O2	GE DRY LOW-NOX COMBUSTOR DESIGN. GOOD COMBUSTION CONTROL.
GY LIMITED	ME	A-718-71-A-N	3/31/98	GAS TURBINES, COGEN, W/DUCT BURNERS	675.00 MMBTU/H TURBINE	74.2100 LB/H NG	CATALYTIC OXIDATION, GOOD COMBUSTION PRACTICES.
GY LIMITED	ME	A-718-71-A-N	3/31/98	GAS TURBINES, COGEN, W/DUCT BURNERS	675.00 MMBTU/H TURBINE	43.7300 LB/H NG OIL.	CATALYTIC OXIDATION, GOOD COMBUSTION PRACTICES.
I PARTNERS, LIMITED PARTNERSHIP	WY	CT-1352	2/27/98	TURBINE, STATIONARY	33.30 MW	25.0000 PPM @ 15% O2	
CIATES	RI	RI-PSD-5	2/13/98	COMBUSTION TURBINE, NATURAL GAS	203.00 MW	12.0000 PPM @ 15% O2	GOOD COMBUSTION
CORPORATION	LA	PSD-LA-622	2/13/98	TURBINE GAS, GE, 7ME 7	966.00 MMBTU/H	25.0000 PPMV	GOOD EQUIPMENT DESIGN, PROPER COMBUSTION TECHNIQUEAND MIN. 2% EXCESS O2
ARTNER, LP	MA	130921	2/2/98	TURBINE, COMBUSTION, WESTINGHOUSE MODEL 501	2534.00 MMBTU/H	0.0700 LB/MMBTU	DRY LOW NOX COMBUSTION TECHNOLOGY IN CONJUNCTION WITH SCR ADD-ON NOX CONTROL.
ANY	HI	0067-01-C	1/6/98	TURBINE, COMBUSTION, 2 EA	30.00 MW	44.0000 PPMVD @ 15% O2	GOOD COMBUSTION DESIGN AND OPERATION.
	LA	PSD-LA-613	12/30/97	DUCT BURNER, COGEN UNIT NO. 2	0.40 MMLB/H STEAM	83.9300 LB/HR	GOOD DESIGN, PROPER OPERATING PRACTICES, 3% EXCESS O2
	LA	PSD-LA-613	12/30/97	TURBINE, COGEN UNIT 2, GE FRAME 6	42.40 MW	83.9300 LB/MMBTU	GOOD DESIGN, PROPER COMBUSTION TECHNIQUES, 3% EXCESS O2
	PA	60-00011A	11/26/97	NG FIRED TURBINE, SOLAR TAURUS T-7300S	5.00 MW	50.0000 PPMV@15%O2	GOOD COMBUSTION
CIATE, LP	MA	4096096	10/6/97	TURBINE, COMBUSTION, ABB GT11N2	1327.00 MMBTU/H	5.9700 LB/H	DRY LOW NOX COMBUSTION TECHNOLOGY WITH SCR ADD-ON NOX CONTROL.
VELOPMENT, INC.	MA	1-X-95-093	9/22/97	TURBINE, COMBUSTION, ABB GT24	1792.00 MMBTU/H	14.3000 LB/H	DRY LOW NOX COMBUSTION TECHNOLOGY WITH SCR ADD-ON NOX CONTROL.
INE & DENTISTRY OF NEW JERSEY	NJ	087427/28/29 (3)	6/26/97	COMBUSTION TURBINE COGENERATION UNITS, 3	56.00 MMBTU/H	75.0000 PPMVD NAT. GAS	
	NM	PSD-NM-1975	6/18/97	TURBINE, NATURAL GAS-FIRED, ELEC. GEN.	100.00 MW	27.0000 LBS/HR	DRY LOW-NOX TECHNOLOGY BY MAINTAINING PROPER AIR- FUEL RATIO.
RS- BRUSH COGEN FAC	CO	91MR993	3/27/97	COGEN TURBINES W/ DUCT BURNERS & BOILERS	305.00 MM BTU/HR	35.0000 PPM @ 15% O2	GOOD COMBUSTION
, INC.	AL	211-0004	3/12/97	COMBINED CYCLE TURBINE (25 MW)	568.00 MMBTU/HR	28.0000 PPMVD@15% O2 (GAS)	PROPER DESIGN AND GOOD COMBUSTION PRACTICES
ORPORATION, BATON ROUGE PLANT	LA	PSD-LA-560 (M-2)	3/7/97	TURBINE/HSRG, GAS COGENERATION	450.00 MM BTU/HR	70.0000 LB/HR	COMBUSTION DESIGN AND CONSTRUCTION.
IC SERVICE COMPANY/CUNNINGHAM STA	NM	PSD-NM-622-M-2	2/15/97	COMBUSTION TURBINE, NATURAL GAS	100.00 MW	0.0000 SEE FACILITY NOTES	GOOD COMBUSTION PRACTICES
	PR	PR-0102	10/1/96	TURBINES, COMBINED-CYCLE COGENERATION	461.00 MW	100.0000 PPMDV AT MIN. LOAD	COMBUSTION CONTROLS.
	PR	PR-0102	10/1/96	TURBINES, COMBINED-CYCLE COGENERATION	461.00 MW	33.0000 PPMDV	COMBUSTION CONTROLS.
ER, LP	PA	09-328-009	7/31/96	COMBUSTION TURBINE WITH HEAT RECOVERY BOILE	153.00 MW	3.1000 PPM @ 15% O2	OXIDATION CATALYST 16 PPM @ 15% O2 WHEN FIRING NO. 2 OIL. AT 75% NG LIMIT S
ESAPEAKE CORPORATION	VA	40898	5/21/96	3 COMBUSTION TURBINES (OIL-FIRED)	6000.00 HRS/YR	96.0000 TPY	GOOD COMBUSTION OPERATING PRACTICES
EP.	IN	CP 127 5260	5/13/96	TURBINE, NATURAL GAS-FIRED	63.00 MEGAWATT	40.0000 LBS/HR	GOOD COMBUSTION AND EMISSIONS NOT TO EXCEED 40 PPMVD AT 15% OXYGEN.
EP.	IN	CP 127 5260	5/13/96	TURBINE, NATURAL GAS-FIRED	63.00 MEGAWATT	12.0000 LBS/HR	GOOD COMBUSTION AND EMISSIONS NOT TO EXCEED 10 PPMVD AT 15% OXYGEN.
LO.-FORT ST VRAIN	CO	94WE609	5/1/96	COMBINED CYCLE TURBINES (2), NATURAL	671.00 MW	15.0000 PPMVD, SMPL CY	GOOD COMBUSTION CONTROL PRACTICES. COMMITMENT TO APATTERN OF OPERATION (LOAD VAI
S TURBINES	SC	1200-0094	4/19/96	I.C. TURBINE	2700.00 MMBTU/HR	27169.0000 LB/HR	GOOD COMBUSTION PRACTICES TO MINIMIZE EMISSIONS
IGHT	NC	1812	4/11/96	COMBUSTION TURBINE, 4 EACH	1907.60 MMBTU/HR	81.0000 LB/HR	COMBUSTION CONTROL
IGHT	NC	1812	4/11/96	COMBUSTION TURBINE, 4 EACH	1907.60 MMBTU/HR	80.0000 LB/HR	COMBUSTION CONTROL
CTRIC POWER ASSOC.	MS	1360-00035	4/9/96	COMBUSTION TURBINE, COMBINED CYCLE	1299.00 MMBTU/HR NAT GAS	26.3000 PPM @ 15% O2, GAS	GOOD COMBUSTION CONTROLS
	GA	4911-076-11753	4/3/96	COMBUSTION TURBINE (2), NATURAL GAS	116.00 MW	10.0000 PPMVD	COMPLETE COMBUSTION
	GA	4911-076-11753	4/3/96	COMBUSTION TURBINE (2), FUEL OIL	116.00 MW	30.0000 PPMVD	COMPLETE COMBUSTION
RATION	LA	PSD-LA-593	3/26/96	GENERATOR, NATURAL GAS FIRED TURBINE	1123.00 MM BTU/HR	972.4000 TPY CAP FOR 3 TURB.	GOOD COMBUSTION PRACTICE AND PROPER OPERATION
IT 2	FL	PA-89-29BA / PSD-FL-214	1/1/96	COMBINED CYCLE COMBUSTION TURBINE	160.00 MW	20.0000 PPM (NAT. GAS)	DRY LNB GOOD COMBUSTION PRACTICES
	AZ	95-0241	11/12/95	ENGINES, COGENERATION (4)	800.00 KW	99.9000 TPY	AIR/FUEL CONTROLLER
IC SYSTEM	FL	AC44-245369 / PSD-FL-21	9/29/95	TURBINE, EXISTING CT RELOCATION TO A NEW PLAN	23.00 MW	20.0000 PPM @ 15% O2 FULL LD	GOOD COMBUSTION
ORATION	LA	PSD-LA-590	9/22/95	DUCT BURNER	710.00 MM BTU/HR	198.6000 LB/HR COMMON VENT	NO ADD-ON CONTROL GOOD COMBUSTION PRACTICE
ORATION	LA	PSD-LA-590	9/22/95	GENERATOR, GAS TURBINE	1313.00 MM BTU/HR	198.6000 LB/HR	NO ADD-ON CONTROL GOOD COMBUSTION PRACTICE
C POWER AUTHORITY (FREPA)	PR	PR-0100	7/31/95	COMBUSTION TURBINES (3), 83 MW SIMPLE-CYCLE EA	268.00 MW	104.0000 LB/HR	MAINTAIN EACH TURBINE IN GOOD WORKING ORDER AND IMPLEMENT GOOD COMBUSTION PRAC
C POWER AUTHORITY (FREPA)	PR	PR-0100	7/31/95	COMBUSTION TURBINES (3), 83 MW SIMPLE-CYCLE EA	268.00 MW	20.0000 LB/HR	MAINTAIN EACH TURBINE IN GOOD WORKING ORDER AND IMPLEMENT GOOD COMBUSTION PRAC
D COGENERATION PARTNERS L.P.	NY	2-6101-00185/00002-9	6/6/95	TURBINE, OIL FIRED	240.00 MW	5.0000 PPM @ 15% O2	
D COGENERATION PARTNERS L.P.	NY	2-6101-00185/00002-9	6/6/95	GENERATOR, 3000 KW EMERGENCY	3000.00 KW	0.2500 LB/MMBTU	
D COGENERATION PARTNERS L.P.	NY	2-6101-00185/00002-9	6/6/95	TURBINE, NATURAL GAS FIRED	240.00 MW	4.0000 PPM @ 15% O2	
	FL	AC53-251898/PSD-FL-216	4/1/95	COMBINED CYCLE COMBUSTION TURBINE (TOTAL 1.1	75.00 MW	25.0000 PPM @ 15% O2	COMBUSTION CONTROLS STANDARD ONLY APPLIES IF GE CT IS SELECTED, THE ABB C
SMISSION COMPANY	NJ	LOC# 94-0059	3/31/95	TURBINES COMBUSTION, TWO SOLAR CENTAUR	3.10 MW EACH	15.2000 LB/H	
ORPORATION, LOUISIANA	LA	PSD-LA-560 (M-1)	3/2/95	TURBINE/HRSG, GAS COGENERATION	450.00 MM BTU/HR	25.8000 LB/HR	PROPER OPERATION
TRIC CO.	MO	0395-015	2/28/95	INSTALL TWO NEW SIMPLE-CYCLE TURBINES	68.77 MW	427.5000 TPY	GOOD COMBUSTION CONTROL
NDIAN BASIN N.G. PLAN	NM	PSD-NM-295-M-2	1/31/95	TURBINES, NATURAL GAS (2)	5500.00 HP	13.2000 LBS/HR	LEAN-PREMIXED COMBUSTION TECHNOLOGY.
ACUSE LP	NY	313201 2010/00001-00007	12/10/94	SIEMENS V64.3 GAS TURBINE (EP #00001)	600.00 MMBTU/HR	9.5000 PPM	NO CONTROLS
RGY CENTER	NY	351200 0211 00001	10/6/94	DUCT BURNER	70.00 MMBTU/HR	0.1280 LB/MMBTU, 3.84 LB/HR	NO CONTROLS
RGY CENTER	NY	351200 0211 00001	10/6/94	GE FRAME 6 GAS TURBINE	570.00 LB/MMBTU	10.0000 PPM, 10.00 LB/HR	NO CONTROLS
T	NY	350400 0221 00001	8/15/94	GE LM5000 GAS TURBINE	570.00 MMBTU/HR	107.0000 PPM, 120 LB/HR	NO CONTROLS
D LIGHT	SC	0820-0033	8/31/94	STATIONARY GAS TURBINE	1550.00 MMBTU/H	414.0000 LB/H	PROPER OPERATION TO ACHIEVE GOOD COMBUSTION
D LIGHT	SC	0820-0033	8/31/94	STATIONARY GAS TURBINE	1550.00 MMBTU/H	702.0000 LB/H	PROPER OPERATION TO ACHIEVE GOOD COMBUSTION
TED	CA	5-2049-1-2	8/19/94	TURBINE, GE, COGENERATION, 48 MW	48.00 MW	252.6000 LB/D	OXIDATION CATALYST
ING CO.	OR	30-0113	7/7/94	TURBINES, NATURAL GAS (2)	1696.00 MMBTU/H	15.0000 PPM @ 15% O2	GOOD COMBUSTION PRACTICES
	NV	A0113	6/10/94	COMBUSTION TURBINE, DIESEL & NATURAL GAS	140.00 MEGAWATT	77.0000 LB/HR	FUEL SPEC: NATURAL GAS
	NV	A0116	6/10/94	COMBUSTION TURBINE, DIESEL & NATURAL GAS	140.00 MEGAWATT	83.0000 LB/HR	FUEL SPEC: NATURAL GAS

st Availble Control Technology (BACT) Determinations for CO Emissions for Combustion Turbines Including Duct Firing

	State	Permit Number	Permit Issue Date	Unit/Process Description	Capacity (size)	CO Emission Limit	Control Method
LECTRIC CO.	OR	25-0031	5/31/94	TURBINES, NATURAL GAS (2)	1720.00 MMBTU	15.0000 PPM @ 15% O2	GOOD COMBUSTION PRACTICES
TRIC CO.	MO	0594-035	5/17/94	INSTALL TWO NEW SIMPLE-CYCLE TURBINES	1345.00 MMBTU/HR	120.0000 TPY	NONE
TRIC CO.	MO	0594-035	5/17/94	INSTALL TWO NEW SIMPLE-CYCLE TURBINES	1315.00 MMBTU/HR	1290.0000 TPY	NONE
ERATION COMPANY	TX	23962/PSD-TX-837	5/2/94	GAS TURBINES	75.30 MW (TOTAL POWER)	300.0000 TPY	INTERNAL COMBUSTION CONTROLS
ORATION POLK COUNTY SITE	FL	PSD-FL-195	2/25/94	TURBINE, NATURAL GAS (2)	1510.00 MMBTU/H	25.0000 PPMVD	GOOD COMBUSTION PRACTICES
ORATION POLK COUNTY SITE	FL	PSD-FL-195	2/25/94	TURBINE, FUEL OIL (2)	1790.00 MMBTU/H	30.0000 PPMVD	GOOD COMBUSTION PRACTICES
	LA	PSD-LA-93(M-3)	2/24/94	TURBINE/HRSG, GAS COGEN	338.00 MM BTU/HR TURBINE	165.9000 LB/HR	COMBUSTION CONTROL
TION	FL	PSD-FL-194	2/24/94	TURBINE, SYNGAS (COAL GASIFICATION)	1755.00 MMBTU/H	25.0000 PPMVD	GOOD COMBUSTION
TION	FL	PSD-FL-194	2/24/94	TURBINE, FUEL OIL	1765.00 MMBTU/H	40.0000 PPMVD	GOOD COMBUSTION
THAGE L.P.	NY	226001 0285 00001	1/18/94	GE FRAME 6 GAS TURBINE	491.00 BTU/HR	10.0000 PPM, 11.0 LB/HR	NO CONTROLS
ON LP	FL	PSD-FL-206	12/30/93	TURBINE, NATURAL GAS, 2	368.30 MMBTU/H	30.0000 PPMVD	GOOD COMBUSTION
CIATES	NY	311500 2015 00001	12/1/93	STACK (TURBINE AND DUCT BURNER)	715.00 MMBTU/HR	106.4000 LB/HR TEMP > 20F	OXIDATION CATALYST
CIATES	NY	311500 2015 00001	12/1/93	GE LM-5000 GAS TURBINE	550.00 MMBTU/HR	92.0000 LB/HR TEMP > 20F	NO CONTROLS
ES CO. - EL CEDRO COMPRESSOR	NM	PSD-NM-340M2	10/29/93	TURBINE, GAS-FIRED	11257.00 HP	50.0000 PPM @ 15% O2	COMBUSTION CONTROL
TION - C&H SUGAR	CA	S-201	10/5/93	TURBINE, GAS, GENERAL ELECTRIC MODEL PG7221(FA	240.00 MW	5.9000 PPMVD @ 15% O2	ENGELHARD OXIDATION CATALYST
ARTNERS, LIMITED PARTNERSHIP	VA	71975	9/15/93	TURBINE, COMBUSTION, SIEMENS MODEL V84.2, 3	10.20 X109 SCF/YR NAT GAS	26.0000 LB/HR	GOOD COMBUSTION OPERATING PRACTICES
SSION COMPANY	AL	503-3028-X003	8/5/93	TURBINE, NATURAL GAS	12600.00 BHP	0.4200 GM/HP HR	AIR-TO-FUEL RATIO CONTROL, DRY COMBUSTION CONTROLS
ILITY	NY	292600 0446/00001-00007	7/14/93	(3) DUCT BURNER (EP #S 00001-00003)	94.10 MMBTU/HR	0.1000 LB/MMBTU, 9.4 LB/HR	NO CONTROLS
ILITY	NY	292600 0446/00001-00007	7/14/93	(6) GE FRAME 6 TURBINES (EP #S 00001-00006)	423.90 MMBTU/HR	10.0000 PPM	NO CONTROLS
	NY	030200 0451	7/7/93	DUCT BURNER EP #00001	70.00 MMBTU/HR	0.0350 LB/MMBTU, 2.5 LB/HR	NO CONTROLS
	NY	030200 0451	7/7/93	GE LM5000 COMBINED CYCLE GAS TURBINE EP #00001	451.00 MMBTU/HR	36.0000 PPM, 33 LB/HR	BAFFLE CHAMBER
ATION PARTNERSHIP, L.P.	NJ	01-92-5231 TO 01-92-5261	6/9/93	TURBINES, COMBUSTION, NATURAL GAS-FIRED (2)	617.00 MMBTU/HR (EACH)	1.8000 PPMDV	OXIDATION CATALYST
ATION PARTNERSHIP, L.P.	NJ	01-92-5231 TO 01-92-5261	6/9/93	TURBINES, COMBUSTION, KEROSENE-FIRED (2)	660.00 MMBTU/H (EACH)	2.6000 PPMDV	OXIDATION CATALYST
SH RIVER STATION	IN	CP 167 2610	5/27/93	COMBINED CYCLE SYNGAS TURBINE	1775.00 MMBTU/HR	15.0000 LESS THAN PPM	OPERATION PRACTICES AND GOOD COMBUSTION, COMBINED CYCLE SYNGAS TURBINE
	FL	PSD-FL-190	5/17/93	DUCT BURNER, GAS	100.00 MMBTU/H	10.0000 LB/H	GOOD COMBUSTION PRACTICES
	FL	PSD-FL-190	5/17/93	TURBINE, GAS	1614.80 MMBTU/H	49.0000 LB/H	GOOD COMBUSTION PRACTICES
	FL	PSD-FL-190	5/17/93	TURBINE, OIL	1849.90 MMBTU/H	98.4000 LB/H	GOOD COMBUSTION PRACTICES
ANY	NY	563203 0099	5/12/93	DUCT BURNER EP #00001	100.00 MMBTU/HR	0.1400 LB/MMBTU, 12.0 LB/HR	NO CONTROLS
ANY	NY	563203 0099	5/12/93	GE FRAME 6 GAS TURBINE EP #00001	491.00 MMBTU/HR	40.0000 PPM	NO CONTROLS
NERS	CO	92WE0357	5/11/93	GENERATOR, STEAM, W/ DUCT BURNER	50.00 MMBTU/HR	91.1800 TPY	FUEL SPEC: NATURAL GAS COMBUSTION
	NY	472200 5378	5/10/93	(3) GE FRAME 7 TURBINES (EP #S 00007-9)	850.00 MMBTU/HR	10.0000 PPM, 19.7 LB/HR	NO CONTROLS
	NY	282089 4163 00004	4/16/93	GE FRAME 6 GAS TURBINE	424.70 MMBTU/HR	10.0000 PPM, 10.0 LB/HR	NO CONTROLS
THORITY	FL	FL-PSD-182	4/7/93	TURBINE, NATURAL GAS	869.00 MMBTU/H	54.0000 LB/H	GOOD COMBUSTION PRACTICES
THORITY	FL	FL-PSD-182	4/7/93	TURBINE, NATURAL GAS	367.00 MMBTU/H	40.0000 LB/H	GOOD COMBUSTION PRACTICES
THORITY	FL	FL-PSD-182	4/7/93	TURBINE, FUEL OIL	928.00 MMBTU/H	65.0000 LB/H	GOOD COMBUSTION PRACTICES
THORITY	FL	FL-PSD-182	4/7/93	TURBINE, FUEL OIL	371.00 MMBTU/H	76.0000 LB/H	GOOD COMBUSTION PRACTICES
R COOPERATIVE	KY	C-93-045	3/24/93	TURBINES (5), #2 FUEL OIL AND NAT. GAS FIRED	1452.00 MMBTU/H (EACH)	75.0000 LBS/H (EACH)	PROPER COMBUSTION TECHNIQUES
CO. RIVERDALE MILL	AL	104-0003-X026	1/11/93	TURBINE, STATIONARY (GAS-FIRED) WITH DUCT BUR	40.00 MW	22.1000 LB/HR	DESIGN
ARTNERS, LP	FL	PSD-FL-185	12/14/92	TURBINE,GAS	1214.00 MMBTU/H	15.0000 PPMVD	GOOD COMBUSTION PRACTICES
ARTNERS, LP	FL	PSD-FL-185	12/14/92	TURBINE, OIL	1170.00 MMBTU/H	25.0000 PPMVD	GOOD COMBUSTION PRACTICES
POWER PARTNERS	NY	7-3556-00040-00007-9	11/24/92	TURBINES, COMBUSTION (4) (NATURAL GAS) (1012 M	2133.00 MMBTU/HR (EACH)	13.0000 PPM	COMBUSTION CONTROLS
VER FALLS COGENERATION FACILITY	NY	6-2320-00018/00001-0	11/9/92	TURBINE, COMBUSTION (NAT. GAS & OIL FUEL) (79MW	650.00 MMBTU/HR	9.5000 PPM	COMBUSTION CONTROLS
RATION PARTNERSHIP	PA	92181 TO 92184	11/4/92	TURBINE (NATURAL GAS & OIL)	1150.00 MMBTU	0.0055 LB/MMBTU (GAS)*	COMBUSTION
RATION PARTNERSHIP	PA	92181 TO 92184	11/4/92	GENERATOR, STEAM	450.00 MMBTU	0.0055 LB/MMBTU (NAT GAS)*	COMBUSTION
MPANY, L.P.	VA	50840	10/30/92	TURBINE, COMBUSTION GAS	474.00 X10(6) BTU/HR N. GAS	11.0000 LBS/HR	GOOD COMBUSTION
MPANY, L.P.	VA	50840	10/30/92	TURBINE, COMBUSTION GAS	468.00 X10(6) BTU/HR #2 OIL	11.0000 LBS/HR	GOOD COMBUSTION
MPANY, L.P.	VA	50840	10/30/92	TURBINE, COMBUSTION GAS (TOTAL)	0.00	48.2000 TPY	GOOD COMBUSTION
Y L.P.	VA	REGISTRATION # 40808	9/25/92	TURBINE FACILITY, GAS	1331.13 X10(7) SCF/Y NAT GAS	249.9000 TOTAL TPY	GOOD COMBUSTION PRACTICES
Y L.P.	VA	REGISTRATION # 40808	9/25/92	TURBINE FACILITY, GAS	7.44 X10(7) GPY FUEL OIL	249.9000 TOTAL TPY	GOOD COMBUSTION PRACTICES
Y L.P.	VA	REGISTRATION # 40808	9/25/92	TURBINES (2) [EACH WITH A SF]	1.51 X10(9) BTU/HR N GAS	57.0000 LBS/HR/UNIT	GOOD COMBUSTION PRACTICES
Y L.P.	VA	REGISTRATION # 40808	9/25/92	TURBINES (2) [EACH WITH A SF]	1.36 X10(9) BTU/H #2 OIL	68.0000 LBS/HR/UNIT	GOOD COMBUSTION PRACTICES
ANY, HARRY ALLEN PEAKING PLANT	NV	A533	9/18/92	COMBUSTION TURBINE ELECTRIC POWER GENERATI	600.00 MW (8 UNITS 75 EACH)	152.5000 TPY (EACH TURBINE)	PRECISION CONTROL FOR THE LOW NOX COMBUSTOR
FALLS COGEN CO	NY	414401 0212 00001	9/10/92	GE FRAME 6 GAS TURBINE	498.00 MMBTU/HR	9.0000 PPM, 11.0 LB/HR	NO CONTROLS
VER COMPANY	SD	NONE	9/2/92	TURBINE, SIMPLE CYCLE, 4 EACH	129.00 MW	50.0000 PPM FOR GAS	GOOD COMBUSTION TECHNIQUES
MBINED CYCLE PLANT	NY	1-4722-00926/00001-9	9/1/92	GENERATOR, EMERGENCY (NATURAL GAS)	1.50 MMBTU/HR	6.5000 LB/MMBTU	COMBUSTION CONTROL
MBINED CYCLE PLANT	NY	1-4722-00926/00001-9	9/1/92	TURBINE, COMBUSTION GAS (150 MW)	1146.00 MMBTU/HR (GAS)*	8.5000 PPM	COMBUSTION CONTROL
	WI	91-RV-043	8/29/92	TURBINES, COMBUSTION (4)	0.00	25.0000 LBS/HR (SEE NOTES)	
ORATION	FL	FL-PSD-180	8/17/92	TURBINE, OIL	1029.00 MMBTU/H	54.0000 LB/H	GOOD COMBUSTION PRACTICES
ORATION	FL	FL-PSD-180	8/17/92	TURBINE, OIL	1866.00 MMBTU/H	79.0000 LB/H	GOOD COMBUSTION PRACTICES
	OH	01-3870	8/12/92	TURBINE (NATURAL GAS) (3)	5500.00 HP (EACH)	0.0150 G/HP-HR	FUEL SPEC: USE OF NATURAL GAS
PANY	NY	5-0942-00106/00001-9	7/31/92	BURNERS, DUCT (2)	553.00 MMBTU/HR EACH	0.0600 LB/MMBTU	OXIDATION CATALYST
PANY	NY	5-0942-00106/00001-9	7/31/92	TURBINES, COMBUSTION (2) (NATURAL GAS)	1123.00 MMBTU/HR (EACH)	3.0000 PPM	OXIDATION CATALYST
ITED PARTNERSHIP	GA	4911-073-10941	7/28/92	TURBINE, GAS FIRED (2 EACH)	1817.00 M BTU/HR	25.0000 PPMVD @ FULL LOAD	FUEL SPEC: CLEAN BURNING FUELS
ITED PARTNERSHIP	GA	4911-073-10941	7/28/92	TURBINE, OIL FIRED (2 EACH)	1840.00 M BTU/HR	25.0000 PPMVD @ FULL LOAD	FUEL SPEC: CLEAN BURNING FUELS
NY, LTD./MAALAEA GENERATING STA	HI	HI 90-05	7/28/92	TURBINE, COMBINED-CYCLE COMBUSTION	28.00 MW	26.9000 LB/HR	COMBUSTION TECHNOLOGY/DESIGN
Y SERVICES	NY	146400 0133	6/24/92	DUCT BURNER (EP #00001)	20.00 MMBTU/HR	0.0400 LB/MMBTU, 0.8 LB/HR	NO CONTROLS
Y SERVICES	NY	146400 0133	6/24/92	GE FRAME 6 GAS TURBINE (EP #00001)	432.20 MMBTU/HR	10.0000 PPM, 10 LB/HR	NO CONTROLS
N PARTNERS, L.P.	NY	4-0122-00078/00002-9	6/18/92	DUCT BURNERS (2)	206.00 MMBTU/HR (EACH)	0.0730 LB/MMBTU GAS, 100%	COMBUSTION CONTROLS
N PARTNERS, L.P.	NY	4-0122-00078/00002-9	6/18/92	DUCT BURNER	123.00 MMBTU/HR	0.0720 LB/MMBTU GAS (100%)	COMBUSTION CONTROL
N PARTNERS, L.P.	NY	4-0122-00078/00002-9	6/18/92	COMBUSTION TURBINES (2) (252 MW)	1173.00 MMBTU/HR (EACH)	10.0000 PPM	COMBUSTION CONTROLS
N PARTNERS, L.P.	NY	4-0122-00078/00002-9	6/18/92	COMBUSTION TURBINE (79 MW)	1173.00 MMBTU/HR	25.0000 PPM	COMBUSTION CONTROL
N PARTNERS, L.P.	WA	91-04	5/29/92	COGENERATION PLANT, COMBINED CYCLE	1.83 MMBTU/HR	20.0000 PPM @ 15% O2	COMBUSTION CONTROL
CORPORATION	CO	91LP792(1-2) MOD. #1	5/29/92	BURNERS, DUCT, COEN	29.00 MMBTU/HR PER BURNER	4.0000 LB/HR	
RIC/NEW ENGLAND POWER CO.	RI	RI-PSD-4	4/13/92	TURBINE, GAS AND DUCT BURNER	1360.00 MMBTU/H EACH	11.0000 PPM @ 15% O2, GAS	
OMPANY	KY	C-92-005	3/10/92	TURBINE, #2 FUEL OIL/NATURAL GAS (8)	1500.00 MM BTU/HR (EACH)	75.0000 LB/HR (EACH)	COMBUSTION CONTROL
NERGY LIMITED PARTNERSHIP	VA	51020	3/3/92	TURBINE, COMBUSTION	1175.00 MMBTU/H NAT. GAS	62.0000 LB/H/UNIT	FURNACE DESIGN
NERGY LIMITED PARTNERSHIP	VA	51020	3/3/92	TURBINE, COMBUSTION	1117.00 MMBTU/H NO2 FUEL OIL	62.0000 LB/H/UNIT	FURNACE DESIGN
NERGY LIMITED PARTNERSHIP	VA	51020	3/3/92	TURBINE, COMBUSTION, 2	0.00	229.3000 T/YR/UNIT	
.TD.	CO	9/WE667(1-5)	2/19/92	TURBINE, GAS FIRED, 5 EACH	246.00 MMBTU/H	25.0000 PPM @ 15% O2	COMBUSTION CONTROL
ND POWER CO.	GA	4911-051-8529	2/12/92	TURBINES, 8	1032.00 MMBTU/H, NAT GAS	9.0000 PPM @ 15% O2	FUEL SPEC: LOW SULFUR FUEL OIL
ND POWER CO.	GA	4911-051-8529	2/12/92	TURBINES, 8	972.00 MMBTU/H, #2 OIL	9.0000 PPM @ 15% O2	FUEL SPEC: LOW SULFUR FUEL OIL

Best Available Control Technology (BACT) Determinations for CO Emissions for Combustion Turbines Including Duct Firing

	State	Permit Number	Permit Issue Date	Unit/Process Description	Capacity (size)	CO Emission Limit	Control Method
HT CO., INC.	HI	HI-90-04	2/12/92	TURBINE, FUEL OIL #2	20.00 MW	26.8000 LB/HR @ 100% PEAKLD	COMBUSTION DESIGN
HT CO., INC.	HI	HI-90-04	2/12/92	TURBINE, FUEL OIL #2	20.00 MW	56.4000 LB/H @ 75-<100% PKLD	COMBUSTION DESIGN
HT CO., INC.	HI	HI-90-04	2/12/92	TURBINE, FUEL OIL #2	20.00 MW	181.0000 LB/H @ 50-<75% PKLD	COMBUSTION DESIGN
HT CO., INC.	HI	HI-90-04	2/12/92	TURBINE, FUEL OIL #2	20.00 MW	475.6000 LB/H @ 25-<50% PKLD	COMBUSTION DESIGN
TURAL DAM LP	NY	404089 0305 00001	12/31/91	GE FRAME 6 GAS TURBINE	500.00 MMBTU/HR	0.0200 LB/MMBTU, 10 LB/HR	NO CONTROLS
COLN COMBUSTION TURBINE STATION	NC	7171	12/20/91	TURBINE, COMBUSTION	1213.00 MM BTU/HR	59.0000 LB/HR	COMBUSTION CONTROL
COLN COMBUSTION TURBINE STATION	NC	7171	12/20/91	TURBINE, COMBUSTION	1247.00 MM BTU/HR	60.0000 LB/HR	COMBUSTION CONTROL
'ANY, LTD.	HI	HI-90-02	12/3/91	TURBINE, FUEL OIL #2	28.00 MW	0.0000 SEE NOTES	GOOD COMBUSTION PRACTICES
LIMITED	MI	1234-90	12/3/91	TURBINE, GAS-FIRED, 2, W/ WASTE HEAT BOILERS	1805.90 MMBTU/H	20.0000 PPMV	DRY LOW NOX TURBINES
	FL	PSD-FL-176	11/20/91	DUCT BURNER, GAS	150.00 MMBTU/H	0.2000 LB/MMBTU	NOT REQUIRED
	FL	PSD-FL-176	11/20/91	TURBINE, GAS, 2 EACH	42.00 MW	42.0000 PPM @ 15% O2	COMBUSTION CONTROL
	FL	PSD-FL-176	11/20/91	TURBINE, OIL, 2 EACH	42.00 MW	78.0000 PPM @ 15% O2	COMBUSTION CONTROL
OMMISSION	FL	PSD-FL-173	11/5/91	TURBINE, GAS, 4 EACH	35.00 MW	10.0000 PPM @ 15% O2	COMBUSTION CONTROL
OMMISSION	FL	PSD-FL-173	11/5/91	TURBINE, OIL, 4 EACH	35.00 MW	10.0000 PPM @ 15% O2	COMBUSTION CONTROL
IA GAS	CA	2046009-011	10/29/91	TURBINE, GAS-FIRED	47.64 MMBTU/H	7.7400 PPM @ 15% O2	HIGH TEMPERATURE OXIDATION CATALYST
IA GAS	CA	2046009-011	10/29/91	TURBINE, GAS FIRED, SOLAR MODEL H	3500.00 HP	7.7400 PPM @ 15% O2	HIGH TEMP OXIDATION CATALYST
S	AZ		10/25/91	TURBINE, GAS, SOLAR CENTAUR H	3500.00 HP	10.5000 PPM @ 15% O2	FUEL SPEC: LEAN FUEL MIX
S	AZ		10/25/91	TURBINE, GAS, SOLAR CENTAUR H	3500.00 HP	10.5000 PPM @ 15% O2	FUEL SPEC: LEAN FUEL MIX
ERATION	FL	PSD-FL-167	10/18/91	TURBINE, OIL, 6 EACH	92.90 MW	54.0000 LB/H	COMBUSTION CONTROL
S	AZ		10/18/91	TURBINE, NAT. GAS TRANSM., GE FRAME 3	12000.00 HP	60.0000 PPM @ 15% O2	LEAN BURN
ENCOGEN NW COGENERATION PROJECT	WA	91-02	9/26/91	TURBINES, COMBINED CYCLE COGEN, GE FRAME 6	123.00 MW	10.0000 PPMDV @ 15% O2	
D LIGHT CO.	SC	0820-0033-CA TO CC	9/23/91	TURBINE, I.C.	80.00 MW	60.0000 LB/H	
JERGY COMPANY	LA	PSD-LA-569	8/5/91	TURBINE, GAS, 2	99.10 MMBTU/H	60.0000 PPM @ 15% O2	BASE CASE, NO ADDITIONAL CONTROLS
NSMISSION CO.	RI	1126-1127	7/31/91	TURBINE, GAS, 2	49.00 MMBTU/H	0.1140 LB/MMBTU	GOOD COMBUSTION PRACTICES
VER PLANT	FL	PSD-FL-166	7/25/91	TURBINE, GAS, 1 EACH	80.00 MW	25.0000 PPM @ 15% O2	COMBUSTION CONTROL
VER PLANT	FL	PSD-FL-166	7/25/91	TURBINE, OIL, 1 EACH	80.00 MW	25.0000 PPM @ 15% O2	COMBUSTION CONTROL
	WA		6/25/91	TURBINE, NATURAL GAS	88.00 MW	6.0000 PPM @ 15% O2	CO CATALYST
4PANY	NV	AJ93	6/17/91	COMBUSTION TURBINE GENERATOR	34.50 MW	9.0000 PPH	CONVERTER (CATALYTIC)
LIGHT	FL	PSD-FL-146	6/5/91	TURBINE, GAS, 4 EACH	400.00 MW	30.0000 PPM @ 15% O2	COMBUSTION CONTROL
LIGHT	FL	PSD-FL-146	6/5/91	TURBINE, CG, 4 EACH	400.00 MW	33.0000 PPM @ 15% O2	COMBUSTION CONTROL
LIGHT	FL	PSD-FL-146	6/5/91	TURBINE, OIL, 2 EACH	400.00 MW	33.0000 PPM @ 15% O2	COMBUSTION CONTROL
DATED POWER	PA	25-328-001	5/3/91	TURBINES, GAS, 2	34.60 KW EACH	110.0000 T/YR	OXIDATION CATALYST
IATION, L.P.	NJ	SEVERAL; SEE NOTES	4/1/91	TURBINES (NATURAL GAS) (2)	1190.00 MMBTU/HR (EACH)	0.0260 LB/MMBTU	TURBINE DESIGN
IATION, L.P.	NJ	SEVERAL; SEE NOTES	4/1/91	TURBINES (#2 FUEL OIL) (2)	1190.00 MMBTU/HR (EACH)	0.0600 LB/MMBTU	TURBINE DESIGN
	CO	90WE438	3/25/91	TURBINE #2, GE FRAME 6	33.00 MW	250.0000 T/YR, LESS THAN	CO CATALYST
LIGHT	FL	PSD-FL-145	3/14/91	TURBINE, GAS, 4 EACH	340.00 MW	30.0000 PPM @ 15% O2	COMBUSTION CONTROL
LIGHT	FL	PSD-FL-145	3/14/91	TURBINE, OIL, 4 EACH	0.00	33.0000 PPM @ 15% O2	COMBUSTION CONTROL
ION ASSOCIATES #2	NV	A391	1/17/91	COMBINED-CYCLE POWER GENERATION	85.00 MW POWER OUTPUT	39.9800 LBS/HR	CATALYTIC CONVERTER
ION ASSOCIATES #1	NV	A360	1/17/91	COMBINED-CYCLE POWER GENERATION	85.00 MW TOTAL OUTPUT	39.9800 LBS/HR	CATALYTIC CONVERTER
ERATION PARTNERSHIP	NJ		11/1/90	TURBINE, KEROSENE FIRED	565.00 MMBTU/HR	0.0630 LB/MMBTU	CATALYTIC OXIDATION
ERATION PARTNERSHIP	NJ		11/1/90	TURBINE, NATURAL GAS FIRED	565.00 MMBTU/HR	0.0055 LB/MMBTU	CATALYTIC OXIDATION
IATION PLANT	NY	262400 5708 00001	8/5/90	GE LM2500 GAS TURBINE	214.90 MMBTU/HR	0.1810 LB/MMBTU	CATALYTIC OXIDIZER
COMPANY - HAGOOD STATION	SC	0560-0029	12/1/89	INTERNAL COMBUSTION TURBINE	110.00 MEGAWATTS	23.0000 LBS/HR	GOOD COMBUSTION PRACTICES
LIGHT PLANT	MA	MBR-89-COM-032	11/30/89	TURBINE, 38 MW NATURAL FAS FIRED	412.00 MMBTU/HR	40.0000 PPM @ 15% O2	GOOD COMBUSTION PRACTICES
CIATES, INC	NY	402201 0295 00001	8/5/89	GE LM5000-N COMBINED CYCLE GAS TURBINE	401.00 LB/MMBTU	0.0280 LB/MMBTU, 11 LB/HR	NO CONTROLS
	CA	A/N 168294 AND 168295	7/18/89	TURBINE, GAS (SEE NOTES)	0.00	10.0000 PPM @ 15% O2	OXIDATION CATALYST
	CA	S-1120-1-7	11/4/86	TURBINE, GAS, GENERAL ELECTRIC LM-2500	25.00 MW	669.1900 LB/D	OXIDATION CATALYST
IUFACTURING U.S.A. INC.	KY	C-86-117	7/17/86	COMBUSTION, NATURAL GAS	0.00	0.0333 LB/MMBTU	
	MO	0579-014 TO 0579-015	5/6/79	CONSTRUCTION OF A NEW OIL FIRED COMBUSTION	622.00 MM BTU/HR	463.0000 TPY	
TELD SERVICE	NM	PSD-NM-839-M-4		TURBINE/COGEN, NATURAL GAS (2)	900.00 MMCF/DAY	27.6000 PPM @ 15% O2	
TER	NY	472800 2084		(2) DUCT BURNER (EP #S 00001&2)	214.10 MMBTU/HR	0.1080 LB/MMBTU, 17.5 LB/HR	
TER	NY	472800 2084		(2) WESTINGHOUSE W501D5 TURBINES (EP #S 00001&2)	1400.00 MMBTU/HR	10.0000 PPM, 29.0 LB/HR	
IES	NY	392400 0095		(2) GAS TURBINES (EP #S 00101&102)	110.00 MMBTU/HR	48.0000 PPM, 12.6 LB/HR	
ECTRIC - PERRYMAN PLANT	MD			TURBINE, 140 MW NATURAL GAS FIRED ELECTRIC	140.00 MW	20.0000 PPM @ 15% O2	GOOD COMBUSTION PRACTICES
ARTNERSHIP	CO	91MR933,1-2		TURBINES, 2 NAT GAS & 2 DUCT BURNERS	385.00 MMBTU/H EACH TURBIN	22.4000 PPM @ 15% O2	
MPANY - THEODORE COGENERATION	AL	503-8073	3/16/99	TURBINE, WITH DUCT BURNER	170.00 MW	0.0860 LB/MMBTU	EFFICIENT COMBUSTION
ASTICS	AL	207-0008-X016	5/27/98	COMBINED CYCLE (TURBINE AND DUCT BURNER)	0.00	0.0800 LBS/MMBTU	PROPER COMBUSTION
RGY LIMITED	ME	A-718-71-A-N	3/31/98	GAS TURBINES, COGEN, W/DUCT BURNERS	675.00 MMBTU/H TURBINE	74.2100 LB/H NG	CATALYTIC OXIDATION, GOOD COMBUSTION PRACTICES.
RGY LIMITED	ME	A-718-71-A-N	3/31/98	GAS TURBINES, COGEN, W/DUCT BURNERS	675.00 MMBTU/H TURBINE	43.7300 LB/H NG OIL	CATALYTIC OXIDATION, GOOD COMBUSTION PRACTICES.
CORPORATION	LA	PSD-LA-622	2/13/98	DUCT BURNER	426.00 MMBTU/H	25.0000 PPMV	GOOD DESIGN, PROPER COMBUSTION PRACTICES, 2% EXCESS O2
	LA	PSD-LA-613	12/30/97	DUCT BURNER, COGEN UNIT NO. 2	0.40 MMLB/H STEAM	83.9300 LB/HR	GOOD DESIGN, PROPER OPERATING PRACTICES, 2% EXCESS O2

Table B-8. Direct and Indirect Capital Costs for CO Catalyst, Siemens-Westinghouse 501 FD Combined Cycle Combustion Turbine

Cost Component	Costs	Basis of Cost Component
Direct Capital Costs		
CO Associated Equipment	$773,000	Vendor Quote
Flue Gas Ductwork	$44,505	Vatavauk,1990
Instrumentation	$77,300	10% of SCR Associated Equipment
Sales Tax	$46,380	6% of SCR Associated Equipment/Catalyst
Freight	$38,650	5% of SCR Associated Equipment/Catalyst
Total Direct Capital Costs (TDCC)	$979,835	
Direct Installation Costs		
Foundation and supports	$78,387	8% of TDCC and RCC;OAQPS Cost Control Manual
Handling & Erection	$137,177	14% of TDCC and RCC;OAQPS Cost Control Manual
Electrical	$39,193	4% of TDCC and RCC;OAQPS Cost Control Manual
Piping	$19,597	2% of TDCC and RCC;OAQPS Cost Control Manual
Insulation for ductwork	$9,798	1% of TDCC and RCC;OAQPS Cost Control Manual
Painting	$9,798	1% of TDCC and RCC;OAQPS Cost Control Manual
Site Preparation	$5,000	Engineering Estimate
Buildings	$0	
Total Direct Installation Costs (TDIC)	$298,951	
Total Capital Costs	$1,278,786	Sum of TDCC, TDIC and RCC
Indirect Costs		
Engineering	$127,879	10% of Total Capital Costs; OAQPS Cost Control Manual
Construction and Field Expense	$63,939	5% of Total Capital Costs; OAQPS Cost Control Manual
Contractor Fees	$127,879	10% of Total Capital Costs; OAQPS Cost Control Manual
Start-up	$25,576	2% of Total Capital Costs; OAQPS Cost Control Manual
Performance Tests	$12,788	1% of Total Capital Costs; OAQPS Cost Control Manual
Contingencies	$38,364	3% of Total Capital Costs; OAQPS Cost Control Manual
Total Indirect Capital Cost (TInDC)	$396,424	
Total Direct, Indirect and Capital Costs (TDICC)	$1,675,210	Sum of TCC and TInCC
Mass Flow of Combustion Turbine	4,518,595 lb/hr	"G"
	3,600,000 lb/hr	"F"

Table B-9. Annualized Cost for CO Catalyst Siemens-Westinghouse 501FD Combined Cycle Combustion Turbine

Cost Component	Cost	Basis of Cost Estimate
Diirect Annual Costs		
Operating Personnel	$6,240	8 hours/week at $15/hr
Supervision	$936	15% of Operating Personnel;OAQPS Cost Control Manual
Catalyst Replacement	$224,667	3 year catalyst life; base on Vendor Budget Quote
Inventory Cost	$24,668	Capital Recovery (10.98%) for 1/3 catalyst
Contingency	$7,695	3% of Direct Annual Costs
Total Direct Annual Costs (TDAC)	$264,206	
Energy Costs		
Heat Rate Penalty	$224,238	0.2% of MW output; EPA, 1993 (Page 6-20) and $3/mmBtu addl fuel costs
Total Energy Costs (TDEC)	$224,238	
Indirect Annual Costs		
Overhead	$4,306	60% of Operating/Supervision Labor
Property Taxes	$16,752	1% of Total Capital Costs
Insurance	$16,752	1% of Total Capital Costs
Annualized Total Direct Capital	$183,938	10.98% Capital Recovery Factor of 7% over 15 yrs times sum of TDICC
Total Indirect Annual Costs	$221,748	
Total Annualized Costs	$710,193	Sum of TDAC, TEC and TIAC
Cost Effectiveness	$2,199	per ton of CO Removed
	$2,332	per ton of Net Emission Reduction

Table B-10. Comparison of Alternative BACT Control Technologies for CO on One Combined Cycle Unit (CT & HRSG)

	Alternative BACT Control Technologies	
	DLN Only	DLN/WI with OC
Technical Assessment	Feasible	Available, Feasible and Demonstrated
Economic Impacts[a]		
Capital Costs	included	$1,675,210
Annualized Costs	included	$710,193
Cost Effectiveness[b]		
CO Removed (per ton of CO)	NA	$2,199 to 4,190
CO Removed (per ton of total pollutants)	NA	$2,332 to 4,417
Environmental Impacts[c]		
Total CO (TPY)	359	36
CO Reduction (TPY)	NA	(323)
PM Emissions (TPY)	0	15
Secondary Emissions (TPY)	0	3.5
Net Emission Reduction (TPY)	NA	(305)
Energy Impacts[d]		
Energy Use (kWh/yr)	0	3,171,120
Energy Use (mmBtu/yr) at 10,000 Btu/kWh	0	30,712
Energy Use (mmcf/yr) at 1,000 Btu/cf for natural gas	0	31

[a] See Tables B-8 and B-9 for detailed development of capital costs (including recurring costs) and annualized costs.

[b] The upper range of cost effectiveness is based on 100-percent load without duct firing and low load operation.

[c] See emission data presented in Table B-11.

[d] Energy impacts are estimated due to the lost energy from heat rate penalty for 8,760 hours per year. Lost energy is based on 0.2 percent of 181 MW.

Table B-11. Maximum Potential Incremental Emissions (TPY) with Oxidation Catalyst

Pollutants	Incremental Emissions (tons/year) of SCR		Total
	Primary	Secondary	
Particulate	14.97	0.11	15.08
Sulfur Dioxide		0.04	0.04
Nitrogen Oxides	0.00	2.05	2.05
Carbon Monoxide	-323.01	1.23	-321.78
Volatile Organic Compounds		0.08	0.08
Total:	-308.04	3.51	-304.53
Carbon Dioxide (additional from gas firing)		1,945.11	1,945.11

Basis:

Lost Energy (mmBtu/year)	30,712
Secondary Emissions (lb/mmBtu): Assumes natural gas firing in NOx controlled steam unit.[a]	
Particulate	0.0072
Sulfur Dioxide	0.0027
Nitrogen Oxides w/LNB	0.1333
Carbon Monoxide	0.0800
Volatile Organic Compounds	0.0052

Reference: Table 1.4-1 and 1.4-2, AP-42, Version 2/98

[a] Replacing lost energy with other generation options such as oil would increase emissions. Therefore, this comparison is conservative.

APPENDIX C

AIR QUALITY MODELING PROTOCOL DOCUMENTS

Golder Associates Inc.

6241 NW 23rd Street, Suite 500
Gainesville, FL 32653-1500
Telephone (352) 336-5600
Fax (352) 336-6603

February 9, 2000

Florida Department of Environmental Protection
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Attention: Mr. A.A. Linero, P.E.

RE: CALPINE CORPORATION, INC.
AIR DISPERSION MODELING PROTOCOL FOR PREVENTION OF SIGNIFICANT DETERIORATION APPLICATION
OSPREY ENERGY CENTER PROJECT, POLK COUNTY, FLORIDA

Dear Mr. Linero:

Calpine Corporation, Inc., is proposing to construct and operate an independent power production facility capable of generating a nominal net electrical output of 540 megawatts (MW) in Polk County, Florida. The facility is referred to as the Osprey Energy Center Project ("the Project"). The facility will be located within the City of Auburndale (after the City's approval of property annexation). The facility will be located on a 20-acre tract approximately 1.5 miles [2.5 kilometers (km)] from downtown Auburndale and about 12 miles (20 km) east of Lakeland, Florida. The Project will consist of two combustion turbines (CTs) (generating approximately 170 MW each), two heat recovery steam generators (HRSG) with duct firing, and one steam turbine (generating approximately 200 MW) operating in combined cycle mode. A cooling tower will be installed and operated to provide cool water to the condensing steam turbine. The tower will be a mechanical draft counter-flow design. The CTs and duct burners will be fired by natural gas only. The facility will be designed for providing baseload service and permitted at an annual capacity of 100 percent. In actual operation, the plant's annual capacity would be approximately 80 percent.

The Project is subject to the siting requirements under the Site Certification of Power Plants. In addition, the Project will also be subject to the new source review requirements under the Prevention of Significant Deterioration (PSD) regulations. Under these regulations, the proposed Project will be considered a major source for nitrogen oxides (NO_x), total particulate matter (PM), particulate matter with aerodynamic diameters less than 10 microns (PM_{10}), and carbon monoxide (CO). The Project will also have emissions above the EPA significant emission rates for sulfur dioxide (SO_2), volatile organic compounds (VOC), and sulfuric acid mist.

This protocol presents the air dispersion modeling methodology to be used for the Site Certification Application and PSD analysis, including a discussion of the site geography; air dispersion model to be used; meteorological data; emissions, stack, and building data; receptor locations; and additional impact analyses.

Air Dispersion Models

The air dispersion modeling analysis will be conducted in accordance with air modeling guidelines recommended by the Florida Department of Environmental Protection (DEP). Based on the types of sources for the Project, the Industrial Source Complex Short-term (ISCST3, Version 99155) will be used to predict maximum air quality impacts in areas that are beyond the Project's property boundary. This is latest version of the ISCST3 model available from EPA. All modeling analyses will use the EPA default regulatory options.

In addition, the California Puff model (CALPUFF, Version 5.0) will be used to predict impacts at the PSD Class I area of the Chassahowitzka Wilderness Area (NWA), located about 102 km from the Project site. The Chassahowitzka NWA is the nearest PSD Class I area to the Project; other PSD Class I areas are located more 200 km away. Since the Project is located more than 200 km away from other Class I areas, it is not expected that the Project's emissions will have a significant impact on those Class I areas. As a result, air quality impacts due to the Project's emissions will be assessed at the Chassahowitzka NWA.

The methods and assumptions used in the CALPUFF model will be based on the latest recommendations for modeling analysis as presented in the *Interagency Workgroup on Air Quality Models (IWAQM), Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts* (EPA, 1998). Based on discussions with DEP, the ISCST3 model will be used to determine the "worst-case" operating load and ambient temperature that produces the Project's maximum impact at the Class I area. Based on that analysis, air quality impacts will be predicted with the CALPUFF model using the "worst-case" operating scenario to compare the Project's impacts to Class I significant impact levels (see discussion below).

Emission Inventory

Stack and operating parameters and emission rates of criteria pollutants for the CTs, duct burners, and cooling tower will be developed from design data supplied by equipment vendors for the Project. The design data will be developed for the turbines firing natural gas and operating at 60, 75, and 100 percent of maximum capacity in combined cycle mode. Because the inlet ambient air temperature directly affects turbine combustion and operation, design data will also be provided for three ambient air temperatures that cover the range of temperatures for the Project site location: 32, 59, and 95°F. Air dispersion modeling will be performed for the three operating loads and three ambient temperatures to provide a range of operating conditions that will produce maximum ground-level impacts. These modeling scenarios encompass the operating conditions that will produce the maximum emissions on a short-term basis (i.e., 100 percent load at 32°F) and the minimum plume rise (i.e., 60 percent load at 95°F).

Building Data Processing
Building dimensions for the Project's structures will be entered into the EPA's Building Profile Input Program (BPIP, Version 95086) for the purpose of obtaining direction-specific building heights and widths for all downwash-affected sources. The direction-specific building dimensions will be input to the ISCST3 and CALPUFF models for processing.

Site Geography
The site elevation is about 140 ft above mean sea level (msl). Around the immediate vicinity of the site, the terrain is flat to gently rolling with elevations that range within 10 to 20 ft of the site elevation.

Since the proposed stack heights for the HRSG and cooling tower stacks will be 135 and 43 ft, respectively, the surrounding terrain is below the proposed stack top heights. Therefore, the surrounding terrain can be considered as simple (i.e., less than stack top); the simple terrain option will be assumed for the air modeling analysis.

Based on topographical maps of the Project site, the land use within a 3-km radius of the site can be classified as rural. As a result, the rural option will be selected in the model.

Meteorological Data
Meteorological data will consist of a 5-year record of hourly surface data from the National Weather Service (NWS) station at Tampa International Airport and upper air observations from the NWS station in Ruskin for the years 1987 to 1991. These data are assumed to be representative of the Project site because both the Project site and the weather stations are situated in central Florida to experience similar weather conditions, such as frontal passages. These data have been accepted for use by the DEP in other PSD permit applications to address air quality impacts for other sources locating in this county and adjacent counties.

Significant Impact Analysis
Based on air modeling results for similar projects, the Project's impacts are expected to be below the EPA Class II significant impact levels (SIL) for all pollutants. Therefore, PSD Class II increment and NAAQS analyses with background air emission sources would not be required. The Project's impacts are also expected to be below the EPA Class I SILs for all pollutants at the PSD Class I area of the Chassahowitzka NWA. As a result, cumulative air quality impact analyses with background air emission sources are not expected to be required to assess compliance with PSD Class II increments.

If more detailed modeling indicates that the proposed Project's emissions result in predicted ambient air quality impacts above the EPA Class II or I SILs, discussions will be held with the DEP and emission inventory data of background sources will be obtained as needed.

In addition, pre-construction ambient air quality monitoring is not anticipated to be required for this Project since the air quality impacts are expected to be less than the *de minimis* monitoring thresholds.

Additional Impact Analysis

Additional analyses will evaluate impairment to visibility and the impact of the proposed Project on soils and vegetation in the Project's immediate vicinity. Impacts as a result of general commercial, residential, industrial, and other growth associated with the proposed Project will also be addressed. An air quality related values (AQRV) analysis will also be performed for the PSD Class I area. This analysis will address the effects of the Project's impacts on soils, vegetation, wildlife, and visibility (regional haze) at the Class I area.

Please call me at (352) 336-5600 if you have any questions or comments on the protocol. Calpine greatly appreciates the assistance of the DEP on this important Project.

Very truly yours,

GOLDER ASSOCIATES INC.

Robert C. McCann, Jr.

RCM/arz

cc: Kennard F. Kosky, GAI
Richard A. Zwolak, GAI
Paul Barnett, Calpine Corporation
David S. Dee, Landers & Parsons
Hamilton S. Oven, Florida DEP

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APPENDIX D

METHODS AND ASSUMPTIONS USED IN THE CALPUFF MODEL

D.0 CALPUFF MODEL ASSUMPTIONS AND APPROACHES

D.1 INTRODUCTION

As part of the new source review requirements under Prevention of Significant Deterioration (PSD) regulations, new sources are required to address air quality impacts at PSD Class I areas. As part of the PSD analysis report submitted to the Florida Department of Environmental Protection (DEP), the air quality impacts due to the potential emissions of the Osprey Energy Center Project are required to be addressed at the PSD Class I area of the Chassahowitzka National Wildlife Area (NWA). The Chassahowitzka NWA is located approximately 102 km west of the Project site and is the nearest Class I area to the Project. Other PSD Class I areas are located more than 200 km from the Project.

The evaluation of air quality impacts are not only concerned with determining compliance with PSD Class I increments but also assessing a source's impact on Air Quality Related Values (AQRVs), such as regional haze. Further, compliance with PSD Class I increments can be evaluated by determining if the source's impacts are less than the proposed U.S. Environmental Protection Agency (EPA) Class I significant impact levels. The significant impact levels are threshold levels that are used to determine the type of air impact analyses needed for the project. If the new source's impacts are predicted to be less than significant, then the source's impacts are assumed not to have a significant adverse affect on air quality and additional modeling with other sources is not required. However, if the source's impacts are predicted to be greater than the significant impact levels, additional modeling with other sources is required to demonstrate compliance with Class I increments.

Currently there are several air quality modeling approaches recommended by the Interagency Workgroup on Air Quality Models (IWAQM) to perform these analyses. The IWAQM consists of EPA and Federal Land Managers (FLM) of Class I areas who are responsible for ensuring that AQRVs are not adversely impacted by new and existing sources. These recommendations have been summarized in two documents:

- *Interagency Workgroup on Air Quality Models (IWAQM) Phase 1 Report: Interim Recommendations for Modeling Long Range Transport and Impacts on Regional Visibility* (EPA, 1993), referred to as the Phase 1 report; and

- *Interagency Workgroup on Air Quality Models (IWAQM), Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts* (EPA, 1998), referred to as the Phase 2 report.

The recommended modeling approaches from these documents are as follows:

- Phase 1 report: screening analysis (Level 1)
- Phase 2 report: screening analysis
- Phase 2 report: refined analysis

For the Osprey Energy Center Project, air quality analyses were performed that assess the Project's impacts in the PSD Class I area of the Chassahowitzka NWA using the refined approach from the Phase 2 report for:

- Significant impact analysis; and
- Regional haze analysis.

The refined analysis approach was used instead of the screening analysis approach since the air quality impacts are based on generally more realistic assumptions, include more detailed meteorological data, and are estimated at locations at the Class I area.

D.2 GENERAL AIR MODELING APPROACH

The general modeling approach was based on using the Industrial Source Complex Short-term model (ISCST3, Version 99155) and the long-range transport model, California Puff model (CALPUFF, Version 5.0). The ISCST3 model is applicable for estimating the air quality impacts in areas that are within 50 km from a source. At distances beyond 50 km, the ISCST3 model is considered to overpredict air quality impacts because it is a steady-state model. At those distances, the CALPUFF model is recommended for use. Recently, the FLM have requested that air quality impacts, such as for regional haze, for a source located more than 50 km from a Class I area be predicted using the CALPUFF model. The Florida DEP has also recommended that the CALPUFF model be used to assess if the source has a significant impact at a Class I area located beyond 50 km from the source. As a result, a significant impact and regional haze analyses were performed using the CALPUFF model to assess the Project's impacts at the Chassahowitzka NWA.

The methods and assumptions used in the CALPUFF model were based on the latest recommendations for a screening analysis as presented in the *Interagency Workgroup on Air Quality Models (IWAQM), Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts* (EPA, 1998).

Based on discussions with DEP, the ISCST3 model can be used to determine the "worst-case" operating load and ambient temperature that produces a source's maximum impact at a Class I area. Based on that analysis, air quality impacts can then be predicted with the CALPUFF model using the "worst-case" operating scenario to compare the source's impacts to Class I significant impact levels and potential contribution to regional haze. For this Project, the ISCST3 model was used to determine the "worst-case" operating scenario that was then considered in the CALPUFF model. The methods and assumptions used in the ISCST3 were based on those presented in Section 6.0 of the PSD report.

A regional haze analysis was performed to determine the affect that the Project's emissions will have on background regional haze levels at the Chassahowitzka NWA. In the regional haze analysis, the change in visual range, as calculated by a deciview change, was estimated for the Project in accordance with the IWAQM recommendations. Based on those recommendations, the CALPUFF model is used to predict the maximum 24-hour average sulfate (SO_4), nitrate (NO_3), and fine particulate (PM_{10}) concentrations as well as ammonium sulfate ($(NH_4)_2SO_4$) and ammonium nitrate (NH_4NO_3) concentrations. The change in visibility due to a source, estimated as a percentage, is then calculated based on the change from background data .

The following sections present the methods and assumptions used to assess the refined significant impact and regional haze analyses performed for the Osprey Energy Center Project. The results of these analyses are presented in Sections 6.0 and 7.0 of the PSD report.

D.3 MODEL SELECTION AND SETTINGS

The California Puff (CALPUFF, version 5.0) air modeling system was used to model to assess the Osprey Energy Center Project's impacts at the PSD Class I area for comparison to the PSD Class

I significant impact levels and to the regional haze visibility criteria. CALPUFF is a non-steady state Lagrangian Gaussian puff long-range transport model that includes algorithms for building downwash effects as well as chemical transformations (important for visibility controlling pollutants), and wet/dry deposition. The CALPUFF meteorological and geophysical data preprocessor (CALMET, Version 5), a preprocessor to CALPUFF, is a diagnostic meteorological model that produces a three-dimensional field of wind and temperature and a two-dimensional field of other meteorological parameters. CALMET was designed to process raw meteorological, terrain and land-use databases to be used in the air modeling analysis. The CALPUFF modeling system uses a number of FORTRAN preprocessor programs that extract data from large databases and converts the data into formats suitable for input to CALMET. The processed data produced from CALMET was input to CALPUFF to assess the pollutant specific impact. Both CALMET and CALPUFF were used in a manner that is recommended by the IWAQM Phase 2 Report (EPA, 1998).

D.3.1 CALPUFF MODEL APPROACHES AND SETTINGS

The IWAQM has recommended approaches for performing a Phase 2 refined modeling analyses that are presented in Table D-1. These approaches involve use of meteorological data, selection of receptors and dispersion conditions, and processing of model output.

The specific settings used in the CALPUFF model are presented in Table D-2.

D.3.2 EMISSION INVENTORY AND BUILDING WAKE EFFECTS

The CALPUFF model included the Project's emission, stack, and operating data as well as building dimensions to account for the effects of building-induced downwash on the emission sources. Dimensions for all significant building structures were processed with the Building Profile Input Program (BPIP), Version 95086, and were included in the CALPUFF model input. The PSD Analysis Report presents a listing of the Project's emissions and structures included in the analysis.

D.4 RECEPTOR LOCATIONS

For the refined analyses, pollutant concentrations were predicted in an array of 13 discrete

receptors located at the CNWR area. These receptors are the same as those used in the PSD Class I analysis performed for the PSD Analysis Report.

D.5 METEOROLOGICAL DATA

D.5.1 REFINED ANALYSIS

CALMET was used to develop the gridded parameter fields required for the refined modeling analyses. The follow sections discuss the specific data used and processed in the CALMET model.

D.5.2 CALMET SETTINGS

The CALMET settings contained in Table D-3 were used for the refined modeling analysis. With the exception of hourly precipitation data files, all input data files needed for CALMET were developed by the FDEP staff.

D.5.3 MODELING DOMAIN

A rectangular modeling domain extending 250 km in the east-west (x) direction and 280 km in the north-south (y) direction was used for the refined modeling analysis. The extent of the modeling domain was selected by the Florida DEP staff for predicting impacts at the Chassahowitzka NWA. The southwest corner of the domain is the origin and is located at 27 degrees north latitude and 83.5 degrees west longitude. This location is in the Gulf of Mexico approximately 110 km west of Venice, Florida. For the processing of meteorological and geophysical data, the domain contains 25 grid cells in the x-direction and 28 grid cells in the y-direction. The domain grid resolution is 10-km. The air modeling analysis was performed in the UTM coordinate system.

D.5.4 MESOSCALE MODEL – GENERATION 4 (MM4) DATA

Pennsylvania State University in conjunction with the NCAR Assessment Laboratory developed the MM4 data set, a prognostic wind field or "guess" field, for the United States. The hourly meteorological variables used to create this data set (wind, temperature, dew point depression, and geopotential height for eight standard levels and up to 15 significant levels) are extensive

and only allow for one data base set for the year 1990. The analysis used the MM4 data to initialize the CALMET wind field. The MM4 data have a horizontal spacing of 80 km and are used to simulate atmospheric variables within the modeling domain.

The MM4 subset domain was provided by FDEP and consisted of a 6 x 6- cell rectangle, with 80 km grid resolution, extending from the MM4 grid points (49,10) to (54, 15). These data were processed to create a MM4.DAT file, for input to the CALMET model.

The MM4 data set used in the CALMET, although advanced, lacks the fine detail of specific temporal and spatial meteorological variables and geophysical data. These variables were processed into the appropriate format and introduced into the CALMET model through the additional data files obtained from the following sources.

D.5.5 SURFACE DATA STATIONS AND PROCESSING

The surface station data processed for the CALPUFF analyses consisted of data from five NWS stations or Federal Aviation Administration (FAA) Flight Service stations for Gainesville, Tampa, Daytona Beach, Vero Beach, Fort Myers and Orlando. A summary of the surface station information and locations are presented in Table D-4. The surface station parameters include wind speed, wind direction, cloud ceiling height, opaque cloud cover, dry bulb temperature, relative humidity, station pressure, and a precipitation code that is based on current weather conditions. The surface station data were processed by FDEP into a SURF.DAT file format for CALMET input.

Because the modeling domain extends largely over water, C-Man station data from Venice was obtained. These data were processed by Florida DEP into an over-water surface station format (i.e., SEA*.DAT) for input to CALMET. The over-water station data include wind direction, wind speed and air temperature.

D.5.6 UPPER AIR DATA STATIONS AND PROCESSING

The analysis included three upper air NWS stations located in Ruskin, Apalachicola, and West Palm Beach. Data for each station were obtained from the Florida DEP in a format for CALMET input.

The data and locations for the upper air stations are presented in Table D-4.

D.5.7 PRECIPITATION DATA STATIONS AND PROCESSING

Precipitation data were processed from a network of hourly precipitation data files collected from primary and secondary NWS precipitation-recording stations located within the latitude and longitudinal limits of the modeling domain. Data for 14 stations were obtained in NCDC TD-3240 variable format and converted into a fixed-length format. The utility programs PXTRACT and PMERGE were then used to process the data into the format for the PRECIP.DAT file that is used by CALMET. A listing of the precipitation stations used for the modeling analysis is presented in Table D-5.

D.5.8 GEOPHYSICAL DATA PROCESSING

The land-use and terrain information data were developed by the FDEP for the modeling domain and were provided in a GEO.DAT file format for input to CALMET. Terrain elevations for each grid cell of the modeling domain were obtained from Digital Elevation Model (DEM) files obtained from US Geographical Survey (USGS). The DEM data was extracted for the modeling domain grid using the utility extraction program LCELEV. Land-use data were obtained from the USGS GIS.DAT which is based on the ARM3 data. The resolution of the GIS.DAT file is one-eighth of a degree in the east-west direction and one-twelfth of a degree in the north-south direction. Land-use values for the domain grid were obtained with the utility program CAL-LAND. Other parameters processed for the modeling domain by CAL-LAND include surface roughness, surface Albedo, Bowen ratio, soil heat flux, and leaf index field. The land-use parameter values were based on annual averaged values.

Table D-1. IWAQM Phase 2 Refined Modeling Analyses Recommendations[a]

Model Input/Output	Description
Meteorology	Use CALMET (minimum 6 to 10 layers in the vertical; top layer must extend above the maximum mixing depth expected); horizontal domain extends 50 to 80 km beyond outer receptors and sources being modeled; terrain elevation and land-use data is resolved for the situation.
Receptors	Within Class I area(s) of concern; obtain regulatory concurrence on coverage.
Dispersion	1. CALPUFF with default dispersion settings. 2. Use MESOPUFF II chemistry with wet and dry deposition. 3. Define background values for ozone and ammonia for area.
Processing	1. For PSD increments: Use highest, second highest 3-hour and 24-hour average SO_2 concentrations; highest, second highest 24-hour average PM_{10} concentrations; and highest annual average SO_2, PM_{10} and NO_2 concentrations. 2. For haze: process the 24-hour average SO_4, NO_3 and HNO_3 values; compute a 24-hour average relative humidity factor (f(RH)) for the day during which the highest concentration was predicted for each species; calculate extinction coefficients for each species; and compute percent change in extinction using the FLM supplied background extinction.

[a] *IWAQM Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts* (EPA, 1998)

Table D-2. CALPUFF Model Settings

Parameter	Setting
Pollutant Species	SO_2, SO_4, NO_x, HNO_3, and NO_3, and PM_{10}
Chemical Transformation	MESOPUFF II scheme
Deposition	Include both dry and wet deposition, plume depletion
Meteorological/Land Use Input	PCRAMMET (enhanced) for the screening analysis; CALMET for the refined analysis
Plume Rise	Transitional, Stack-tip downwash, Partial plume penetration
Dispersion	Puff plume element, PG /MP coefficients, rural mode, ISC building downwash scheme
Terrain Effects	Partial plume path adjustment
Output	Create binary concentration file including output species for SO_4, NO_3 and PM_{10}
Model Processing	Highest predicted 24-hour SO_4, NO_3 and PM_{10} concentrations for year
Background Values [a]	Ozone: 80 ppb; Ammonia: 10 ppb

[a] Recommended values by the Florida DEP.

Table D-3. CALMET Settings

Parameter	Setting
Horizontal Grid Dimensions	250 by 280 km, 10 km grid resolution
Vertical Grid	9 layers
Weather Station Data Inputs	6 surface, 3 upper air, 14 precipitation stations
Wind model options	Diagnostic wind model, no kinematic effects
Prognostic wind field model	MM4 data, 80 km resolution, 6 x 6 grid, used for wind field initialization
Output	Binary hourly gridded meteorological data file for CALPUFF input

Table D-4. Surface and Upper Air Stations Used in the CALPUFF Analysis

Station Name	Station Symbol	WBAN Number	UTM Coordinates Easting (km)	UTM Coordinates Northing (km)	Zone	Anemometer Height (m)
Surface Stations						
Tampa	TPA	12842	349.20	3094.25	17	6.7
Daytona Beach	DAB	12834	495.14	3228.05	17	9.1
Orlando	ORL	12815	468.96	3146.88	17	10.1
Gainesville	GNV	12816	377.40	3284.12	17	6.7
Vero Beach	VER	12843	557.52	3058.36	17	6.7
Fort Myers	FMY	12835	413.65	2940.38	17	6.1
Upper Air Stations						
Ruskin	TBW	12842	349.20	3094.28	17	NA
West Palm Beach	PBI	12844	587.87	2951.42	17	NA
Apalachicola	AQQ	12832	110.00[a]	3296.00	16	NA

[a] Equivalent coordinate for Zone 17; Zone 16 coordinate is 690.22 km.

Table D-5. Hourly Precipitation Stations Used in the CALPUFF Analysis

Station Name (Florida)	Station Number	UTM Coordinates		
		Easting (km)	Northing (km)	Zone
Brooksville 7 SSW	81048	358.03	3149.55	17
Daytona Beach WSO AP	82158	495.14	3228.09	17
Deland 1 SSE	82229	470.78	3209.66	17
Inglis 3 E	84273	342.63	3211.65	17
Lakeland	84797	409.87	3099.18	17
Lisbon	85076	423.59	3193.26	17
Lynne	85237	409.26	3230.30	17
Orlando WSO McCoy	86628	468.99	3146.88	17
Parrish	86880	366.99	3054.39	17
Saint Leo	87851	376.48	3135.09	17
St. Petersburg	87886	339.04	3072.21	17
Tampa WSCMO AP	88788	349.17	3094.25	17
Venice	89176	357.59	2998.18	17
Venus	89184	466.756	2996.09	17

APPENDIX E

BUILDING DOWNWASH INFORMATION FROM BPIP

```
'OSPREY ENERGY CENTER BPIP- PN, TN IS 0 DEG FROM PN 3/8/00'
'ST'
'FEET' 0.3048
'UTMN'  0.
4
'CT BUILDING'  1 0.0
4 96.0
 140    -70
 140    290
 290    290
 290    -70
'HRSG1 STRUCT.' 1 0.0
4 80.0
  10   -25
  10    25
 110    25
 110   -25
'HRSG2 STRUCT.' 1 0.0
4 80.0
  10    95
  10   145
 110   145
 110    95
'COOLING TWR'  1 0.0
4 45.0
  10    600
  10    684
 280    684
 280    600
12
'HRSG1'   0.0  135.    0.     0.
'HRSG2'   0.0  135.    0.   120.
'COOL1'   0.0   55.   35.   620.
'COOL2'   0.0   55.   89.   620.
'COOL3'   0.0   55.  143.   620.
'COOL4'   0.0   55.  197.   620.
'COOL5'   0.0   55.  251.   620.
'COOL6'   0.0   55.   35.   665.
'COOL7'   0.0   55.   89.   665.
'COOL8'   0.0   55.  143.   665.
'COOL9'   0.0   55.  197.   665.
'COOL10'  0.0   55.  251.   665.
0
```

BPIP (Dated: 95086)
DATE : 03/08/00
TIME : 17:36:19
OSPREY ENERGY CENTER BPIP- PN, TN IS 0 DEG FROM PN 3/8/00

==========
PIP PROCESSING INFORMATION:
==========

The ST flag has been set for processing for an ISCST2 run.

Inputs entered in FEET will be converted to meters using a conversion factor of 0.3048. Output will be in meters.

UTMP is set to UTMN. The input is assumed to be in a local X-Y coordinate system as opposed to a UTM coordinate system. True North is in the positive Y direction.

Plant north is set to 0.00 degrees with respect to True North.

OSPREY ENERGY CENTER BPIP- PN, TN IS 0 DEG FROM PN 3/8/00

PRELIMINARY* GEP STACK HEIGHT RESULTS TABLE
(Output Units: meters)

Stack Name	Stack Height	Stack-Building Base Elevation Differences	GEP** EQN1	Preliminary* GEP Stack Height Value
HRSG1	41.15	0.00	73.15	73.15
HRSG2	41.15	0.00	73.15	73.15
COOL1	16.76	0.00	73.15	73.15
COOL2	16.76	0.00	73.15	73.15
COOL3	16.76	0.00	73.15	73.15
COOL4	16.76	0.00	73.15	73.15
COOL5	16.76	0.00	73.15	73.15
COOL6	16.76	0.00	73.15	73.15
COOL7	16.76	0.00	73.15	73.15
COOL8	16.76	0.00	73.15	73.15
COOL9	16.76	0.00	73.15	73.15
COOL10	16.76	0.00	73.15	73.15

* Results are based on Determinants 1 & 2 on pages 1 & 2 of the GEP Technical Support Document. Determinant 3 may be investigated for additional stack height credit. Final values result after Determinant 3 has been taken into consideration.
** Results were derived from Equation 1 on page 6 of GEP Technical Support Document. Values have been adjusted for any stack-building base elevation differences.

Note: Criteria for determining stack heights for modeling emission limitations for a source can be found in Table 3.1 of the GEP Technical Support Document.

BPIP (Dated: 95086)
DATE : 03/08/00
TIME : 17:36:19

OSPREY ENERGY CENTER BPIP- PN, TN IS 0 DEG FROM PN 3/8/00

BPIP output is in meters

SO BUILDHGT	HRSG1	24.38	29.26	29.26	29.26	29.26	29.26
SO BUILDHGT	HRSG1	29.26	29.26	29.26	29.26	29.26	29.26
SO BUILDHGT	HRSG1	29.26	24.38	24.38	24.38	24.38	24.38
SO BUILDHGT	HRSG1	24.38	29.26	29.26	29.26	29.26	29.26
SO BUILDHGT	HRSG1	29.26	29.26	29.26	29.26	29.26	29.26

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 SO BUILDHGT HRSG1     29.26   24.38   24.38   24.38   24.38   24.38
 SO BUILDWID HRSG1     32.66   80.49   94.46  105.56  113.44  117.89
 SO BUILDWID HRSG1    118.75  116.00  109.73  116.00  118.75  117.89
 SO BUILDWID HRSG1    113.44   33.15   34.02   33.85   32.66   30.48
 SO BUILDWID HRSG1     32.66   80.49   94.46  105.56  113.44  117.89
 SO BUILDWID HRSG1    118.75  116.00  109.73  116.00  118.75  117.89
 SO BUILDWID HRSG1    113.44   33.15   34.02   33.85   32.66   30.48

 SO BUILDHGT HRSG2     24.38   24.38   29.26   29.26   29.26   29.26
 SO BUILDHGT HRSG2     29.26   29.26   29.26   29.26   29.26   29.26
 SO BUILDHGT HRSG2     29.26   29.26   29.26   24.38   24.38   24.38
 SO BUILDHGT HRSG2     24.38   24.38   29.26   29.26   29.26   29.26
 SO BUILDHGT HRSG2     29.26   29.26   29.26   29.26   29.26   29.26
 SO BUILDHGT HRSG2     29.26   29.26   29.26   24.38   24.38   24.38
 SO BUILDWID HRSG2     32.66   33.85   94.46  105.56  113.44  117.89
 SO BUILDWID HRSG2    118.75  116.00  109.73  116.00  118.75  117.89
 SO BUILDWID HRSG2    113.44  105.56   94.46   33.85   32.66   30.48
 SO BUILDWID HRSG2     32.66   33.85   94.46  105.56  113.44  117.89
 SO BUILDWID HRSG2    118.75  116.00  109.73  116.00  118.75  117.89
 SO BUILDWID HRSG2    113.44  105.56   94.46   33.85   32.66   30.48

 SO BUILDHGT COOL1     13.72   13.72   13.72   13.72   13.72   13.72
 SO BUILDHGT COOL1     13.72   13.72   13.72   13.72   13.72   13.72
 SO BUILDHGT COOL1     13.72   13.72   13.72   13.72   13.72   13.72
 SO BUILDHGT COOL1     13.72   13.72   13.72   13.72   13.72   13.72
 SO BUILDHGT COOL1     13.72   13.72   13.72   13.72   13.72   13.72
 SO BUILDHGT COOL1     13.72   29.26   29.26   29.26   29.26   24.38
 SO BUILDWID COOL1     85.49   86.09   84.07   79.50   72.51   63.32
 SO BUILDWID COOL1     52.21   39.50   25.60   39.50   52.21   63.32
 SO BUILDWID COOL1     72.51   79.50   84.07   86.09   85.49   82.30
 SO BUILDWID COOL1     85.49   86.09   84.07   79.50   72.51   63.32
 SO BUILDWID COOL1     52.21   39.50   25.60   39.50   52.21   63.32
 SO BUILDWID COOL1     72.51  105.56   94.46   80.49   64.08   85.34

 SO BUILDHGT COOL2     24.38   13.72   13.72   13.72   13.72   13.72
 SO BUILDHGT COOL2     13.72   13.72   13.72   13.72   13.72   13.72
 SO BUILDHGT COOL2     13.72   13.72   13.72   13.72   13.72   13.72
 SO BUILDHGT COOL2     13.72   13.72   13.72   13.72   13.72   13.72
 SO BUILDHGT COOL2     13.72   13.72   13.72   13.72   13.72   13.72
 SO BUILDHGT COOL2     13.72   13.72   29.26   29.26   29.26   24.38
 SO BUILDWID COOL2     95.43   86.09   84.07   79.50   72.51   63.32
 SO BUILDWID COOL2     52.21   39.50   25.60   39.50   52.21   63.32
 SO BUILDWID COOL2     72.51   79.50   84.07   86.09   85.49   82.30
 SO BUILDWID COOL2     85.49   86.09   84.07   79.50   72.51   63.32
 SO BUILDWID COOL2     52.21   39.50   25.60   39.50   52.21   63.32
 SO BUILDWID COOL2     72.51   79.50   94.46   80.49   64.08   85.34

 SO BUILDHGT COOL3     24.38   24.38   13.72   13.72   13.72   13.72
 SO BUILDHGT COOL3     13.72   13.72   13.72   13.72   13.72   13.72
 SO BUILDHGT COOL3     13.72   13.72   13.72   13.72   13.72   13.72
 SO BUILDHGT COOL3     13.72   13.72   13.72   13.72   13.72   13.72
 SO BUILDHGT COOL3     13.72   13.72   13.72   13.72   13.72   13.72
 SO BUILDHGT COOL3     13.72   13.72   29.26   29.26   29.26   29.26
 SO BUILDWID COOL3     95.43  102.61   84.07   79.50   72.51   63.32
 SO BUILDWID COOL3     52.21   39.50   25.60   39.50   52.21   63.32
 SO BUILDWID COOL3     72.51   79.50   84.07   86.09   85.49   82.30
 SO BUILDWID COOL3     85.49   86.09   84.07   79.50   72.51   63.32
 SO BUILDWID COOL3     52.21   39.50   25.60   39.50   52.21   63.32
 SO BUILDWID COOL3     72.51   79.50   94.46   80.49   64.08   45.72

 SO BUILDHGT COOL4     29.26   24.38   13.72   13.72   13.72   13.72
 SO BUILDHGT COOL4     13.72   13.72   13.72   13.72   13.72   13.72
 SO BUILDHGT COOL4     13.72   13.72   13.72   13.72   13.72   13.72
 SO BUILDHGT COOL4     13.72   13.72   13.72   13.72   13.72   13.72
 SO BUILDHGT COOL4     13.72   13.72   13.72   13.72   13.72   13.72
 SO BUILDHGT COOL4     13.72   13.72   13.72   29.26   29.26   29.26
 SO BUILDWID COOL4     64.08  102.61   84.07   79.50   72.51   63.32
 SO BUILDWID COOL4     52.21   39.50   25.60   39.50   52.21   63.32
 SO BUILDWID COOL4     72.51   79.50   84.07   86.09   85.49   82.30
 SO BUILDWID COOL4     85.49   86.09   84.07   79.50   72.51   63.32
 SO BUILDWID COOL4     52.21   39.50   25.60   39.50   52.21   63.32
 SO BUILDWID COOL4     72.51   79.50   84.07   80.49   64.08   45.72
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SO BUILDHGT COOL5	29.26	29.26	24.38	13.72	13.72	13.72
SO BUILDHGT COOL5	13.72	13.72	13.72	13.72	13.72	13.72
SO BUILDHGT COOL5	13.72	13.72	13.72	13.72	13.72	13.72
SO BUILDHGT COOL5	13.72	13.72	13.72	13.72	13.72	13.72
SO BUILDHGT COOL5	13.72	13.72	13.72	13.72	13.72	13.72
SO BUILDHGT COOL5	13.72	13.72	13.72	13.72	29.26	29.26
SO BUILDWID COOL5	64.08	80.49	106.68	79.50	72.51	63.32
SO BUILDWID COOL5	52.21	39.50	25.60	39.50	52.21	63.32
SO BUILDWID COOL5	72.51	79.50	84.07	86.09	85.49	82.30
SO BUILDWID COOL5	85.49	86.09	84.07	79.50	72.51	63.32
SO BUILDWID COOL5	52.21	39.50	25.60	39.50	52.21	63.32
SO BUILDWID COOL5	72.51	79.50	84.07	86.09	64.08	45.72
SO BUILDHGT COOL6	13.72	13.72	13.72	13.72	13.72	13.72
SO BUILDHGT COOL6	13.72	13.72	13.72	13.72	13.72	13.72
SO BUILDHGT COOL6	13.72	13.72	13.72	13.72	13.72	13.72
SO BUILDHGT COOL6	13.72	13.72	13.72	13.72	13.72	13.72
SO BUILDHGT COOL6	13.72	13.72	13.72	13.72	13.72	13.72
SO BUILDHGT COOL6	13.72	29.26	29.26	29.26	29.26	24.38
SO BUILDWID COOL6	85.49	86.09	84.07	79.50	72.51	63.32
SO BUILDWID COOL6	52.21	39.50	25.60	39.50	52.21	63.32
SO BUILDWID COOL6	72.51	79.50	84.07	86.09	85.49	82.30
SO BUILDWID COOL6	85.49	86.09	84.07	79.50	72.51	63.32
SO BUILDWID COOL6	52.21	39.50	25.60	39.50	52.21	63.32
SO BUILDWID COOL6	72.51	105.56	94.46	80.49	64.08	85.34
SO BUILDHGT COOL7	24.38	13.72	13.72	13.72	13.72	13.72
SO BUILDHGT COOL7	13.72	13.72	13.72	13.72	13.72	13.72
SO BUILDHGT COOL7	13.72	13.72	13.72	13.72	13.72	13.72
SO BUILDHGT COOL7	13.72	13.72	13.72	13.72	13.72	13.72
SO BUILDHGT COOL7	13.72	13.72	13.72	13.72	13.72	13.72
SO BUILDHGT COOL7	13.72	13.72	29.26	29.26	29.26	24.38
SO BUILDWID COOL7	95.43	86.09	84.07	79.50	72.51	63.32
SO BUILDWID COOL7	52.21	39.50	25.60	39.50	52.21	63.32
SO BUILDWID COOL7	72.51	79.50	84.07	86.09	85.49	82.30
SO BUILDWID COOL7	85.49	86.09	84.07	79.50	72.51	63.32
SO BUILDWID COOL7	52.21	39.50	25.60	39.50	52.21	63.32
SO BUILDWID COOL7	72.51	79.50	94.46	80.49	64.08	85.34
SO BUILDHGT COOL8	24.38	13.72	13.72	13.72	13.72	13.72
SO BUILDHGT COOL8	13.72	13.72	13.72	13.72	13.72	13.72
SO BUILDHGT COOL8	13.72	13.72	13.72	13.72	13.72	13.72
SO BUILDHGT COOL8	13.72	13.72	13.72	13.72	13.72	13.72
SO BUILDHGT COOL8	13.72	13.72	13.72	13.72	13.72	13.72
SO BUILDHGT COOL8	13.72	13.72	13.72	29.26	29.26	29.26
SO BUILDWID COOL8	95.43	86.09	84.07	79.50	72.51	63.32
SO BUILDWID COOL8	52.21	39.50	25.60	39.50	52.21	63.32
SO BUILDWID COOL8	72.51	79.50	84.07	86.09	85.49	82.30
SO BUILDWID COOL8	85.49	86.09	84.07	79.50	72.51	63.32
SO BUILDWID COOL8	52.21	39.50	25.60	39.50	52.21	63.32
SO BUILDWID COOL8	72.51	79.50	84.07	80.49	64.08	45.72
SO BUILDHGT COOL9	29.26	24.38	13.72	13.72	13.72	13.72
SO BUILDHGT COOL9	13.72	13.72	13.72	13.72	13.72	13.72
SO BUILDHGT COOL9	13.72	13.72	13.72	13.72	13.72	13.72
SO BUILDHGT COOL9	13.72	13.72	13.72	13.72	13.72	13.72
SO BUILDHGT COOL9	13.72	13.72	13.72	13.72	13.72	13.72
SO BUILDHGT COOL9	13.72	13.72	13.72	29.26	29.26	29.26
SO BUILDWID COOL9	64.08	102.61	84.07	79.50	72.51	63.32
SO BUILDWID COOL9	52.21	39.50	25.60	39.50	52.21	63.32
SO BUILDWID COOL9	72.51	79.50	84.07	86.09	85.49	82.30
SO BUILDWID COOL9	85.49	86.09	84.07	79.50	72.51	63.32
SO BUILDWID COOL9	52.21	39.50	25.60	39.50	52.21	63.32
SO BUILDWID COOL9	72.51	79.50	84.07	80.49	64.08	45.72
SO BUILDHGT COOL10	29.26	29.26	13.72	13.72	13.72	13.72
SO BUILDHGT COOL10	13.72	13.72	13.72	13.72	13.72	13.72
SO BUILDHGT COOL10	13.72	13.72	13.72	13.72	13.72	13.72
SO BUILDHGT COOL10	13.72	13.72	13.72	13.72	13.72	13.72
SO BUILDHGT COOL10	13.72	13.72	13.72	13.72	13.72	13.72

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 SO BUILDHGT COOL10    13.72   13.72   13.72   13.72   29.26   29.26
 SO BUILDWID COOL10    64.08   80.49   84.07   79.50   72.51   63.32
 SO BUILDWID COOL10    52.21   39.50   25.60   39.50   52.21   63.32
 SO BUILDWID COOL10    72.51   79.50   84.07   86.09   85.49   82.30
 SO BUILDWID COOL10    85.49   86.09   84.07   79.50   72.51   63.32
 SO BUILDWID COOL10    52.21   39.50   25.60   39.50   52.21   63.32
 SO BUILDWID COOL10    72.51   79.50   84.07   86.09   64.08   45.72
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BPIP (Dated: 95086)
DATE : 03/08/00
TIME : 17:36:19
OSPREY ENERGY CENTER BPIP- PN, TN IS 0 DEG FROM PN 3/8/00

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BPIP PROCESSING INFORMATION:
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The ST flag has been set for processing for an ISCST2 run.

Inputs entered in FEET will be converted to meters using a conversion factor of 0.3048. Output will be in meters.

UTMP is set to UTMN. The input is assumed to be in a local X-Y coordinate system as opposed to a UTM coordinate system. True North is in the positive Y direction.

Plant north is set to 0.00 degrees with respect to True North.

==========
INPUT SUMMARY:
==========

Number of buildings to be processed : 4

CT BUILD has 1 tier(s) with a base elevation of 0.00 FEET
(0.00) meters

BUILDING NAME	TIER NUMBER	BLDG-TIER NUMBER	TIER HEIGHT	NO. OF CORNERS	CORNER	COORDINATES
					X	Y
CT BUILD	1	1	96.00	4		
			29.26 meters			
					140.00	-70.00 FEET
					42.67	-21.34 meters
					140.00	290.00 FEET
					42.67	88.39 meters
					290.00	290.00 FEET
					88.39	88.39 meters
					290.00	-70.00 FEET
					88.39	-21.34 meters

HRSG1 ST has 1 tier(s) with a base elevation of 0.00 FEET
(0.00) meters

BUILDING NAME	TIER NUMBER	BLDG-TIER NUMBER	TIER HEIGHT	NO. OF CORNERS	CORNER	COORDINATES
					X	Y
HRSG1 ST	1	5	80.00	4		
			24.38 meters			
					10.00	-25.00 FEET
					3.05	-7.62 meters
					10.00	25.00 FEET
					3.05	7.62 meters
					110.00	25.00 FEET
					33.53	7.62 meters
					110.00	-25.00 FEET
					33.53	-7.62 meters

HRSG2 ST has 1 tier(s) with a base elevation of 0.00 FEET
(0.00) meters

BUILDING NAME	TIER NUMBER	BLDG-TIER NUMBER	TIER HEIGHT	NO. OF CORNERS	CORNER	COORDINATES
					X	Y
HRSG2 ST	1	9	80.00	4		
			24.38 meters			
					10.00	95.00 FEET
					3.05	28.96 meters

10.00	145.00 FEET
3.05	44.20 meters
110.00	145.00 FEET
33.53	44.20 meters
110.00	95.00 FEET
33.53	28.96 meters

COOLING has 1 tier(s) with a base elevation of 0.00 FEET
(0.00) meters

BUILDING NAME	TIER NUMBER	BLDG-TIER NUMBER	TIER HEIGHT	NO. OF CORNERS	CORNER X	COORDINATES Y
COOLING	1	13	45.00	4		
			13.72 meters			
					10.00	600.00 FEET
					3.05	182.88 meters
					10.00	684.00 FEET
					3.05	208.48 meters
					280.00	684.00 FEET
					85.34	208.48 meters
					280.00	600.00 FEET
					85.34	182.88 meters

Number of stacks to be processed : 12

STACK NAME	STACK BASE	STACK HEIGHT	STACK X	COORDINATES Y
HRSG1	0.00	135.00 FEET		
	(0.00	41.15) meters		
			0.00	0.00 FEET
			(0.00	0.00) meters
HRSG2	0.00	135.00 FEET		
	(0.00	41.15) meters		
			0.00	120.00 FEET
			(0.00	36.58) meters
COOL1	0.00	55.00 FEET		
	(0.00	16.76) meters		
			35.00	620.00 FEET
			(10.67	188.98) meters
COOL2	0.00	55.00 FEET		
	(0.00	16.76) meters		
			89.00	620.00 FEET
			(27.13	188.98) meters
COOL3	0.00	55.00 FEET		
	(0.00	16.76) meters		
			143.00	620.00 FEET
			(43.59	188.98) meters
COOL4	0.00	55.00 FEET		
	(0.00	16.76) meters		
			197.00	620.00 FEET
			(60.05	188.98) meters
COOL5	0.00	55.00 FEET		
	(0.00	16.76) meters		
			251.00	620.00 FEET
			(76.50	188.98) meters
COOL6	0.00	55.00 FEET		
	(0.00	16.76) meters		
			35.00	665.00 FEET
			(10.67	202.69) meters
COOL7	0.00	55.00 FEET		
	(0.00	16.76) meters		
			89.00	665.00 FEET
			(27.13	202.69) meters
COOL8	0.00	55.00 FEET		
	(0.00	16.76) meters		
			143.00	665.00 FEET
			(43.59	202.69) meters
COOL9	0.00	55.00 FEET		
	(0.00	16.76) meters		
			197.00	665.00 FEET
			(60.05	202.69) meters
COOL10	0.00	55.00 FEET		
	(0.00	16.76) meters		
			251.00	665.00 FEET

(76.50 202.69) meters

The following lists the stacks that have been identified as being atop the noted building-tiers.

STACK NAME	NO.	BUILDING NAME	NO.	TIER NO.
COOL1	3	COOLING	4	1
COOL2	4	COOLING	4	1
COOL3	5	COOLING	4	1
COOL4	6	COOLING	4	1
COOL5	7	COOLING	4	1
COOL6	8	COOLING	4	1
COOL7	9	COOLING	4	1
COOL8	10	COOLING	4	1
COOL9	11	COOLING	4	1
COOL10	12	COOLING	4	1

Overall GEP Summary Table
(Units: meters)

StkNo: 1 Stk Name:HRSG1 Stk Ht: 41.15 Prelim. GEP Stk.Ht: 73.15
GEP: BH: 29.26 PBW: 89.19 *Eqn1 Ht: 73.15
*adjusted for a Stack-Building elevation difference of 0.00
No. of Tiers affecting Stk: 1 Direction occurred: 206.00
Bldg-Tier nos. contributing to GEP: 1

StkNo: 2 Stk Name:HRSG2 Stk Ht: 41.15 Prelim. GEP Stk.Ht: 73.15
GEP: BH: 29.26 PBW: 102.02 *Eqn1 Ht: 73.15
*adjusted for a Stack-Building elevation difference of 0.00
No. of Tiers affecting Stk: 1 Direction occurred: 323.50
Bldg-Tier nos. contributing to GEP: 1

StkNo: 3 Stk Name:COOL1 Stk Ht: 16.76 Prelim. GEP Stk.Ht: 73.15
GEP: BH: 29.26 PBW: 68.81 *Eqn1 Ht: 73.15
*adjusted for a Stack-Building elevation difference of 0.00
No. of Tiers affecting Stk: 1 Direction occurred: 347.25
Bldg-Tier nos. contributing to GEP: 1

StkNo: 4 Stk Name:COOL2 Stk Ht: 16.76 Prelim. GEP Stk.Ht: 73.15
GEP: BH: 29.26 PBW: 57.39 *Eqn1 Ht: 73.15
*adjusted for a Stack-Building elevation difference of 0.00
No. of Tiers affecting Stk: 1 Direction occurred: 353.75
Bldg-Tier nos. contributing to GEP: 1

StkNo: 5 Stk Name:COOL3 Stk Ht: 16.76 Prelim. GEP Stk.Ht: 73.15
GEP: BH: 29.26 PBW: 45.72 *Eqn1 Ht: 73.15
*adjusted for a Stack-Building elevation difference of 0.00
No. of Tiers affecting Stk: 1 Direction occurred: 360.00
Bldg-Tier nos. contributing to GEP: 1

StkNo: 6 Stk Name:COOL4 Stk Ht: 16.76 Prelim. GEP Stk.Ht: 73.15
GEP: BH: 29.26 PBW: 45.72 *Eqn1 Ht: 73.15
*adjusted for a Stack-Building elevation difference of 0.00
No. of Tiers affecting Stk: 1 Direction occurred: 360.00
Bldg-Tier nos. contributing to GEP: 1

StkNo: 7 Stk Name:COOL5 Stk Ht: 16.76 Prelim. GEP Stk.Ht: 73.15
GEP: BH: 29.26 PBW: 45.72 *Eqn1 Ht: 73.15
*adjusted for a Stack-Building elevation difference of 0.00
No. of Tiers affecting Stk: 1 Direction occurred: 360.00
Bldg-Tier nos. contributing to GEP: 1

StkNo: 8 Stk Name:COOL6 Stk Ht: 16.76 Prelim. GEP Stk.Ht: 73.15
GEP: BH: 29.26 PBW: 68.81 *Eqn1 Ht: 73.15
*adjusted for a Stack-Building elevation difference of 0.00
No. of Tiers affecting Stk: 1 Direction occurred: 347.25

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  Bldg-Tier nos. contributing to GEP:   1


StkNo:  9  Stk Name:COOL7    Stk Ht:  16.76 Prelim. GEP Stk.Ht:   73.15
           GEP:  BH:  29.26  PBW:   57.39            *Eqn1 Ht:   73.15
         *adjusted for a Stack-Building elevation difference of   0.00
 No. of Tiers affecting Stk:  1  Direction occurred:  353.75
  Bldg-Tier nos. contributing to GEP:   1


StkNo: 10  Stk Name:COOL8    Stk Ht:  16.76 Prelim. GEP Stk.Ht:   73.15
           GEP:  BH:  29.26  PBW:   45.72            *Eqn1 Ht:   73.15
         *adjusted for a Stack-Building elevation difference of   0.00
 No. of Tiers affecting Stk:  1  Direction occurred:  360.00
  Bldg-Tier nos. contributing to GEP:   1


StkNo: 11  Stk Name:COOL9    Stk Ht:  16.76 Prelim. GEP Stk.Ht:   73.15
           GEP:  BH:  29.26  PBW:   45.72            *Eqn1 Ht:   73.15
         *adjusted for a Stack-Building elevation difference of   0.00
 No. of Tiers affecting Stk:  1  Direction occurred:  360.00
  Bldg-Tier nos. contributing to GEP:   1


StkNo: 12  Stk Name:COOL10   Stk Ht:  16.76 Prelim. GEP Stk.Ht:   73.15
           GEP:  BH:  29.26  PBW:   45.72            *Eqn1 Ht:   73.15
         *adjusted for a Stack-Building elevation difference of   0.00
 No. of Tiers affecting Stk:  1  Direction occurred:  360.00
  Bldg-Tier nos. contributing to GEP:   1
```

APPENDIX F

COMPUTER PRINTOUTS OF ISCST3 AND CALPUFF MODEL RESULTS
(FOR ISCST3 MODEL, PRINTOUT PROVIDED FOR 1987)

Table F-1. Maximum Pollutant Concentrations Predicted for One Combustion Turbine Firing Natural Gas in Combined-Cycle Operation

Pollutant	Maximum Emission Rates (lb/hr) by Operating Load and Air Inlet Temperature									Averaging Time	Maximum Predicted Concentrations (ug/m³) by Operating Load and Air Inlet Temperature (1)								
	Base Load			75% Load			60% Load				Base Load			75% Load			60% Load		
	32°F	59°F	95°F	32°F	59°F	95°F	32°F	59°F	95°F		32°F	59°F	95°F	32°F	59°F	95°F	32°F	59°F	95°F
WITHOUT DUCT FIRING																			
Generic (10 g/s)	79.37	79.37	79.37	79.37	79.37	79.37	79.37	79.37	79.37	Annual	0.113	0.119	0.132	0.133	0.157	0.205	0.266	0.282	0.314
										24-Hour	3.866	4.059	4.699	4.737	5.258	5.625	6.919	7.427	8.240
										8-Hour	11.601	14.000	15.831	15.951	16.755	18.137	20.646	21.491	22.827
										3-Hour	23.213	24.825	28.236	28.526	30.331	32.918	37.608	39.184	41.713
										1-Hour	68.383	73.103	83.496	84.340	89.581	97.074	111.091	116.029	123.850
SO_2	11.0	10.4	9.4	8.6	8.1	7.6	7.4	7.2	6.5	Annual	0.0157	0.0156	0.0157	0.0144	0.0161	0.0195	0.0249	0.0255	0.0257
										24-Hour	0.536	0.530	0.558	0.512	0.539	0.535	0.649	0.670	0.675
										3-Hour	3.219	3.243	3.352	3.083	3.109	3.133	3.529	3.535	3.417
PM10	22.3	21.1	19.0	19.0	18.2	16.9	16.0	15.4	14.3	Annual	0.0317	0.0317	0.0316	0.0319	0.0359	0.0436	0.0537	0.0549	0.0568
										24-Hour	1.09	1.08	1.12	1.14	1.20	1.20	1.40	1.44	1.49
NO_x/ NO_2	29.5	27.7	25.2	22.9	21.7	20.2	19.9	19.1	17.4	Annual	0.042	0.042	0.042	0.038	0.043	0.052	0.067	0.068	0.069
CO	45.0	43.0	39.0	35.0	33.0	31.0	152.0	146.0	133.0	8-Hour	6.58	7.59	7.78	7.03	6.97	7.08	39.54	39.53	38.25
										1-Hour	38.8	39.6	41.0	37.2	37.2	37.9	212.8	213.4	207.5
WITH POWER AUGMENTATION & DUCT FIRING (2)																			
Generic (10 g/s)	NA	NA	79.37	NA	NA	NA	NA	NA	NA	Annual	NA	NA	0.119	NA	NA	NA	NA	NA	NA
										24-Hour	NA	NA	4.059	NA	NA	NA	NA	NA	NA
										8-Hour	NA	NA	14.000	NA	NA	NA	NA	NA	NA
										3-Hour	NA	NA	24.825	NA	NA	NA	NA	NA	NA
										1-Hour	NA	NA	73.103	NA	NA	NA	NA	NA	NA
SO_2	NA	NA	11.8	NA	NA	NA	NA	NA	NA	Annual	NA	NA	0.0178	NA	NA	NA	NA	NA	NA
										24-Hour	NA	NA	0.6036	NA	NA	NA	NA	NA	NA
										3-Hour	NA	NA	3.692	NA	NA	NA	NA	NA	NA
PM10	NA	NA	22.5	NA	NA	NA	NA	NA	NA	Annual	NA	NA	0.0338	NA	NA	NA	NA	NA	NA
										24-Hour	NA	NA	1.1503	NA	NA	NA	NA	NA	NA
NO_x/ NO_2	NA	NA	31.4	NA	NA	NA	NA	NA	NA	Annual	NA	NA	0.0473	NA	NA	NA	NA	NA	NA
CO	NA	NA	136.0	NA	NA	NA	NA	NA	NA	8-Hour	NA	NA	23.99	NA	NA	NA	NA	NA	NA
										1-Hour	NA	NA	125.27	NA	NA	NA	NA	NA	NA

Note: NA= not applicable

(1) Concentrations are based on highest predicted concentrations using five years of meteorological for 1987 to 1991 of surface and upper air data from the National Weather Service stations at Tampa International Airport and Ruskin, respectively.

Pollutant concentrations were based on a modeled or generic concentration predicted using a modeled emission rate of 79.37 lb/hr (10 g/s). Specific pollutant concentrations were estimated by multiplying the modeled concentration (at 10 g/s) by the ratio of the specific pollutant emission rate to the modeled emission rate of 10 g/s.

(2) Duct firing based on natural gas-fired duct burner with maximum heat input rate of 250 mmBtu/hr.

Table F-2. Maximum Pollutant Concentrations Predicted for One Combustion Turbine Firing Natural Gas in Combined-Cycle Operation at the PSD Class I Area of the Chassahowitzka NWA

	Maximum Emission Rates (lb/hr) by Operating Load and Air Inlet Temperature										Maximum Predicted Concentrations (ug/m^3) by Operating Load and Air Inlet Temperature (1)								
	Base Load			75% Load			60% Load			Averaging	Base Load			75% Load			60% Load		
Pollutant	32°F	59°F	95°F	32°F	59°F	95°F	32°F	59°F	95°F	Time	32°F	59°F	95°F	32°F	59°F	95°F	32°F	59°F	95°F
WITHOUT DUCT FIRING																			
Generic (10 g/s)	79.37	79.37	79.37	79.37	79.37	79.37	79.37	79.37	79.37	Annual	0.010	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.011
										24-Hour	0.204	0.208	0.217	0.217	0.221	0.226	0.234	0.237	0.241
										8-Hour	0.433	0.448	0.476	0.478	0.489	0.505	0.532	0.540	0.553
										3-Hour	0.814	0.834	0.899	0.904	0.934	0.975	1.046	1.069	1.104
										1-Hour	1.337	1.370	1.476	1.484	1.534	1.602	1.718	1.755	1.813
SO_2	11.0	10.4	9.4	8.6	8.1	7.6	7.4	7.2	6.5	Annual	0.00135	0.00130	0.00123	0.00112	0.00108	0.00102	0.00103	0.00100	0.00092
										24-Hour	0.0282	0.0272	0.0257	0.0235	0.0226	0.0215	0.0220	0.0214	0.0197
										3-Hour	0.113	0.109	0.107	0.098	0.096	0.093	0.098	0.096	0.090
PM10	22.3	21.1	19.0	19.0	18.2	16.9	16.0	15.4	14.3	Annual	0.0027	0.0027	0.0025	0.0025	0.0024	0.0023	0.0022	0.0021	0.0020
										24-Hour	0.0571	0.0554	0.0519	0.0521	0.0506	0.0480	0.0473	0.0460	0.0435
NO_x/NO_2	29.5	27.7	25.2	22.9	21.7	20.2	19.9	19.1	17.4	Annual	0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.002
WITH POWER AUGMENTATION & DUCT FIRING (2)																			
Generic (10 g/s)	NA	NA	79.37	NA	NA	NA	NA	NA	NA	Annual	NA	NA	0.010	NA	NA	NA	NA	NA	NA
										24-Hour	NA	NA	0.208	NA	NA	NA	NA	NA	NA
										8-Hour	NA	NA	0.448	NA	NA	NA	NA	NA	NA
										3-Hour	NA	NA	0.834	NA	NA	NA	NA	NA	NA
										1-Hour	NA	NA	1.370	NA	NA	NA	NA	NA	NA
SO_2	NA	NA	11.8	NA	NA	NA	NA	NA	NA	Annual	NA	NA	0.0015	NA	NA	NA	NA	NA	NA
										24-Hour	NA	NA	0.0310	NA	NA	NA	NA	NA	NA
										3-Hour	NA	NA	0.1241	NA	NA	NA	NA	NA	NA
PM10	NA	NA	22.5	NA	NA	NA	NA	NA	NA	Annual	NA	NA	0.0028	NA	NA	NA	NA	NA	NA
										24-Hour	NA	NA	0.0591	NA	NA	NA	NA	NA	NA
NO_x/NO_2	NA	NA	31.4	NA	NA	NA	NA	NA	NA	Annual	NA	NA	0.004	NA	NA	NA	NA	NA	NA

Note: NA = not applicable

(1) Concentrations are based on highest predicted concentrations using the ISCST3 model with five years of meteorological for 1987 to 1991 of surface and upper air data from the National Weather Service stations at Tampa International Airport and Ruskin, respectively.

Pollutant concentrations were based on a modeled or generic concentration predicted using a modeled emission rate of 79.37 lb/hr (10 g/s). Specific pollutant concentrations were estimated by multiplying the modeled concentration (at 10 g/s) by the ratio of the specific pollutant emission rate to the modeled emission rate of 10 g/s.

(2) Duct firing based on natural gas-fired duct burner with maximum heat input rate of 250 mmBtu/hr.

COMPUTER PRINTOUTS FOR ISCST3 MODEL
FOR SIGNIFICANT IMPACT ANALYSIS

ISCBOB3 RELEASE 98056

ISCST3 OUTPUT FILE NUMBER 1 :OSPC2C.087
ISCST3 OUTPUT FILE NUMBER 2 :OSPC2C.088
ISCST3 OUTPUT FILE NUMBER 3 :OSPC2C.089
ISCST3 OUTPUT FILE NUMBER 4 :OSPC2C.090
ISCST3 OUTPUT FILE NUMBER 5 :OSPC2C.091
First title for last output file is: 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE 3/8/00
Second title for last output file is: NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB

AVERAGING TIME	YEAR	CONC (ug/m3)	DIR (deg) or X (m)	DIST (m) or Y (m)	PERIOD ENDING (YYMMDDHH)
SOURCE GROUP ID:	BASE32				
Annual					
	1987	0.11293	90.	2500.	87123124
	1988	0.08261	220.	7000.	88123124
	1989	0.10904	10.	2500.	89123124
	1990	0.10706	80.	2500.	90123124
	1991	0.09401	240.	10000.	91123124
HIGH 24-Hour					
	1987	2.14077	160.	200.	87122924
	1988	3.86622	170.	200.	88112324
	1989	3.70584	180.	200.	89122324
	1990	1.87917	340.	300.	90022224
	1991	3.28485	190.	200.	91031024
HIGH 8-Hour					
	1987	6.11841	160.	200.	87122916
	1988	8.80434	190.	200.	88112308
	1989	7.22790	180.	200.	89122324
	1990	4.14069	10.	313.	90021016
	1991	11.60070	190.	200.	91031008
HIGH 3-Hour					
	1987	11.84953	170.	200.	87112012
	1988	12.97920	190.	200.	88112303
	1989	10.61492	180.	200.	89101924
	1990	8.83832	10.	313.	90101115
	1991	23.21337	190.	200.	91031009
HIGH 1-Hour					
	1987	26.58003	180.	200.	87081111
	1988	38.93760	190.	200.	88112301
	1989	19.71541	180.	200.	89040104
	1990	17.76271	140.	300.	90102515
	1991	68.38259	190.	200.	91031007
SOURCE GROUP ID:	BASE59				
Annual					
	1987	0.11943	90.	2500.	87123124
	1988	0.08977	220.	7000.	88123124
	1989	0.11572	10.	2500.	89123124
	1990	0.11278	80.	2500.	90123124
	1991	0.10195	240.	7000.	91123124
HIGH 24-Hour					
	1987	2.33548	160.	200.	87122924
	1988	4.05927	170.	200.	88112324
	1989	3.92040	180.	200.	89122324
	1990	1.97642	340.	300.	90022224
	1991	3.94345	190.	200.	91031024
HIGH 8-Hour					
	1987	6.69304	160.	200.	87122916
	1988	9.49038	190.	200.	88112308
	1989	7.59652	180.	200.	89122324
	1990	4.34790	10.	313.	90021016
	1991	14.00012	190.	200.	91031008
HIGH 3-Hour					
	1987	12.39000	170.	200.	87112012
	1988	14.25317	190.	100.	88112303
	1989	11.23019	190.	200.	89122324
	1990	9.77086	180.	200.	90011821
	1991	24.82506	190.	200.	91031009
HIGH 1-Hour					
	1987	29.05637	180.	200.	87081111
	1988	42.75951	190.	100.	88112301
	1989	21.66615	180.	200.	89040104
	1990	20.14398	140.	200.	90102515
	1991	73.10324	190.	200.	91031007
SOURCE GROUP ID:	BASE95				

Annual

1987	0.13219	90.	2500.	87123124
1988	0.10300	220.	5000.	88123124
1989	0.13139	180.	200.	89123124
1990	0.12453	80.	2000.	90123124
1991	0.11690	240.	7000.	91123124

HIGH 24-Hour

1987	3.25508	170.	200.	87010524
1988	4.69885	170.	200.	88112324
1989	4.62977	180.	200.	89122324
1990	2.52147	340.	300.	90022224
1991	4.45057	190.	200.	91031024

HIGH 8-Hour

1987	8.71970	160.	200.	87122916
1988	10.77529	190.	200.	88112308
1989	8.60318	180.	200.	89122324
1990	5.31537	180.	200.	90011308
1991	15.83083	190.	200.	91031008

HIGH 3-Hour

1987	13.60576	170.	200.	87112012
1988	18.86506	130.	300.	88012515
1989	13.09853	190.	200.	89122324
1990	10.77848	180.	200.	90011821
1991	28.23631	190.	100.	91031009

HIGH 1-Hour

1987	35.23141	180.	200.	87122302
1988	50.67451	190.	77.	88112301
1989	26.34552	180.	200.	89040104
1990	24.81348	140.	200.	90102515
1991	83.49613	190.	100.	91031007

SOURCE GROUP ID: LD7532

Annual

1987	0.13309	90.	2500.	87123124
1988	0.10388	220.	5000.	88123124
1989	0.13227	180.	200.	89123124
1990	0.12554	80.	2000.	90123124
1991	0.11794	240.	7000.	91123124

HIGH 24-Hour

1987	3.27391	170.	200.	87010524
1988	4.73737	170.	200.	88112324
1989	4.67327	180.	200.	89122324
1990	2.53685	340.	300.	90022224
1991	4.48402	190.	200.	91031024

HIGH 8-Hour

1987	8.82609	160.	200.	87122916
1988	10.86818	190.	200.	88112308
1989	8.69104	180.	200.	89122324
1990	5.34970	180.	200.	90011308
1991	15.95142	190.	200.	91031008

HIGH 3-Hour

1987	13.73046	170.	200.	87112012
1988	19.24244	130.	300.	88012515
1989	13.26342	190.	200.	89122324
1990	10.85194	180.	200.	90011821
1991	28.52640	190.	100.	91031009

HIGH 1-Hour

1987	35.70874	180.	200.	87122302
1988	51.25607	190.	77.	88112301
1989	26.69147	180.	200.	89040104
1990	25.14608	140.	200.	90102515
1991	84.33978	190.	100.	91031007

SOURCE GROUP ID: LD7559

Annual

1987	0.13882	90.	2500.	87123124
1988	0.11052	220.	5000.	88123124
1989	0.15680	180.	200.	89123124
1990	0.13185	80.	2000.	90123124
1991	0.12445	240.	7000.	91123124

HIGH 24-Hour

1987	3.45232	160.	200.	87122924
1988	5.25830	170.	200.	88112324
1989	4.95168	180.	200.	89122324
1990	2.81355	340.	300.	90022224
1991	4.74569	190.	100.	91031024

HIGH 8-Hour

1987	9.49399	160.	200.	87122916
1988	11.52155	190.	77.	88112308

	1989	9.25962	180.	200.	89122324
	1990	5.71311	190.	200.	90012616
	1991	16.75451	190.	100.	91031008
HIGH 3-Hour					
	1987	14.56766	170.	200.	87112012
	1988	21.59474	130.	300.	88012515
	1989	14.29867	190.	200.	89122324
	1990	11.43666	10.	313.	90101115
	1991	30.33106	190.	100.	91031009
HIGH 1-Hour					
	1987	38.71484	180.	200.	87122302
	1988	54.88159	190.	77.	88112301
	1989	28.86585	180.	200.	89040104
	1990	27.19660	140.	200.	90102515
	1991	89.58113	190.	100.	91031007
SOURCE GROUP ID: LD7595					
Annual					
	1987	0.14778	90.	2000.	87123124
	1988	0.14749	190.	200.	88123124
	1989	0.20520	180.	200.	89123124
	1990	0.14124	80.	2000.	90123124
	1991	0.13445	240.	7000.	91123124
HIGH 24-Hour					
	1987	3.79452	160.	200.	87122924
	1988	5.62501	170.	200.	88112324
	1989	5.39464	180.	200.	89122324
	1990	2.96196	340.	300.	90022224
	1991	5.44348	110.	300.	91021524
HIGH 8-Hour					
	1987	10.46903	160.	200.	87122916
	1988	12.95734	190.	77.	88112308
	1989	10.20216	180.	200.	89122324
	1990	6.14901	190.	200.	90012616
	1991	18.13673	190.	100.	91031008
HIGH 3-Hour					
	1987	16.15297	170.	200.	87112012
	1988	24.95881	130.	300.	88012515
	1989	15.81055	190.	200.	89122324
	1990	12.59237	10.	313.	90101115
	1991	32.91788	190.	100.	91031009
GH 1-Hour					
	1987	43.13102	180.	200.	87122302
	1988	60.09933	190.	77.	88112301
	1989	32.04736	180.	200.	89040104
	1990	30.07441	140.	200.	90102515
	1991	97.07440	190.	100.	91031007
SOURCE GROUP ID: LD6032					
Annual					
	1987	0.16719	90.	2000.	87123124
	1988	0.19086	190.	200.	88123124
	1989	0.26583	180.	200.	89123124
	1990	0.16109	250.	4000.	90123124
	1991	0.15366	240.	5000.	91123124
HIGH 24-Hour					
	1987	4.61816	160.	200.	87122924
	1988	6.60563	170.	200.	88112324
	1989	6.79942	180.	200.	89122324
	1990	3.52206	340.	300.	90022224
	1991	6.91948	110.	300.	91021524
HIGH 8-Hour					
	1987	12.29145	160.	200.	87122916
	1988	15.70318	190.	77.	88112308
	1989	12.34926	180.	200.	89122324
	1990	7.10027	190.	200.	90012616
	1991	20.64621	190.	100.	91031008
HIGH 3-Hour					
	1987	19.66536	170.	200.	87112012
	1988	30.93968	130.	300.	88012515
	1989	19.92774	190.	77.	89122324
	1990	14.84591	150.	200.	90022403
	1991	37.60757	190.	100.	91031009
HIGH 1-Hour					
	1987	51.44741	180.	200.	87122302
	1988	69.61103	190.	77.	88112301
	1989	38.00042	180.	200.	89040104
	1990	35.09058	140.	200.	90102515
	1991	111.09071	190.	77.	91031007

SOURCE GROUP ID: LD6059

Annual					
	1987	0.17422	90.	2000.	87123124
	1988	0.20206	190.	200.	88123124
	1989	0.28220	180.	200.	89123124
	1990	0.16887	250.	4000.	90123124
	1991	0.16144	240.	5000.	91123124
HIGH 24-Hour					
	1987	4.84464	160.	200.	87122924
	1988	6.99886	170.	200.	88112324
	1989	7.37290	180.	200.	89122324
	1990	3.66573	340.	300.	90022224
	1991	7.42737	110.	300.	91021524
HIGH 8-Hour					
	1987	12.91914	160.	200.	87122916
	1988	16.66602	190.	77.	88112308
	1989	13.11641	180.	76.	89122324
	1990	7.48215	150.	200.	90022408
	1991	21.49058	190.	100.	91031008
HIGH 3-Hour					
	1987	20.91159	170.	200.	87112012
	1988	32.89647	130.	300.	88012515
	1989	21.42921	190.	77.	89122324
	1990	15.92487	150.	200.	90022403
	1991	39.18377	190.	100.	91031009
HIGH 1-Hour					
	1987	54.32894	180.	200.	87122302
	1988	72.81993	190.	77.	88112301
	1989	40.05214	180.	200.	89040104
	1990	36.71620	140.	200.	90102515
	1991	116.02912	190.	77.	91031007

SOURCE GROUP ID: LD6095

Annual					
	1987	0.18552	90.	2000.	87123124
	1988	0.22725	190.	200.	88123124
	1989	0.31429	180.	200.	89123124
	1990	0.18213	250.	3000.	90123124
	1991	0.17395	240.	5000.	91123124
HIGH 24-Hour					
	1987	5.28173	120.	300.	87033124
	1988	7.64686	170.	200.	88112324
	1989	8.05292	180.	200.	89122324
	1990	4.01944	340.	300.	90022224
	1991	8.24007	110.	300.	91021524
HIGH 8-Hour					
	1987	13.92572	160.	200.	87122916
	1988	18.22834	190.	77.	88112308
	1989	14.91526	180.	76.	89122324
	1990	8.21591	150.	200.	90022408
	1991	22.82688	190.	100.	91031008
HIGH 3-Hour					
	1987	22.93481	170.	200.	87112012
	1988	35.92354	130.	300.	88012515
	1989	23.89555	190.	77.	89122324
	1990	17.67789	150.	200.	90022403
	1991	41.71305	190.	77.	91031009
HIGH 1-Hour					
	1987	58.97198	180.	200.	87122302
	1988	77.90483	190.	77.	88112301
	1989	44.04426	180.	76.	89040104
	1990	44.56331	160.	200.	90062311
	1991	123.85020	190.	77.	91031007

SOURCE GROUP ID: BSPD95

Annual					
	1987	0.11943	90.	2500.	87123124
	1988	0.08977	220.	7000.	88123124
	1989	0.11572	10.	2500.	89123124
	1990	0.11278	80.	2500.	90123124
	1991	0.10195	240.	7000.	91123124
HIGH 24-Hour					
	1987	2.33548	160.	200.	87122924
	1988	4.05927	170.	200.	88112324
	1989	3.92040	180.	200.	89122324
	1990	1.97642	340.	300.	90022224
	1991	3.94345	190.	200.	91031024
HIGH 8-Hour					
	1987	6.69304	160.	200.	87122916

	1988	9.49038	190.	200.	88112308
	1989	7.59652	180.	200.	89122324
	1990	4.34790	10.	313.	90021016
	1991	14.00012	190.	200.	91031008
HIGH 3-Hour					
	1987	12.39000	170.	200.	87112012
	1988	14.25317	190.	100.	88112303
	1989	11.23019	190.	200.	89122324
	1990	9.77086	180.	200.	90011821
	1991	24.82506	190.	200.	91031009
HIGH 1-Hour					
	1987	29.05637	180.	200.	87081111
	1988	42.75951	190.	100.	88112301
	1989	21.66615	180.	200.	89040104
	1990	20.14398	140.	200.	90102515
	1991	73.10324	190.	200.	91031007

All receptor computations reported with respect to a user-specified origin

GRID	0.00	0.00
DISCRETE	0.00	0.00

```
CO STARTING
CO TITLEONE 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE      3/8/00
CO TITLETWO NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB
CO MODELOPT DFAULT CONC   RURAL NOCMPL
CO AVERTIME  PERIOD 24 8 3 1
CO POLLUTID GEN
CO DCAYCOEF    .000000
CO RUNORNOT RUN
CO FINISHED

SO STARTING

** Source Location Cards:
**          SRCID SRCTYP        XS            YS            ZS
** MODELING ORIGIN HRSG NO.1 STACK LOCATION
** LOCATION IS USED FOR POLAR DISCRETE RECEPTORS.
**  HRSG STACK NUMBER CODE
** ------------------------
**  A -  HRSG NO. 1
**  B -  HRSG NO. 2
** Source Location Cards:
**          SRCID SRCTYP      XS        YS        ZS
**   UTM                     (m)       (m)       (m)
SO LOCATION  BASE32A  POINT    0.00     0.0       0.0
SO LOCATION  BASE32B  POINT    0.00    36.6       0.0
**
SO LOCATION  BASE59A  POINT    0.00     0.0       0.0
SO LOCATION  BASE59B  POINT    0.00    36.6       0.0
**
SO LOCATION  BASE95A  POINT    0.00     0.0       0.0
SO LOCATION  BASE95B  POINT    0.00    36.6       0.0
**
SO LOCATION  LD7532A  POINT    0.00     0.0       0.0
SO LOCATION  LD7532B  POINT    0.00    36.6       0.0
**
SO LOCATION  LD7559A  POINT    0.00     0.0       0.0
SO LOCATION  LD7559B  POINT    0.00    36.6       0.0
**
SO LOCATION  LD7595A  POINT    0.00     0.0       0.0
SO LOCATION  LD7595B  POINT    0.00    36.6       0.0
**
SO LOCATION  LD6032A  POINT    0.00     0.0       0.0
SO LOCATION  LD6032B  POINT    0.00    36.6       0.0
**
SO LOCATION  LD6059A  POINT    0.00     0.0       0.0
SO LOCATION  LD6059B  POINT    0.00    36.6       0.0
**
SO LOCATION  LD6095A  POINT    0.00     0.0       0.0
SO LOCATION  LD6095B  POINT    0.00    36.6       0.0
**
SO LOCATION  BSPD95A  POINT    0.00     0.0       0.0
SO LOCATION  BSPD95B  POINT    0.00    36.6       0.0
**
** Source Parameter Cards:
** POINT:   SRCID          QS        HS        TS        VS        DS
**                        (g/s)      (m)       (K)      (m/s)      (m)
SO SRCPARAM   BASE32A    5.000     41.1     366.0     19.2      5.79
SO SRCPARAM   BASE32B    5.000     41.1     366.0     19.2      5.79
**
SO SRCPARAM   BASE59A    5.000     41.1     366.0     18.3      5.79
SO SRCPARAM   BASE59B    5.000     41.1     366.0     18.3      5.79
**
SO SRCPARAM   BASE95A    5.000     41.1     366.0     16.8      5.79
SO SRCPARAM   BASE95B    5.000     41.1     366.0     16.8      5.79
**
SO SRCPARAM   LD7532A    5.000     41.1     366.0     16.7      5.79
SO SRCPARAM   LD7532B    5.000     41.1     366.0     16.7      5.79
**
SO SRCPARAM   LD7559A    5.000     41.1     366.0     16.1      5.79
SO SRCPARAM   LD7559B    5.000     41.1     366.0     16.1      5.79
**
SO SRCPARAM   LD7595A    5.000     41.1     366.0     15.3      5.79
SO SRCPARAM   LD7595B    5.000     41.1     366.0     15.3      5.79
**
SO SRCPARAM   LD6032A    5.000     41.1     366.0     14.0      5.79
SO SRCPARAM   LD6032B    5.000     41.1     366.0     14.0      5.79
```

```
**
SO SRCPARAM   LD6059A     5.000    41.1       366.0      13.6       5.79
SO SRCPARAM   LD6059B     5.000    41.1       366.0      13.6       5.79
**
SO SRCPARAM   LD6095A     5.000    41.1       366.0      13.0       5.79
SO SRCPARAM   LD6095B     5.000    41.1       366.0      13.0       5.79
**
SO SRCPARAM   BSPD95A     5.000    41.1       366.0      18.3       5.79
SO SRCPARAM   BSPD95B     5.000    41.1       366.0      18.3       5.79
**
SO BUILDHGT BASE32A-BASE95A    24.38   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BASE32A-BASE95A    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BASE32A-BASE95A    29.26   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT BASE32A-BASE95A    24.38   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BASE32A-BASE95A    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BASE32A-BASE95A    29.26   24.38   24.38   24.38   24.38   24.38
SO BUILDWID BASE32A-BASE95A    32.66   80.49   94.46  105.56  113.44  117.89
SO BUILDWID BASE32A-BASE95A   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID BASE32A-BASE95A   113.44   33.15   34.02   33.85   32.66   30.48
SO BUILDWID BASE32A-BASE95A    32.66   80.49   94.46  105.56  113.44  117.89
SO BUILDWID BASE32A-BASE95A   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID BASE32A-BASE95A   113.44   33.15   34.02   33.85   32.66   30.48
**
SO BUILDHGT LD6032A-LD7595A    24.38   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT LD6032A-LD7595A    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT LD6032A-LD7595A    29.26   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LD6032A-LD7595A    24.38   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT LD6032A-LD7595A    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT LD6032A-LD7595A    29.26   24.38   24.38   24.38   24.38   24.38
SO BUILDWID LD6032A-LD7595A    32.66   80.49   94.46  105.56  113.44  117.89
SO BUILDWID LD6032A-LD7595A   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID LD6032A-LD7595A   113.44   33.15   34.02   33.85   32.66   30.48
SO BUILDWID LD6032A-LD7595A    32.66   80.49   94.46  105.56  113.44  117.89
SO BUILDWID LD6032A-LD7595A   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID LD6032A-LD7595A   113.44   33.15   34.02   33.85   32.66   30.48
**
SO BUILDHGT BASE32B-BASE95B    24.38   24.38   29.26   29.26   29.26   29.26
SO BUILDHGT BASE32B-BASE95B    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BASE32B-BASE95B    29.26   29.26   29.26   24.38   24.38   24.38
SO BUILDHGT BASE32B-BASE95B    24.38   24.38   29.26   29.26   29.26   29.26
SO BUILDHGT BASE32B-BASE95B    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BASE32B-BASE95B    29.26   29.26   29.26   24.38   24.38   24.38
SO BUILDWID BASE32B-BASE95B    32.66   33.85   94.46  105.56  113.44  117.89
SO BUILDWID BASE32B-BASE95B   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID BASE32B-BASE95B   113.44  105.56   94.46   33.85   32.66   30.48
SO BUILDWID BASE32B-BASE95B    32.66   33.85   94.46  105.56  113.44  117.89
SO BUILDWID BASE32B-BASE95B   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID BASE32B-BASE95B   113.44  105.56   94.46   33.85   32.66   30.48
**
SO BUILDHGT LD6032B-LD7595B    24.38   24.38   29.26   29.26   29.26   29.26
SO BUILDHGT LD6032B-LD7595B    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT LD6032B-LD7595B    29.26   29.26   29.26   24.38   24.38   24.38
SO BUILDHGT LD6032B-LD7595B    24.38   24.38   29.26   29.26   29.26   29.26
SO BUILDHGT LD6032B-LD7595B    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT LD6032B-LD7595B    29.26   29.26   29.26   24.38   24.38   24.38
SO BUILDWID LD6032B-LD7595B    32.66   33.85   94.46  105.56  113.44  117.89
SO BUILDWID LD6032B-LD7595B   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID LD6032B-LD7595B   113.44  105.56   94.46   33.85   32.66   30.48
SO BUILDWID LD6032B-LD7595B    32.66   33.85   94.46  105.56  113.44  117.89
SO BUILDWID LD6032B-LD7595B   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID LD6032B-LD7595B   113.44  105.56   94.46   33.85   32.66   30.48
**
SO BUILDHGT BSPD32A-BSPD95A    24.38   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32A-BSPD95A    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32A-BSPD95A    29.26   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT BSPD32A-BSPD95A    24.38   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32A-BSPD95A    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32A-BSPD95A    29.26   24.38   24.38   24.38   24.38   24.38
SO BUILDWID BSPD32A-BSPD95A    32.66   80.49   94.46  105.56  113.44  117.89
SO BUILDWID BSPD32A-BSPD95A   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID BSPD32A-BSPD95A   113.44   33.15   34.02   33.85   32.66   30.48
SO BUILDWID BSPD32A-BSPD95A    32.66   80.49   94.46  105.56  113.44  117.89
SO BUILDWID BSPD32A-BSPD95A   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID BSPD32A-BSPD95A   113.44   33.15   34.02   33.85   32.66   30.48
**
SO BUILDHGT BSPD32B-BSPD95B    24.38   24.38   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32B-BSPD95B    29.26   29.26   29.26   29.26   29.26   29.26
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SO BUILDHGT BSPD32B-BSPD95B     29.26   29.26   29.26   24.38   24.38   24.38
SO BUILDHGT BSPD32B-BSPD95B     24.38   24.38   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32B-BSPD95B     29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32B-BSPD95B     29.26   29.26   29.26   24.38   24.38   24.38
SO BUILDWID BSPD32B-BSPD95B     32.66   33.85   94.46  105.56  113.44  117.89
SO BUILDWID BSPD32B-BSPD95B    118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID BSPD32B-BSPD95B    113.44  105.56   94.46   33.85   32.66   30.48
SO BUILDWID BSPD32B-BSPD95B     32.66   33.85   94.46  105.56  113.44  117.89
SO BUILDWID BSPD32B-BSPD95B    118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID BSPD32B-BSPD95B    113.44  105.56   94.46   33.85   32.66   30.48
**
SO EMISUNIT    .100000E+07 (GRAMS/SEC)          (MICROGRAMS/CUBIC-METER)
SO SRCGROUP BASE32 BASE32A BASE32B
SO SRCGROUP BASE59 BASE59A BASE59B
SO SRCGROUP BASE95 BASE95A BASE95B
SO SRCGROUP LD7532 LD7532A LD7532B
SO SRCGROUP LD7559 LD7559A LD7559B
SO SRCGROUP LD7595 LD7595A LD7595B
SO SRCGROUP LD6032 LD6032A LD6032B
SO SRCGROUP LD6059 LD6059A LD6059B
SO SRCGROUP LD6095 LD6095A LD6095B
SO SRCGROUP BSPD95 BSPD95A BSPD95B
**
SO FINISHED
**
RE STARTING
RE GRIDPOLR POL STA
RE GRIDPOLR POL ORIG  0.0   0.0
RE GRIDPOLR POL DIST  400 500 700 1000 1500 2000 2500 3000 4000 5000
RE GRIDPOLR POL DIST  7000 10000 12000 15000 20000 25000 30000
RE GRIDPOLR POL GDIR  36  10.00  10.00
RE GRIDPOLR POL END
RE DISCPOLR BSPD95A       313.        10
RE DISCPOLR BSPD95A       328.        20
RE DISCPOLR BSPD95A       280.        30
RE DISCPOLR BSPD95A       300.        30
RE DISCPOLR BSPD95A       218.        40
RE DISCPOLR BSPD95A       300.        40
RE DISCPOLR BSPD95A       183.        50
RE DISCPOLR BSPD95A       200.        50
RE DISCPOLR BSPD95A       300.        50
RE DISCPOLR BSPD95A       162.        60
RE DISCPOLR BSPD95A       200.        60
RE DISCPOLR BSPD95A       300.        60
RE DISCPOLR BSPD95A       149.        70
RE DISCPOLR BSPD95A       200.        70
RE DISCPOLR BSPD95A       300.        70
RE DISCPOLR BSPD95A       142.        80
RE DISCPOLR BSPD95A       200.        80
RE DISCPOLR BSPD95A       300.        80
RE DISCPOLR BSPD95A       140.        90
RE DISCPOLR BSPD95A       200.        90
RE DISCPOLR BSPD95A       300.        90
RE DISCPOLR BSPD95A       142.       100
RE DISCPOLR BSPD95A       200.       100
RE DISCPOLR BSPD95A       300.       100
RE DISCPOLR BSPD95A       149.       110
RE DISCPOLR BSPD95A       200.       110
RE DISCPOLR BSPD95A       300.       110
RE DISCPOLR BSPD95A       152.       120
RE DISCPOLR BSPD95A       200.       120
RE DISCPOLR BSPD95A       300.       120
RE DISCPOLR BSPD95A       119.       130
RE DISCPOLR BSPD95A       200.       130
RE DISCPOLR BSPD95A       300.       130
RE DISCPOLR BSPD95A        99.       140
RE DISCPOLR BSPD95A       100.       140
RE DISCPOLR BSPD95A       200.       140
RE DISCPOLR BSPD95A       300.       140
RE DISCPOLR BSPD95A        88.       150
RE DISCPOLR BSPD95A       100.       150
RE DISCPOLR BSPD95A       200.       150
RE DISCPOLR BSPD95A       300.       150
RE DISCPOLR BSPD95A        81.       160
RE DISCPOLR BSPD95A       100.       160
RE DISCPOLR BSPD95A       200.       160
RE DISCPOLR BSPD95A       300.       160
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RE DISCPOLR BSPD95A        77.       170
RE DISCPOLR BSPD95A       100.       170
RE DISCPOLR BSPD95A       200.       170
RE DISCPOLR BSPD95A       300.       170
RE DISCPOLR BSPD95A        76.       180
RE DISCPOLR BSPD95A       100.       180
RE DISCPOLR BSPD95A       200.       180
RE DISCPOLR BSPD95A       300.       180
RE DISCPOLR BSPD95A        77.       190
RE DISCPOLR BSPD95A       100.       190
RE DISCPOLR BSPD95A       200.       190
RE DISCPOLR BSPD95A       300.       190
RE DISCPOLR BSPD95A        81.       200
RE DISCPOLR BSPD95A       100.       200
RE DISCPOLR BSPD95A       200.       200
RE DISCPOLR BSPD95A       300.       200
RE DISCPOLR BSPD95A        88.       210
RE DISCPOLR BSPD95A       100.       210
RE DISCPOLR BSPD95A       200.       210
RE DISCPOLR BSPD95A       300.       210
RE DISCPOLR BSPD95A        95.       220
RE DISCPOLR BSPD95A       100.       220
RE DISCPOLR BSPD95A       200.       220
RE DISCPOLR BSPD95A       300.       220
RE DISCPOLR BSPD95A        80.       230
RE DISCPOLR BSPD95A       100.       230
RE DISCPOLR BSPD95A       200.       230
RE DISCPOLR BSPD95A       300.       230
RE DISCPOLR BSPD95A        70.       240
RE DISCPOLR BSPD95A       100.       240
RE DISCPOLR BSPD95A       200.       240
RE DISCPOLR BSPD95A       300.       240
RE DISCPOLR BSPD95A        65.       250
RE DISCPOLR BSPD95A       100.       250
RE DISCPOLR BSPD95A       200.       250
RE DISCPOLR BSPD95A       300.       250
RE DISCPOLR BSPD95A        62.       260
RE DISCPOLR BSPD95A       100.       260
RE DISCPOLR BSPD95A       200.       260
RE DISCPOLR BSPD95A       300.       260
RE DISCPOLR BSPD95A        61.       270
RE DISCPOLR BSPD95A       100.       270
RE DISCPOLR BSPD95A       200.       270
RE DISCPOLR BSPD95A       300.       270
RE DISCPOLR BSPD95A        62.       280
RE DISCPOLR BSPD95A       100.       280
RE DISCPOLR BSPD95A       200.       280
RE DISCPOLR BSPD95A       300.       280
RE DISCPOLR BSPD95A        65.       290
RE DISCPOLR BSPD95A       100.       290
RE DISCPOLR BSPD95A       200.       290
RE DISCPOLR BSPD95A       300.       290
RE DISCPOLR BSPD95A        70.       300
RE DISCPOLR BSPD95A       100.       300
RE DISCPOLR BSPD95A       200.       300
RE DISCPOLR BSPD95A       300.       300
RE DISCPOLR BSPD95A        80.       310
RE DISCPOLR BSPD95A       100.       310
RE DISCPOLR BSPD95A       200.       310
RE DISCPOLR BSPD95A       300.       310
RE DISCPOLR BSPD95A        95.       320
RE DISCPOLR BSPD95A       100.       320
RE DISCPOLR BSPD95A       200.       320
RE DISCPOLR BSPD95A       300.       320
RE DISCPOLR BSPD95A       122.       330
RE DISCPOLR BSPD95A       200.       330
RE DISCPOLR BSPD95A       300.       330
RE DISCPOLR BSPD95A       178.       340
RE DISCPOLR BSPD95A       200.       340
RE DISCPOLR BSPD95A       300.       340
RE DISCPOLR BSPD95A       313.       350
RE DISCPOLR BSPD95A       308.       360
RE FINISHED
**
ME STARTING
ME INPUTFIL C:\MET\TPA87D.MET
ME ANEMHGHT    6.700 METERS
```

```
ME SURFDATA  12842  1987            TAMPA
ME UAIRDATA  12842  1987            RUSKIN
ME WINDCATS    1.54    3.09    5.14    8.23   10.80
ME FINISHED

OU STARTING
OU RECTABLE ALLAVE FIRST
OU FINISHED

***********************************
*** SETUP Finishes Successfully ***
***********************************

  *** ISCST3 - VERSION 99155 ***    *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE      3/8/00          ***        03/0
                                   *** NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB      ***        22:37
**MODELOPTs:                                                                                                 PAGE
CONC                       RURAL  FLAT          DFAULT                                                  NOCMPL

                                        ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Simple Terrain Model is Selected

**Model Is Setup For Calculation of Average CONCentration Values.

  --  SCAVENGING/DEPOSITION LOGIC --
**Model Uses NO DRY DEPLETION.  DDPLETE =  F
**Model Uses NO WET DEPLETION.  WDPLETE =  F
**NO WET SCAVENGING Data Provided.
**NO GAS DRY DEPOSITION Data Provided.
**Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

**Model Uses RURAL Dispersion.

**Model Uses Regulatory DEFAULT Options:
          1. Final Plume Rise.
          2. Stack-tip Downwash.
          3. Buoyancy-induced Dispersion.
          4. Use Calms Processing Routine.
          5. Not Use Missing Data Processing Routine.
          6. Default Wind Profile Exponents.
          7. Default Vertical Potential Temperature Gradients.
          8. "Upper Bound" Values for Supersquat Buildings.
          9. No Exponential Decay for RURAL Mode

**Model Assumes Receptors on FLAT Terrain.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  4 Short Term Average(s) of:  24-HR   8-HR   3-HR   1-HR
    and Calculates PERIOD Averages

**This Run Includes:    20 Source(s);     10 Source Group(s); and     729 Receptor(s)

**The Model Assumes A Pollutant Type of:  GEN

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of PERIOD Averages by Receptor
        Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Anem. Hgt. (m) =     6.70 ;    Decay Coef. =    0.000     ;    Rot. Angle =     0.0
                 Emission Units = (GRAMS/SEC)                              ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = (MICROGRAMS/CUBIC-METER)

**Approximate Storage Requirements of Model =     1.7 MB of RAM.

  Input Runstream File:          OSPC2C.I87
  Output Print File:             OSPC2C.O87
  *** ISCST3 - VERSION 99155 ***    *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE      3/8/00          ***        03/0
                                   *** NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB      ***        22:37
**MODELOPTs:                                                                                                 PAGE
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CONC RURAL FLAT DFAULT NOCMPL

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (USER UNITS)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSION RATE SCALAR VARY BY
BASE32A	0	0.50000E+01	0.0	0.0	0.0	41.10	366.00	19.20	5.79	YES	
BASE32B	0	0.50000E+01	0.0	36.6	0.0	41.10	366.00	19.20	5.79	YES	
BASE59A	0	0.50000E+01	0.0	0.0	0.0	41.10	366.00	18.30	5.79	YES	
BASE59B	0	0.50000E+01	0.0	36.6	0.0	41.10	366.00	18.30	5.79	YES	
BASE95A	0	0.50000E+01	0.0	0.0	0.0	41.10	366.00	16.80	5.79	YES	
BASE95B	0	0.50000E+01	0.0	36.6	0.0	41.10	366.00	16.80	5.79	YES	
LD7532A	0	0.50000E+01	0.0	0.0	0.0	41.10	366.00	16.70	5.79	YES	
LD7532B	0	0.50000E+01	0.0	36.6	0.0	41.10	366.00	16.70	5.79	YES	
LD7559A	0	0.50000E+01	0.0	0.0	0.0	41.10	366.00	16.10	5.79	YES	
LD7559B	0	0.50000E+01	0.0	36.6	0.0	41.10	366.00	16.10	5.79	YES	
LD7595A	0	0.50000E+01	0.0	0.0	0.0	41.10	366.00	15.30	5.79	YES	
LD7595B	0	0.50000E+01	0.0	36.6	0.0	41.10	366.00	15.30	5.79	YES	
LD6032A	0	0.50000E+01	0.0	0.0	0.0	41.10	366.00	14.00	5.79	YES	
LD6032B	0	0.50000E+01	0.0	36.6	0.0	41.10	366.00	14.00	5.79	YES	
LD6059A	0	0.50000E+01	0.0	0.0	0.0	41.10	366.00	13.60	5.79	YES	
LD6059B	0	0.50000E+01	0.0	36.6	0.0	41.10	366.00	13.60	5.79	YES	
LD6095A	0	0.50000E+01	0.0	0.0	0.0	41.10	366.00	13.00	5.79	YES	
LD6095B	0	0.50000E+01	0.0	36.6	0.0	41.10	366.00	13.00	5.79	YES	
BSPD95A	0	0.50000E+01	0.0	0.0	0.0	41.10	366.00	18.30	5.79	YES	
BSPD95B	0	0.50000E+01	0.0	36.6	0.0	41.10	366.00	18.30	5.79	YES	

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
BASE32	BASE32A , BASE32B ,
BASE59	BASE59A , BASE59B ,
BASE95	BASE95A , BASE95B ,
LD7532	LD7532A , LD7532B ,
LD7559	LD7559A , LD7559B ,
LD7595	LD7595A , LD7595B ,
LD6032	LD6032A , LD6032B ,
LD6059	LD6059A , LD6059B ,
LD6095	LD6095A , LD6095B ,
BSPD95	BSPD95A , BSPD95B ,

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: BASE32A

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	
1	24.4,	32.7,	0	2	29.3,	80.5,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11
13	29.3,	113.4,	0	14	24.4,	33.2,	0	15	24.4,	34.0,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3
19	24.4,	32.7,	0	20	29.3,	80.5,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11
31	29.3,	113.4,	0	32	24.4,	33.2,	0	33	24.4,	34.0,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3

SOURCE ID: BASE32B

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	
1	24.4,	32.7,	0	2	24.4,	33.8,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11
13	29.3,	113.4,	0	14	29.3,	105.6,	0	15	29.3,	94.5,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3
19	24.4,	32.7,	0	20	24.4,	33.8,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11
31	29.3,	113.4,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3

SOURCE ID: BASE59A

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	
1	24.4,	32.7,	0	2	29.3,	80.5,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11
13	29.3,	113.4,	0	14	24.4,	33.2,	0	15	24.4,	34.0,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3
19	24.4,	32.7,	0	20	29.3,	80.5,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11
31	29.3,	113.4,	0	32	24.4,	33.2,	0	33	24.4,	34.0,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3

SOURCE ID: BASE59B

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	
1	24.4,	32.7,	0	2	24.4,	33.8,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11
13	29.3,	113.4,	0	14	29.3,	105.6,	0	15	29.3,	94.5,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3
19	24.4,	32.7,	0	20	24.4,	33.8,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11
31	29.3,	113.4,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: BASE95A

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	
1	24.4,	32.7,	0	2	29.3,	80.5,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11
13	29.3,	113.4,	0	14	24.4,	33.2,	0	15	24.4,	34.0,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3
19	24.4,	32.7,	0	20	29.3,	80.5,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11
31	29.3,	113.4,	0	32	24.4,	33.2,	0	33	24.4,	34.0,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3

SOURCE ID: BASE95B

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	
1	24.4,	32.7,	0	2	24.4,	33.8,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11
13	29.3,	113.4,	0	14	29.3,	105.6,	0	15	29.3,	94.5,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3
19	24.4,	32.7,	0	20	24.4,	33.8,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11
31	29.3,	113.4,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3

SOURCE ID: LD7532A

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH		
1	24.4,	32.7,	0	2	29.3,	80.5,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11	
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11	
13	29.3,	113.4,	0	14	24.4,	33.2,	0	15	24.4,	34.0,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3	
19	24.4,	32.7,	0	20	29.3,	80.5,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11	
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11	
31	29.3,	113.4,	0	32	24.4,	33.2,	0	33	24.4,	34.0,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3	

SOURCE ID: LD7532B

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH		
1	24.4,	32.7,	0	2	24.4,	33.8,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11	
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11	
13	29.3,	113.4,	0	14	29.3,	105.6,	0	15	29.3,	94.5,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3	
19	24.4,	32.7,	0	20	24.4,	33.8,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11	
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11	
31	29.3,	113.4,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3	

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE 3/8/00 *** 03/0
*** NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB *** 22:37

**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: LD7559A

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH		
1	24.4,	32.7,	0	2	29.3,	80.5,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11	
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11	
13	29.3,	113.4,	0	14	24.4,	33.2,	0	15	24.4,	34.0,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3	
19	24.4,	32.7,	0	20	29.3,	80.5,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11	
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11	
31	29.3,	113.4,	0	32	24.4,	33.2,	0	33	24.4,	34.0,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3	

SOURCE ID: LD7559B

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH		
1	24.4,	32.7,	0	2	24.4,	33.8,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11	
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11	
13	29.3,	113.4,	0	14	29.3,	105.6,	0	15	29.3,	94.5,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3	
19	24.4,	32.7,	0	20	24.4,	33.8,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11	
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11	
31	29.3,	113.4,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3	

SOURCE ID: LD7595A

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH		
1	24.4,	32.7,	0	2	29.3,	80.5,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11	
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11	
13	29.3,	113.4,	0	14	24.4,	33.2,	0	15	24.4,	34.0,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3	
19	24.4,	32.7,	0	20	29.3,	80.5,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11	
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11	
31	29.3,	113.4,	0	32	24.4,	33.2,	0	33	24.4,	34.0,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3	

SOURCE ID: LD7595B

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH		
1	24.4,	32.7,	0	2	24.4,	33.8,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11	
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11	
13	29.3,	113.4,	0	14	29.3,	105.6,	0	15	29.3,	94.5,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3	
19	24.4,	32.7,	0	20	24.4,	33.8,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11	
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11	
31	29.3,	113.4,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3	

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE 3/8/00 *** 03/0
*** NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB *** 22:37

**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: LD6032A

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	24.4,	32.7,	0	2	29.3,	80.5,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11	
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11	
13	29.3,	113.4,	0	14	24.4,	33.2,	0	15	24.4,	34.0,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3	
19	24.4,	32.7,	0	20	29.3,	80.5,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11	
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11	
31	29.3,	113.4,	0	32	24.4,	33.2,	0	33	24.4,	34.0,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3	

SOURCE ID: LD6032B

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	24.4,	32.7,	0	2	24.4,	33.8,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11	
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11	
13	29.3,	113.4,	0	14	29.3,	105.6,	0	15	29.3,	94.5,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3	
19	24.4,	32.7,	0	20	24.4,	33.8,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11	
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11	
31	29.3,	113.4,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3	

SOURCE ID: LD6059A

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	24.4,	32.7,	0	2	29.3,	80.5,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11	
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11	
13	29.3,	113.4,	0	14	24.4,	33.2,	0	15	24.4,	34.0,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3	
19	24.4,	32.7,	0	20	29.3,	80.5,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11	
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11	
31	29.3,	113.4,	0	32	24.4,	33.2,	0	33	24.4,	34.0,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3	

SOURCE ID: LD6059B

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	24.4,	32.7,	0	2	24.4,	33.8,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11	
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11	
13	29.3,	113.4,	0	14	29.3,	105.6,	0	15	29.3,	94.5,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3	
19	24.4,	32.7,	0	20	24.4,	33.8,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11	
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11	
31	29.3,	113.4,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3	

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: LD6095A

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	24.4,	32.7,	0	2	29.3,	80.5,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11	
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11	
13	29.3,	113.4,	0	14	24.4,	33.2,	0	15	24.4,	34.0,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3	
19	24.4,	32.7,	0	20	29.3,	80.5,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11	
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11	
31	29.3,	113.4,	0	32	24.4,	33.2,	0	33	24.4,	34.0,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3	

SOURCE ID: LD6095B

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	24.4,	32.7,	0	2	24.4,	33.8,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11	
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11	
13	29.3,	113.4,	0	14	29.3,	105.6,	0	15	29.3,	94.5,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3	
19	24.4,	32.7,	0	20	24.4,	33.8,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11	
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11	
31	29.3,	113.4,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3	

SOURCE ID: BSPD95A

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	
1	24.4,	32.7,	0	2	29.3,	80.5,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11
13	29.3,	113.4,	0	14	24.4,	33.2,	0	15	24.4,	34.0,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3
19	24.4,	32.7,	0	20	29.3,	80.5,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11
31	29.3,	113.4,	0	32	24.4,	33.2,	0	33	24.4,	34.0,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3

SOURCE ID: BSPD95B

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	
1	24.4,	32.7,	0	2	24.4,	33.8,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11
13	29.3,	113.4,	0	14	29.3,	105.6,	0	15	29.3,	94.5,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3
19	24.4,	32.7,	0	20	24.4,	33.8,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11
31	29.3,	113.4,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE 3/8/00 *** 03/0
*** NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB *** 22:37
**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** GRIDDED RECEPTOR NETWORK SUMMARY ***

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

*** ORIGIN FOR POLAR NETWORK ***
X-ORIG = 0.00 ; Y-ORIG = 0.00 (METERS)

*** DISTANCE RANGES OF NETWORK ***
(METERS)

400.0, 500.0, 700.0, 1000.0, 1500.0, 2000.0, 2500.0, 3000.0, 4000.0, 5000.0,
7000.0, 10000.0, 12000.0, 15000.0, 20000.0, 25000.0, 30000.0,

*** DIRECTION RADIALS OF NETWORK ***
(DEGREES)

10.0, 20.0, 30.0, 40.0, 50.0, 60.0, 70.0, 80.0, 90.0, 100.0,
110.0, 120.0, 130.0, 140.0, 150.0, 160.0, 170.0, 180.0, 190.0, 200.0,
210.0, 220.0, 230.0, 240.0, 250.0, 260.0, 270.0, 280.0, 290.0, 300.0,
310.0, 320.0, 330.0, 340.0, 350.0, 360.0,

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE 3/8/00 *** 03/0
*** NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB *** 22:37
**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** DISCRETE POLAR RECEPTORS ***
ORIGIN: (DIST, DIR, ZELEV, ZFLAG)
SRCID: (METERS,DEG,METERS,METERS)

BSPD95A : (	313.0,	10.0,	0.0,	0.0);	BSPD95A : (	328.0,	20.0,	0.0,	0.0);
BSPD95A : (	280.0,	30.0,	0.0,	0.0);	BSPD95A : (	300.0,	30.0,	0.0,	0.0);
BSPD95A : (	218.0,	40.0,	0.0,	0.0);	BSPD95A : (	300.0,	40.0,	0.0,	0.0);
BSPD95A : (	183.0,	50.0,	0.0,	0.0);	BSPD95A : (	200.0,	50.0,	0.0,	0.0);
BSPD95A : (	300.0,	50.0,	0.0,	0.0);	BSPD95A : (	162.0,	60.0,	0.0,	0.0);
BSPD95A : (	200.0,	60.0,	0.0,	0.0);	BSPD95A : (	300.0,	60.0,	0.0,	0.0);
BSPD95A : (	149.0,	70.0,	0.0,	0.0);	BSPD95A : (	200.0,	70.0,	0.0,	0.0);
BSPD95A : (	300.0,	70.0,	0.0,	0.0);	BSPD95A : (	142.0,	80.0,	0.0,	0.0);
BSPD95A : (	200.0,	80.0,	0.0,	0.0);	BSPD95A : (	300.0,	80.0,	0.0,	0.0);
BSPD95A : (	140.0,	90.0,	0.0,	0.0);	BSPD95A : (	200.0,	90.0,	0.0,	0.0);
BSPD95A : (	300.0,	90.0,	0.0,	0.0);	BSPD95A : (	142.0,	100.0,	0.0,	0.0);
BSPD95A : (	200.0,	100.0,	0.0,	0.0);	BSPD95A : (	300.0,	100.0,	0.0,	0.0);
BSPD95A : (	149.0,	110.0,	0.0,	0.0);	BSPD95A : (	200.0,	110.0,	0.0,	0.0);
BSPD95A : (	300.0,	110.0,	0.0,	0.0);	BSPD95A : (	152.0,	120.0,	0.0,	0.0);
BSPD95A : (	200.0,	120.0,	0.0,	0.0);	BSPD95A : (	300.0,	120.0,	0.0,	0.0);
BSPD95A : (	119.0,	130.0,	0.0,	0.0);	BSPD95A : (	200.0,	130.0,	0.0,	0.0);
BSPD95A : (	300.0,	130.0,	0.0,	0.0);	BSPD95A : (	99.0,	140.0,	0.0,	0.0);
BSPD95A : (	100.0,	140.0,	0.0,	0.0);	BSPD95A : (	200.0,	140.0,	0.0,	0.0);
BSPD95A : (	300.0,	140.0,	0.0,	0.0);	BSPD95A : (	88.0,	150.0,	0.0,	0.0);
BSPD95A : (	100.0,	150.0,	0.0,	0.0);	BSPD95A : (	200.0,	150.0,	0.0,	0.0);
BSPD95A : (	300.0,	150.0,	0.0,	0.0);	BSPD95A : (	81.0,	160.0,	0.0,	0.0);

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   BSPD95A : (    100.0,     160.0,       0.0,       0.0);    BSPD95A : (    200.0,     160.0,       0.0,       0.0);
   BSPD95A : (    300.0,     160.0,       0.0,       0.0);    BSPD95A : (     77.0,     170.0,       0.0,       0.0);
   BSPD95A : (    100.0,     170.0,       0.0,       0.0);    BSPD95A : (    200.0,     170.0,       0.0,       0.0);
   BSPD95A : (    300.0,     170.0,       0.0,       0.0);    BSPD95A : (     76.0,     180.0,       0.0,       0.0);
   BSPD95A : (    100.0,     180.0,       0.0,       0.0);    BSPD95A : (    200.0,     180.0,       0.0,       0.0);
   BSPD95A : (    300.0,     180.0,       0.0,       0.0);    BSPD95A : (     77.0,     190.0,       0.0,       0.0);
   BSPD95A : (    100.0,     190.0,       0.0,       0.0);    BSPD95A : (    200.0,     190.0,       0.0,       0.0);
   BSPD95A : (    300.0,     190.0,       0.0,       0.0);    BSPD95A : (     81.0,     200.0,       0.0,       0.0);
   BSPD95A : (    100.0,     200.0,       0.0,       0.0);    BSPD95A : (    200.0,     200.0,       0.0,       0.0);
   BSPD95A : (    300.0,     200.0,       0.0,       0.0);    BSPD95A : (     88.0,     210.0,       0.0,       0.0);
   BSPD95A : (    100.0,     210.0,       0.0,       0.0);    BSPD95A : (    200.0,     210.0,       0.0,       0.0);
   BSPD95A : (    300.0,     210.0,       0.0,       0.0);    BSPD95A : (     95.0,     220.0,       0.0,       0.0);
   BSPD95A : (    100.0,     220.0,       0.0,       0.0);    BSPD95A : (    200.0,     220.0,       0.0,       0.0);
   BSPD95A : (    300.0,     220.0,       0.0,       0.0);    BSPD95A : (     80.0,     230.0,       0.0,       0.0);
   BSPD95A : (    100.0,     230.0,       0.0,       0.0);    BSPD95A : (    200.0,     230.0,       0.0,       0.0);
   BSPD95A : (    300.0,     230.0,       0.0,       0.0);    BSPD95A : (     70.0,     240.0,       0.0,       0.0);
   BSPD95A : (    100.0,     240.0,       0.0,       0.0);    BSPD95A : (    200.0,     240.0,       0.0,       0.0);
   BSPD95A : (    300.0,     240.0,       0.0,       0.0);    BSPD95A : (     65.0,     250.0,       0.0,       0.0);
   BSPD95A : (    100.0,     250.0,       0.0,       0.0);    BSPD95A : (    200.0,     250.0,       0.0,       0.0);
   BSPD95A : (    300.0,     250.0,       0.0,       0.0);    BSPD95A : (     62.0,     260.0,       0.0,       0.0);
   BSPD95A : (    100.0,     260.0,       0.0,       0.0);    BSPD95A : (    200.0,     260.0,       0.0,       0.0);
   BSPD95A : (    300.0,     260.0,       0.0,       0.0);    BSPD95A : (     61.0,     270.0,       0.0,       0.0);
   BSPD95A : (    100.0,     270.0,       0.0,       0.0);    BSPD95A : (    200.0,     270.0,       0.0,       0.0);
   BSPD95A : (    300.0,     270.0,       0.0,       0.0);    BSPD95A : (     62.0,     280.0,       0.0,       0.0);
 *** ISCST3 - VERSION 99155 ***    *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE      3/8/00          ***        03/0
                                  *** NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB       ***        22:37
**MODELOPTs:                                                                                                 PAGE
CONC                        RURAL  FLAT          DFAULT                                                   NOCMPL

                                  *** DISCRETE POLAR RECEPTORS ***
                                  ORIGIN: (DIST, DIR, ZELEV, ZFLAG)
                                  SRCID: (METERS,DEG,METERS,METERS)

   BSPD95A : (    100.0,     280.0,       0.0,       0.0);    BSPD95A : (    200.0,     280.0,       0.0,       0.0);
   BSPD95A : (    300.0,     280.0,       0.0,       0.0);    BSPD95A : (     65.0,     290.0,       0.0,       0.0);
   BSPD95A : (    100.0,     290.0,       0.0,       0.0);    BSPD95A : (    200.0,     290.0,       0.0,       0.0);
   BSPD95A : (    300.0,     290.0,       0.0,       0.0);    BSPD95A : (     70.0,     300.0,       0.0,       0.0);
   BSPD95A : (    100.0,     300.0,       0.0,       0.0);    BSPD95A : (    200.0,     300.0,       0.0,       0.0);
   BSPD95A : (    300.0,     300.0,       0.0,       0.0);    BSPD95A : (     80.0,     310.0,       0.0,       0.0);
   BSPD95A : (    100.0,     310.0,       0.0,       0.0);    BSPD95A : (    200.0,     310.0,       0.0,       0.0);
   BSPD95A : (    300.0,     310.0,       0.0,       0.0);    BSPD95A : (     95.0,     320.0,       0.0,       0.0);
   BSPD95A : (    100.0,     320.0,       0.0,       0.0);    BSPD95A : (    200.0,     320.0,       0.0,       0.0);
   BSPD95A : (    300.0,     320.0,       0.0,       0.0);    BSPD95A : (    122.0,     330.0,       0.0,       0.0);
   BSPD95A : (    200.0,     330.0,       0.0,       0.0);    BSPD95A : (    300.0,     330.0,       0.0,       0.0);
   BSPD95A : (    178.0,     340.0,       0.0,       0.0);    BSPD95A : (    200.0,     340.0,       0.0,       0.0);
   BSPD95A : (    300.0,     340.0,       0.0,       0.0);    BSPD95A : (    313.0,     350.0,       0.0,       0.0);
   BSPD95A : (    308.0,     360.0,       0.0,       0.0);
 *** ISCST3 - VERSION 99155 ***    *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE      3/8/00          ***        03/0
                                  *** NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB       ***        22:37
**MODELOPTs:                                                                                                 PAGE
CONC                        RURAL  FLAT          DFAULT                                                   NOCMPL
```

* SOURCE-RECEPTOR COMBINATIONS FOR WHICH CALCULATIONS MAY NOT BE PERFORMED *
LESS THAN 1.0 METER OR 3*ZLB IN DISTANCE, OR WITHIN OPEN PIT SOURCE

SOURCE ID	- - RECEPTOR LOCATION - - XR (METERS)	YR (METERS)	DISTANCE (METERS)
BASE32A	-27.7	-76.1	81.00
BASE32A	-61.3	-51.4	80.00
BASE32A	-60.6	-35.0	70.00
BASE32A	-61.1	-22.2	65.00
BASE32A	-61.1	-10.8	62.00
BASE32A	-61.0	0.0	61.00
BASE32A	-61.1	10.8	62.00
BASE32A	-61.1	22.2	65.00
BASE32A	-60.6	35.0	70.00
BASE32A	-61.3	51.4	80.00
BASE32B	-61.1	-22.2	84.81
BASE32B	-61.1	-10.8	77.28
BASE32B	-61.0	0.0	71.14
BASE32B	-61.1	10.8	66.30
BASE32B	-61.1	22.2	62.75
BASE32B	-60.6	35.0	60.64

BASE32B	-86.6	50.0	87.63
BASE32B	-61.3	51.4	63.05
BASE32B	-76.6	64.3	81.45
BASE32B	-61.1	72.8	70.98
BASE32B	-64.3	76.6	75.71
BASE59A	-27.7	-76.1	81.00
BASE59A	-61.3	-51.4	80.00
BASE59A	-60.6	-35.0	70.00
BASE59A	-61.1	-22.2	65.00
BASE59A	-61.1	-10.8	62.00
BASE59A	-61.0	0.0	61.00
BASE59A	-61.1	10.8	62.00
BASE59A	-61.1	22.2	65.00
BASE59A	-60.6	35.0	70.00
BASE59A	-61.3	51.4	80.00
BASE59B	-61.1	-22.2	84.81
BASE59B	-61.1	-10.8	77.28
BASE59B	-61.0	0.0	71.14
BASE59B	-61.1	10.8	66.30
BASE59B	-61.1	22.2	62.75
BASE59B	-60.6	35.0	60.64
BASE59B	-86.6	50.0	87.63
BASE59B	-61.3	51.4	63.05
BASE59B	-76.6	64.3	81.45

**MODELOPTs:
CONC RURAL FLAT DFAULT NOCMPL

* SOURCE-RECEPTOR COMBINATIONS FOR WHICH CALCULATIONS MAY NOT BE PERFORMED *
LESS THAN 1.0 METER OR 3*ZLB IN DISTANCE, OR WITHIN OPEN PIT SOURCE

SOURCE ID	- - RECEPTOR LOCATION - - XR (METERS)	YR (METERS)	DISTANCE (METERS)
BASE59B	-61.1	72.8	70.98
BASE59B	-64.3	76.6	75.71
BASE95A	-27.7	-76.1	81.00
BASE95A	-61.3	-51.4	80.00
BASE95A	-60.6	-35.0	70.00
BASE95A	-61.1	-22.2	65.00
BASE95A	-61.1	-10.8	62.00
BASE95A	-61.0	0.0	61.00
BASE95A	-61.1	10.8	62.00
BASE95A	-61.1	22.2	65.00
BASE95A	-60.6	35.0	70.00
BASE95A	-61.3	51.4	80.00
BASE95B	-61.1	-22.2	84.81
BASE95B	-61.1	-10.8	77.28
BASE95B	-61.0	0.0	71.14
BASE95B	-61.1	10.8	66.30
BASE95B	-61.1	22.2	62.75
BASE95B	-60.6	35.0	60.64
BASE95B	-86.6	50.0	87.63
BASE95B	-61.3	51.4	63.05
BASE95B	-76.6	64.3	81.45
BASE95B	-61.1	72.8	70.98
BASE95B	-64.3	76.6	75.71
LD7532A	-27.7	-76.1	81.00
LD7532A	-61.3	-51.4	80.00
LD7532A	-60.6	-35.0	70.00
LD7532A	-61.1	-22.2	65.00
LD7532A	-61.1	-10.8	62.00
LD7532A	-61.0	0.0	61.00
LD7532A	-61.1	10.8	62.00
LD7532A	-61.1	22.2	65.00
LD7532A	-60.6	35.0	70.00
LD7532A	-61.3	51.4	80.00
LD7532B	-61.1	-22.2	84.81
LD7532B	-61.1	-10.8	77.28
LD7532B	-61.0	0.0	71.14
LD7532B	-61.1	10.8	66.30
LD7532B	-61.1	22.2	62.75
LD7532B	-60.6	35.0	60.64
LD7532B	-86.6	50.0	87.63

* SOURCE-RECEPTOR COMBINATIONS FOR WHICH CALCULATIONS MAY NOT BE PERFORMED *
LESS THAN 1.0 METER OR 3*ZLB IN DISTANCE, OR WITHIN OPEN PIT SOURCE

SOURCE ID	- - RECEPTOR LOCATION - - XR (METERS)	YR (METERS)	DISTANCE (METERS)
LD7532B	-61.3	51.4	63.05
LD7532B	-76.6	64.3	81.45
LD7532B	-61.1	72.8	70.98
LD7532B	-64.3	76.6	75.71
LD7559A	-27.7	-76.1	81.00
LD7559A	-61.3	-51.4	80.00
LD7559A	-60.6	-35.0	70.00
LD7559A	-61.1	-22.2	65.00
LD7559A	-61.1	-10.8	62.00
LD7559A	-61.0	0.0	61.00
LD7559A	-61.1	10.8	62.00
LD7559A	-61.1	22.2	65.00
LD7559A	-60.6	35.0	70.00
LD7559A	-61.3	51.4	80.00
LD7559B	-61.1	-22.2	84.81
LD7559B	-61.1	-10.8	77.28
LD7559B	-61.0	0.0	71.14
LD7559B	-61.1	10.8	66.30
LD7559B	-61.1	22.2	62.75
LD7559B	-60.6	35.0	60.64
LD7559B	-86.6	50.0	87.63
LD7559B	-61.3	51.4	63.05
LD7559B	-76.6	64.3	81.45
LD7559B	-61.1	72.8	70.98
LD7559B	-64.3	76.6	75.71
LD7595A	-27.7	-76.1	81.00
LD7595A	-61.3	-51.4	80.00
LD7595A	-60.6	-35.0	70.00
LD7595A	-61.1	-22.2	65.00
LD7595A	-61.1	-10.8	62.00
LD7595A	-61.0	0.0	61.00
LD7595A	-61.1	10.8	62.00
LD7595A	-61.1	22.2	65.00
LD7595A	-60.6	35.0	70.00
LD7595A	-61.3	51.4	80.00
LD7595B	-61.1	-22.2	84.81
LD7595B	-61.1	-10.8	77.28
LD7595B	-61.0	0.0	71.14
LD7595B	-61.1	10.8	66.30
LD7595B	-61.1	22.2	62.75

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE 3/8/00 *** 03/0
*** NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB *** 22:37
PAGE

**MODELOPTs:
CONC RURAL FLAT DFAULT NOCMPL

* SOURCE-RECEPTOR COMBINATIONS FOR WHICH CALCULATIONS MAY NOT BE PERFORMED *
LESS THAN 1.0 METER OR 3*ZLB IN DISTANCE, OR WITHIN OPEN PIT SOURCE

SOURCE ID	- - RECEPTOR LOCATION - - XR (METERS)	YR (METERS)	DISTANCE (METERS)
LD7595B	-60.6	35.0	60.64
LD7595B	-86.6	50.0	87.63
LD7595B	-61.3	51.4	63.05
LD7595B	-76.6	64.3	81.45
LD7595B	-61.1	72.8	70.98
LD7595B	-64.3	76.6	75.71
LD6032A	-27.7	-76.1	81.00
LD6032A	-61.3	-51.4	80.00
LD6032A	-60.6	-35.0	70.00
LD6032A	-61.1	-22.2	65.00
LD6032A	-61.1	-10.8	62.00

LD6032A	-61.0	0.0	61.00
LD6032A	-61.1	10.8	62.00
LD6032A	-61.1	22.2	65.00
LD6032A	-60.6	35.0	70.00
LD6032A	-61.3	51.4	80.00
LD6032B	-61.1	-22.2	84.81
LD6032B	-61.1	-10.8	77.28
LD6032B	-61.0	0.0	71.14
LD6032B	-61.1	10.8	66.30
LD6032B	-61.1	22.2	62.75
LD6032B	-60.6	35.0	60.64
LD6032B	-86.6	50.0	87.63
LD6032B	-61.3	51.4	63.05
LD6032B	-76.6	64.3	81.45
LD6032B	-61.1	72.8	70.98
LD6032B	-64.3	76.6	75.71
LD6059A	-27.7	-76.1	81.00
LD6059A	-61.3	-51.4	80.00
LD6059A	-60.6	-35.0	70.00
LD6059A	-61.1	-22.2	65.00
LD6059A	-61.1	-10.8	62.00
LD6059A	-61.0	0.0	61.00
LD6059A	-61.1	10.8	62.00
LD6059A	-61.1	22.2	65.00
LD6059A	-60.6	35.0	70.00
LD6059A	-61.3	51.4	80.00
LD6059B	-61.1	-22.2	84.81
LD6059B	-61.1	-10.8	77.28
LD6059B	-61.0	0.0	71.14

**MODELOPTs:
CONC RURAL FLAT DFAULT NOCMPL

* SOURCE-RECEPTOR COMBINATIONS FOR WHICH CALCULATIONS MAY NOT BE PERFORMED *
LESS THAN 1.0 METER OR 3*ZLB IN DISTANCE, OR WITHIN OPEN PIT SOURCE

SOURCE ID	- - RECEPTOR LOCATION - - XR (METERS)	YR (METERS)	DISTANCE (METERS)
LD6059B	-61.1	10.8	66.30
LD6059B	-61.1	22.2	62.75
LD6059B	-60.6	35.0	60.64
LD6059B	-86.6	50.0	87.63
LD6059B	-61.3	51.4	63.05
LD6059B	-76.6	64.3	81.45
LD6059B	-61.1	72.8	70.98
LD6059B	-64.3	76.6	75.71
LD6095A	-27.7	-76.1	81.00
LD6095A	-61.3	-51.4	80.00
LD6095A	-60.6	-35.0	70.00
LD6095A	-61.1	-22.2	65.00
LD6095A	-61.1	-10.8	62.00
LD6095A	-61.0	0.0	61.00
LD6095A	-61.1	10.8	62.00
LD6095A	-61.1	22.2	65.00
LD6095A	-60.6	35.0	70.00
LD6095A	-61.3	51.4	80.00
LD6095B	-61.1	-22.2	84.81
LD6095B	-61.1	-10.8	77.28
LD6095B	-61.0	0.0	71.14
LD6095B	-61.1	10.8	66.30
LD6095B	-61.1	22.2	62.75
LD6095B	-60.6	35.0	60.64
LD6095B	-86.6	50.0	87.63
LD6095B	-61.3	51.4	63.05
LD6095B	-76.6	64.3	81.45
LD6095B	-61.1	72.8	70.98
LD6095B	-64.3	76.6	75.71
BSPD95A	-27.7	-76.1	81.00
BSPD95A	-61.3	-51.4	80.00
BSPD95A	-60.6	-35.0	70.00
BSPD95A	-61.1	-22.2	65.00
BSPD95A	-61.1	-10.8	62.00
BSPD95A	-61.0	0.0	61.00

BSPD95A	-61.1	10.8	62.00
BSPD95A	-61.1	22.2	65.00
BSPD95A	-60.6	35.0	70.00
BSPD95A	-61.3	51.4	80.00
BSPD95B	-61.1	-22.2	84.81

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*** ISCST3 - VERSION 99155 ***    *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE      3/8/00          ***      03/0
                                  *** NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB      ***      22:37
**MODELOPTs:                                                                                                       PAGE
CONC                    RURAL  FLAT        DFAULT                                                        NOCMPL
```

* SOURCE-RECEPTOR COMBINATIONS FOR WHICH CALCULATIONS MAY NOT BE PERFORMED *
LESS THAN 1.0 METER OR 3*ZLB IN DISTANCE, OR WITHIN OPEN PIT SOURCE

SOURCE ID	- - RECEPTOR LOCATION - - XR (METERS)	YR (METERS)	DISTANCE (METERS)
BSPD95B	-61.1	-10.8	77.28
BSPD95B	-61.0	0.0	71.14
BSPD95B	-61.1	10.8	66.30
BSPD95B	-61.1	22.2	62.75
BSPD95B	-60.6	35.0	60.64
BSPD95B	-86.6	50.0	87.63
BSPD95B	-61.3	51.4	63.05
BSPD95B	-76.6	64.3	81.45
BSPD95B	-61.1	72.8	70.98
BSPD95B	-64.3	76.6	75.71

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*** ISCST3 - VERSION 99155 ***    *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE      3/8/00          ***      03/0
                                  *** NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB      ***      22:37
**MODELOPTs:                                                                                                       PAGE
CONC                    RURAL  FLAT        DFAULT                                                        NOCMPL
```

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
B	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
C	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
D	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
E	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00
F	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00

C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

**MODELOPTs:
CONC RURAL FLAT DFAULT NOCMPL

*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

FILE: C:\MET\TPA87D.MET
FORMAT: (4I2,2F9.4,F6.1,I2,2F7.1,f9.4,f10.1,f8.4,i4,f7.2)
SURFACE STATION NO.: 12842 UPPER AIR STATION NO.: 12842
NAME: TAMPA NAME: RUSKIN
YEAR: 1987 YEAR: 1987

YR	MN	DY	HR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	MIXING HEIGHT (M) URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-O (M)	IPCODE	PRATE (mm/HR)
87	01	01	01	341.0	6.17	293.7	4	598.7	598.7	0.0000	0.0	0.0000	0	0.00
87	01	01	02	358.0	4.12	293.2	5	651.8	1306.0	0.0000	0.0	0.0000	0	0.00
87	01	01	03	34.0	6.17	293.2	4	704.8	704.8	0.0000	0.0	0.0000	0	0.00
87	01	01	04	73.0	6.69	291.5	4	757.8	757.8	0.0000	0.0	0.0000	0	0.00
87	01	01	05	83.0	7.20	290.9	4	810.8	810.8	0.0000	0.0	0.0000	0	0.00
87	01	01	06	102.0	7.20	290.4	4	863.8	863.8	0.0000	0.0	0.0000	0	0.00
87	01	01	07	105.0	6.69	289.3	4	916.9	916.9	0.0000	0.0	0.0000	0	0.00
87	01	01	08	113.0	7.72	288.7	4	969.9	969.9	0.0000	0.0	0.0000	0	0.00
87	01	01	09	107.0	6.17	288.2	4	1022.9	1022.9	0.0000	0.0	0.0000	0	0.00
87	01	01	10	121.0	6.17	288.2	4	1075.9	1075.9	0.0000	0.0	0.0000	0	0.00
87	01	01	11	114.0	6.69	287.6	4	1128.9	1128.9	0.0000	0.0	0.0000	0	0.00
87	01	01	12	116.0	6.17	287.0	4	1182.0	1182.0	0.0000	0.0	0.0000	0	0.00
87	01	01	13	133.0	7.20	287.6	4	1235.0	1235.0	0.0000	0.0	0.0000	0	0.00
87	01	01	14	119.0	7.72	287.6	4	1288.0	1288.0	0.0000	0.0	0.0000	0	0.00
87	01	01	15	132.0	7.20	288.2	4	1288.0	1288.0	0.0000	0.0	0.0000	0	0.00
87	01	01	16	134.0	7.72	289.3	4	1288.0	1288.0	0.0000	0.0	0.0000	0	0.00
87	01	01	17	141.0	7.20	288.2	4	1288.0	1288.0	0.0000	0.0	0.0000	0	0.00
87	01	01	18	137.0	5.14	287.6	5	1286.4	1238.1	0.0000	0.0	0.0000	0	0.00
87	01	01	19	144.0	3.60	286.5	5	1281.2	1078.6	0.0000	0.0	0.0000	0	0.00
87	01	01	20	117.0	2.06	285.4	6	1276.0	919.0	0.0000	0.0	0.0000	0	0.00
87	01	01	21	110.0	1.54	284.8	7	1270.9	759.5	0.0000	0.0	0.0000	0	0.00
87	01	01	22	112.0	0.00	283.7	7	1265.7	600.0	0.0000	0.0	0.0000	0	0.00
87	01	01	23	120.0	2.57	283.7	6	1260.5	440.5	0.0000	0.0	0.0000	0	0.00
87	01	01	24	130.0	1.54	282.6	7	1255.4	281.0	0.0000	0.0	0.0000	0	0.00

*** NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.
FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE 3/8/00 *** 03/0
*** NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB *** 22:37
PAGE
**MODELOPTs:
CONC RURAL FLAT DFAULT NOCMPL

*** THE SUMMARY OF MAXIMUM PERIOD (8760 HRS) RESULTS ***

** CONC OF GEN IN (MICROGRAMS/CUBIC-METER) **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF	TYPE	NETWORK GRID-ID
BASE32	1ST HIGHEST VALUE IS	0.11293 AT (	2500.00, 0.00, 0.00, 0.00)	GP	POL	
	2ND HIGHEST VALUE IS	0.10919 AT (	3000.00, 0.00, 0.00, 0.00)	GP	POL	
	3RD HIGHEST VALUE IS	0.10612 AT (	2000.00, 0.00, 0.00, 0.00)	GP	POL	
BASE59	1ST HIGHEST VALUE IS	0.11943 AT (	2500.00, 0.00, 0.00, 0.00)	GP	POL	
	2ND HIGHEST VALUE IS	0.11452 AT (	3000.00, 0.00, 0.00, 0.00)	GP	POL	
	3RD HIGHEST VALUE IS	0.11387 AT (	2000.00, 0.00, 0.00, 0.00)	GP	POL	
BASE95	1ST HIGHEST VALUE IS	0.13219 AT (	2500.00, 0.00, 0.00, 0.00)	GP	POL	
	2ND HIGHEST VALUE IS	0.12901 AT (	2000.00, 0.00, 0.00, 0.00)	GP	POL	
	3RD HIGHEST VALUE IS	0.12500 AT (	3000.00, 0.00, 0.00, 0.00)	GP	POL	

LD7532	1ST HIGHEST VALUE IS	0.13309 AT (	2500.00,	0.00,	0.00,	0.00)	GP	POL
	2ND HIGHEST VALUE IS	0.13012 AT (	2000.00,	0.00,	0.00,	0.00)	GP	POL
	3RD HIGHEST VALUE IS	0.12572 AT (	3000.00,	0.00,	0.00,	0.00)	GP	POL
7559	1ST HIGHEST VALUE IS	0.13882 AT (	2500.00,	0.00,	0.00,	0.00)	GP	POL
	2ND HIGHEST VALUE IS	0.13720 AT (	2000.00,	0.00,	0.00,	0.00)	GP	POL
	3RD HIGHEST VALUE IS	0.13031 AT (	3000.00,	0.00,	0.00,	0.00)	GP	POL
LD7595	1ST HIGHEST VALUE IS	0.14778 AT (	2000.00,	0.00,	0.00,	0.00)	GP	POL
	2ND HIGHEST VALUE IS	0.14734 AT (	2500.00,	0.00,	0.00,	0.00)	GP	POL
	3RD HIGHEST VALUE IS	0.13713 AT (	3000.00,	0.00,	0.00,	0.00)	GP	POL
LD6032	1ST HIGHEST VALUE IS	0.16719 AT (	2000.00,	0.00,	0.00,	0.00)	GP	POL
	2ND HIGHEST VALUE IS	0.16287 AT (	2500.00,	0.00,	0.00,	0.00)	GP	POL
	3RD HIGHEST VALUE IS	0.14961 AT (	3000.00,	0.00,	0.00,	0.00)	GP	POL
LD6059	1ST HIGHEST VALUE IS	0.17422 AT (	2000.00,	0.00,	0.00,	0.00)	GP	POL
	2ND HIGHEST VALUE IS	0.16839 AT (	2500.00,	0.00,	0.00,	0.00)	GP	POL
	3RD HIGHEST VALUE IS	0.15398 AT (	3000.00,	0.00,	0.00,	0.00)	GP	POL
LD6095	1ST HIGHEST VALUE IS	0.18552 AT (	2000.00,	0.00,	0.00,	0.00)	GP	POL
	2ND HIGHEST VALUE IS	0.17722 AT (	2500.00,	0.00,	0.00,	0.00)	GP	POL
	3RD HIGHEST VALUE IS	0.16511 AT (	1500.00,	0.00,	0.00,	0.00)	GP	POL
BSPD95	1ST HIGHEST VALUE IS	0.11943 AT (	2500.00,	0.00,	0.00,	0.00)	GP	POL
	2ND HIGHEST VALUE IS	0.11452 AT (	3000.00,	0.00,	0.00,	0.00)	GP	POL
	3RD HIGHEST VALUE IS	0.11387 AT (	2000.00,	0.00,	0.00,	0.00)	GP	POL

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

**MODELOPTs:
ONC RURAL FLAT DFAULT NOCMPL

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF GEN IN (MICROGRAMS/CUBIC-METER) **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)				OF TYPE	NETWO GRID-
BASE32	HIGH 1ST HIGH VALUE IS	2.14077	ON 87122924: AT (	68.40,	-187.94,	0.00,	0.00)	DP	NA
BASE59	HIGH 1ST HIGH VALUE IS	2.33548	ON 87122924: AT (	68.40,	-187.94,	0.00,	0.00)	DP	NA
BASE95	HIGH 1ST HIGH VALUE IS	3.25508	ON 87010524: AT (	34.73,	-196.96,	0.00,	0.00)	DP	NA
LD7532	HIGH 1ST HIGH VALUE IS	3.27391	ON 87010524: AT (	34.73,	-196.96,	0.00,	0.00)	DP	NA
LD7559	HIGH 1ST HIGH VALUE IS	3.45232	ON 87122924: AT (	68.40,	-187.94,	0.00,	0.00)	DP	NA
LD7595	HIGH 1ST HIGH VALUE IS	3.79452	ON 87122924: AT (	68.40,	-187.94,	0.00,	0.00)	DP	NA
LD6032	HIGH 1ST HIGH VALUE IS	4.61816	ON 87122924: AT (	68.40,	-187.94,	0.00,	0.00)	DP	NA
LD6059	HIGH 1ST HIGH VALUE IS	4.84464	ON 87122924: AT (	68.40,	-187.94,	0.00,	0.00)	DP	NA
LD6095	HIGH 1ST HIGH VALUE IS	5.28173	ON 87033124: AT (	259.81,	-150.00,	0.00,	0.00)	DP	NA
BSPD95	HIGH 1ST HIGH VALUE IS	2.33548	ON 87122924: AT (	68.40,	-187.94,	0.00,	0.00)	DP	NA

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

**MODELOPTs:

CONC RURAL FLAT DFAULT NOCMPL

*** THE SUMMARY OF HIGHEST 8-HR RESULTS ***

** CONC OF GEN IN (MICROGRAMS/CUBIC-METER) **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWO GRID-
BASE32 HIGH 1ST HIGH VALUE IS	6.11841	ON 87122916:	AT (68.40, -187.94, 0.00, 0.00)	DP	NA
BASE59 HIGH 1ST HIGH VALUE IS	6.69304	ON 87122916:	AT (68.40, -187.94, 0.00, 0.00)	DP	NA
BASE95 HIGH 1ST HIGH VALUE IS	8.71970	ON 87122916:	AT (68.40, -187.94, 0.00, 0.00)	DP	NA
LD7532 HIGH 1ST HIGH VALUE IS	8.82609	ON 87122916:	AT (68.40, -187.94, 0.00, 0.00)	DP	NA
LD7559 HIGH 1ST HIGH VALUE IS	9.49399	ON 87122916:	AT (68.40, -187.94, 0.00, 0.00)	DP	NA
LD7595 HIGH 1ST HIGH VALUE IS	10.46903	ON 87122916:	AT (68.40, -187.94, 0.00, 0.00)	DP	NA
LD6032 HIGH 1ST HIGH VALUE IS	12.29145	ON 87122916:	AT (68.40, -187.94, 0.00, 0.00)	DP	NA
LD6059 HIGH 1ST HIGH VALUE IS	12.91914	ON 87122916:	AT (68.40, -187.94, 0.00, 0.00)	DP	NA
LD6095 HIGH 1ST HIGH VALUE IS	13.92572	ON 87122916:	AT (68.40, -187.94, 0.00, 0.00)	DP	NA
BSPD95 HIGH 1ST HIGH VALUE IS	6.69304	ON 87122916:	AT (68.40, -187.94, 0.00, 0.00)	DP	NA

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

**MODELOPTs:
CONC RURAL FLAT DFAULT NOCMPL

*** THE SUMMARY OF HIGHEST 3-HR RESULTS ***

** CONC OF GEN IN (MICROGRAMS/CUBIC-METER) **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWO GRID-
BASE32 HIGH 1ST HIGH VALUE IS	11.84953	ON 87112012:	AT (34.73, -196.96, 0.00, 0.00)	DP	NA
BASE59 HIGH 1ST HIGH VALUE IS	12.39000	ON 87112012:	AT (34.73, -196.96, 0.00, 0.00)	DP	NA
BASE95 HIGH 1ST HIGH VALUE IS	13.60576	ON 87112012:	AT (34.73, -196.96, 0.00, 0.00)	DP	NA
LD7532 HIGH 1ST HIGH VALUE IS	13.73046	ON 87112012:	AT (34.73, -196.96, 0.00, 0.00)	DP	NA
LD7559 HIGH 1ST HIGH VALUE IS	14.56766	ON 87112012:	AT (34.73, -196.96, 0.00, 0.00)	DP	NA
LD7595 HIGH 1ST HIGH VALUE IS	16.15297	ON 87112012:	AT (34.73, -196.96, 0.00, 0.00)	DP	NA
LD6032 HIGH 1ST HIGH VALUE IS	19.66536	ON 87112012:	AT (34.73, -196.96, 0.00, 0.00)	DP	NA
LD6059 HIGH 1ST HIGH VALUE IS	20.91159	ON 87112012:	AT (34.73, -196.96, 0.00, 0.00)	DP	NA
LD6095 HIGH 1ST HIGH VALUE IS	22.93481	ON 87112012:	AT (34.73, -196.96, 0.00, 0.00)	DP	NA
BSPD95 HIGH 1ST HIGH VALUE IS	12.39000	ON 87112012:	AT (34.73, -196.96, 0.00, 0.00)	DP	NA

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE 3/8/00 *** 03/0
*** NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB *** 22:37
**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF GEN IN (MICROGRAMS/CUBIC-METER) **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWO GRID-
BASE32 HIGH 1ST HIGH VALUE IS	26.58003	ON 87081111: AT (	0.00, -200.00, 0.00, 0.00)	DP	NA
BASE59 HIGH 1ST HIGH VALUE IS	29.05637	ON 87081111: AT (	0.00, -200.00, 0.00, 0.00)	DP	NA
BASE95 HIGH 1ST HIGH VALUE IS	35.23141	ON 87122302: AT (	0.00, -200.00, 0.00, 0.00)	DP	NA
LD7532 HIGH 1ST HIGH VALUE IS	35.70874	ON 87122302: AT (	0.00, -200.00, 0.00, 0.00)	DP	NA
LD7559 HIGH 1ST HIGH VALUE IS	38.71484	ON 87122302: AT (	0.00, -200.00, 0.00, 0.00)	DP	NA
LD7595 HIGH 1ST HIGH VALUE IS	43.13102	ON 87122302: AT (	0.00, -200.00, 0.00, 0.00)	DP	NA
LD6032 HIGH 1ST HIGH VALUE IS	51.44741	ON 87122302: AT (	0.00, -200.00, 0.00, 0.00)	DP	NA
LD6059 HIGH 1ST HIGH VALUE IS	54.32894	ON 87122302: AT (	0.00, -200.00, 0.00, 0.00)	DP	NA
LD6095 HIGH 1ST HIGH VALUE IS	58.97198	ON 87122302: AT (	0.00, -200.00, 0.00, 0.00)	DP	NA
BSPD95 HIGH 1ST HIGH VALUE IS	29.05637	ON 87081111: AT (	0.00, -200.00, 0.00, 0.00)	DP	NA

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE 3/8/00 *** 03/0
*** NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB *** 22:37
**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** Message Summary : ISCST3 Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 0 Warning Message(s)
A Total of 531 Informational Message(s)

A Total of 531 Calm Hours Identified

******** FATAL ERROR MESSAGES ********
*** NONE ***

******** WARNING MESSAGES ********
*** NONE ***

****
*** ISCST3 Finishes Successfully ***

ISCBOB3 RELEASE 98056

ISCST3 OUTPUT FILE NUMBER 1 :PMC2C.087
ISCST3 OUTPUT FILE NUMBER 2 :PMC2C.088
SCST3 OUTPUT FILE NUMBER 3 :PMC2C.089
.SCST3 OUTPUT FILE NUMBER 4 :PMC2C.090
ISCST3 OUTPUT FILE NUMBER 5 :PMC2C.091
First title for last output file is: 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE+COOLING TWR 3/08/00
Second title for last output file is: NATURAL GAS, PM10, BASED ON 60% LOAD 95 DEG.F

AVERAGING TIME	YEAR	CONC (ug/m3)	DIR (deg) or X (m)	DIST (m) or Y (m)	PERIOD ENDING (YYMMDDHH)
SOURCE GROUP ID:	COOL				
Annual					
	1987	0.08600	10.	313.	87123124
	1988	0.15082	10.	313.	88123124
	1989	0.20724	10.	313.	89123124
	1990	0.13461	10.	313.	90123124
	1991	0.09750	10.	313.	91123124
HIGH 24-Hour					
	1987	2.31081	10.	313.	87011924
	1988	2.99178	10.	313.	88112724
	1989	3.39466	10.	313.	89060924
	1990	2.91614	10.	313.	90021024
	1991	2.29155	10.	313.	91030824
SOURCE GROUP ID:	ALL				
Annual					
	1987	0.10377	10.	313.	87123124
	1988	0.18729	10.	313.	88123124
	1989	0.25841	10.	313.	89123124
	1990	0.17558	10.	313.	90123124
	1991	0.13981	10.	313.	91123124
HIGH 24-Hour					
	1987	2.84694	10.	313.	87011924
	1988	4.01401	10.	313.	88112724
	1989	4.50154	10.	313.	89060924
	1990	4.07117	10.	313.	90021024
	1991	3.67957	10.	313.	91030824

All receptor computations reported with respect to a user-specified origin

GRID	0.00	0.00
DISCRETE	0.00	0.00

```
CO STARTING
CO TITLEONE 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE+COOLING TWR 3/08/00
CO TITLETWO NATURAL GAS, PM10, BASED ON 60% LOAD 95 DEG.F
CO MODELOPT DFAULT CONC   RURAL NOCMPL
CO AVERTIME  PERIOD 24
CO POLLUTID GEN
CO DCAYCOEF    .000000
CO RUNORNOT RUN
CO FINISHED

SO STARTING

** Source Location Cards:
**          SRCID SRCTYP        XS            YS            ZS
** MODELING ORIGIN HRSG NO.1 STACK LOCATION
** LOCATION IS USED FOR POLAR DISCRETE RECEPTORS.
**  HRSG STACK NUMBER CODE
** ------------------------
**  A -  HRSG NO. 1
**  B -  HRSG NO. 2
** Source Location Cards:
**          SRCID SRCTYP      XS        YS        ZS
**   UTM                     (m)       (m)       (m)
**
SO LOCATION  LD6095A  POINT    0.00     0.0       0.0
SO LOCATION  LD6095B  POINT    0.00    36.6       0.0
**
SO LOCATION  COOL1    POINT   10.70   189.0       0.0
SO LOCATION  COOL2    POINT   27.10   189.0       0.0
SO LOCATION  COOL3    POINT   43.60   189.0       0.0
SO LOCATION  COOL4    POINT   60.00   189.0       0.0
SO LOCATION  COOL5    POINT   76.50   189.0       0.0
SO LOCATION  COOL6    POINT   10.70   203.0       0.0
SO LOCATION  COOL7    POINT   27.10   203.0       0.0
SO LOCATION  COOL8    POINT   43.60   203.0       0.0
SO LOCATION  COOL9    POINT   60.00   203.0       0.0
SO LOCATION  COOL10   POINT   76.50   203.0       0.0

** Source Parameter Cards:
** POINT:   SRCID          QS       HS        TS        VS        DS
**                        (g/s)     (m)       (K)      (m/s)     (m)
**
SO SRCPARAM   LD6095A     1.810    41.1      366.0     13.0      5.79
SO SRCPARAM   LD6095B     1.810    41.1      366.0     13.0      5.79
**
SO SRCPARAM   COOL1       0.012    16.8      300.0     9.88      8.54
SO SRCPARAM   COOL2       0.012    16.8      300.0     9.88      8.54
SO SRCPARAM   COOL3       0.012    16.8      300.0     9.88      8.54
SO SRCPARAM   COOL4       0.012    16.8      300.0     9.88      8.54
SO SRCPARAM   COOL5       0.012    16.8      300.0     9.88      8.54
SO SRCPARAM   COOL6       0.012    16.8      300.0     9.88      8.54
SO SRCPARAM   COOL7       0.012    16.8      300.0     9.88      8.54
SO SRCPARAM   COOL8       0.012    16.8      300.0     9.88      8.54
SO SRCPARAM   COOL9       0.012    16.8      300.0     9.88      8.54
SO SRCPARAM   COOL10      0.012    16.8      300.0     9.88      8.54
**
**
SO BUILDHGT LD6032A-LD7595A    24.38   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT LD6032A-LD7595A    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT LD6032A-LD7595A    29.26   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LD6032A-LD7595A    24.38   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT LD6032A-LD7595A    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT LD6032A-LD7595A    29.26   24.38   24.38   24.38   24.38   24.38
SO BUILDWID LD6032A-LD7595A    32.66   80.49   94.46  105.56  113.44  117.89
SO BUILDWID LD6032A-LD7595A   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID LD6032A-LD7595A   113.44   33.15   34.02   33.85   32.66   30.48
SO BUILDWID LD6032A-LD7595A    32.66   80.49   94.46  105.56  113.44  117.89
SO BUILDWID LD6032A-LD7595A   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID LD6032A-LD7595A   113.44   33.15   34.02   33.85   32.66   30.48
**
SO BUILDHGT LD6032B-LD7595B    24.38   24.38   29.26   29.26   29.26   29.26
SO BUILDHGT LD6032B-LD7595B    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT LD6032B-LD7595B    29.26   29.26   29.26   24.38   24.38   24.38
SO BUILDHGT LD6032B-LD7595B    24.38   24.38   29.26   29.26   29.26   29.26
SO BUILDHGT LD6032B-LD7595B    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT LD6032B-LD7595B    29.26   29.26   29.26   24.38   24.38   24.38
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SO BUILDWID LD6032B-LD7595B     32.66   33.85   94.46  105.56  113.44  117.89
SO BUILDWID LD6032B-LD7595B    118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID LD6032B-LD7595B    113.44  105.56   94.46   33.85   32.66   30.48
SO BUILDWID LD6032B-LD7595B     32.66   33.85   94.46  105.56  113.44  117.89
SO BUILDWID LD6032B-LD7595B    118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID LD6032B-LD7595B    113.44  105.56   94.46   33.85   32.66   30.48
**
SO BUILDHGT COOL1      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL1      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL1      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL1      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL1      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL1      13.72   29.26   29.26   29.26   29.26   24.38
SO BUILDWID COOL1      85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL1      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL1      72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL1      85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL1      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL1      72.51  105.56   94.46   80.49   64.08   85.34

SO BUILDHGT COOL2      24.38   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL2      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL2      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL2      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL2      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL2      13.72   13.72   29.26   29.26   29.26   24.38
SO BUILDWID COOL2      95.43   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL2      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL2      72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL2      85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL2      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL2      72.51   79.50   94.46   80.49   64.08   85.34

SO BUILDHGT COOL3      24.38   24.38   13.72   13.72   13.72   13.72
SO BUILDHGT COOL3      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL3      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL3      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL3      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL3      13.72   13.72   29.26   29.26   29.26   29.26
SO BUILDWID COOL3      95.43  102.61   84.07   79.50   72.51   63.32
SO BUILDWID COOL3      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL3      72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL3      85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL3      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL3      72.51   79.50   94.46   80.49   64.08   45.72

SO BUILDHGT COOL4      29.26   24.38   13.72   13.72   13.72   13.72
SO BUILDHGT COOL4      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL4      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL4      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL4      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL4      13.72   13.72   13.72   29.26   29.26   29.26
SO BUILDWID COOL4      64.08  102.61   84.07   79.50   72.51   63.32
SO BUILDWID COOL4      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL4      72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL4      85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL4      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL4      72.51   79.50   84.07   80.49   64.08   45.72

SO BUILDHGT COOL5      29.26   29.26   24.38   13.72   13.72   13.72
SO BUILDHGT COOL5      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL5      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL5      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL5      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL5      13.72   13.72   13.72   13.72   29.26   29.26
SO BUILDWID COOL5      64.08   80.49  106.68   79.50   72.51   63.32
SO BUILDWID COOL5      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL5      72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL5      85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL5      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL5      72.51   79.50   84.07   86.09   64.08   45.72
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SO BUILDHGT COOL6     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL6     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL6     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL6     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL6     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL6     13.72   29.26   29.26   29.26   29.26   24.38
SO BUILDWID COOL6     85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL6     52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL6     72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL6     85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL6     52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL6     72.51  105.56   94.46   80.49   64.08   85.34

SO BUILDHGT COOL7     24.38   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL7     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL7     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL7     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL7     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL7     13.72   13.72   29.26   29.26   29.26   24.38
SO BUILDWID COOL7     95.43   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL7     52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL7     72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL7     85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL7     52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL7     72.51   79.50   94.46   80.49   64.08   85.34

SO BUILDHGT COOL8     24.38   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL8     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL8     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL8     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL8     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL8     13.72   13.72   13.72   29.26   29.26   29.26
SO BUILDWID COOL8     95.43   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL8     52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL8     72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL8     85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL8     52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL8     72.51   79.50   84.07   80.49   64.08   45.72

SO BUILDHGT COOL9     29.26   24.38   13.72   13.72   13.72   13.72
SO BUILDHGT COOL9     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL9     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL9     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL9     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL9     13.72   13.72   13.72   29.26   29.26   29.26
SO BUILDWID COOL9     64.08  102.61   84.07   79.50   72.51   63.32
SO BUILDWID COOL9     52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL9     72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL9     85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL9     52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL9     72.51   79.50   84.07   80.49   64.08   45.72

SO BUILDHGT COOL10    29.26   29.26   13.72   13.72   13.72   13.72
SO BUILDHGT COOL10    13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL10    13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL10    13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL10    13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL10    13.72   13.72   13.72   13.72   29.26   29.26
SO BUILDWID COOL10    64.08   80.49   84.07   79.50   72.51   63.32
SO BUILDWID COOL10    52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL10    72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL10    85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL10    52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL10    72.51   79.50   84.07   86.09   64.08   45.72
**
SO EMISUNIT    .100000E+07 (GRAMS/SEC)          (MICROGRAMS/CUBIC-METER)
SO SRCGROUP COOL    COOL1-COOL10
SO SRCGROUP ALL

FINISHED

RE STARTING
RE GRIDPOLR POL STA
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RE GRIDPOLR POL ORIG  0.0   0.0
RE GRIDPOLR POL DIST  400 500 700 1000 1500 2000 2500 3000 4000 5000
RE GRIDPOLR POL DIST  7000 10000 12000 15000 20000 25000 30000
 E GRIDPOLR POL GDIR  36  10.00  10.00
.E GRIDPOLR POL END
RE DISCPOLR LD6095A       313.        10
RE DISCPOLR LD6095A       328.        20
RE DISCPOLR LD6095A       280.        30
RE DISCPOLR LD6095A       300.        30
RE DISCPOLR LD6095A       218.        40
RE DISCPOLR LD6095A       300.        40
RE DISCPOLR LD6095A       183.        50
RE DISCPOLR LD6095A       200.        50
RE DISCPOLR LD6095A       300.        50
RE DISCPOLR LD6095A       162.        60
RE DISCPOLR LD6095A       200.        60
RE DISCPOLR LD6095A       300.        60
RE DISCPOLR LD6095A       149.        70
RE DISCPOLR LD6095A       200.        70
RE DISCPOLR LD6095A       300.        70
RE DISCPOLR LD6095A       142.        80
RE DISCPOLR LD6095A       200.        80
RE DISCPOLR LD6095A       300.        80
RE DISCPOLR LD6095A       140.        90
RE DISCPOLR LD6095A       200.        90
RE DISCPOLR LD6095A       300.        90
RE DISCPOLR LD6095A       142.       100
RE DISCPOLR LD6095A       200.       100
RE DISCPOLR LD6095A       300.       100
RE DISCPOLR LD6095A       149.       110
RE DISCPOLR LD6095A       200.       110
RE DISCPOLR LD6095A       300.       110
RE DISCPOLR LD6095A       152.       120
RE DISCPOLR LD6095A       200.       120
RE DISCPOLR LD6095A       300.       120
RE DISCPOLR LD6095A       119.       130
RE DISCPOLR LD6095A       200.       130
 E DISCPOLR LD6095A       300.       130
RE DISCPOLR LD6095A        99.       140
RE DISCPOLR LD6095A       100.       140
RE DISCPOLR LD6095A       200.       140
RE DISCPOLR LD6095A       300.       140
RE DISCPOLR LD6095A        88.       150
RE DISCPOLR LD6095A       100.       150
RE DISCPOLR LD6095A       200.       150
RE DISCPOLR LD6095A       300.       150
RE DISCPOLR LD6095A        81.       160
RE DISCPOLR LD6095A       100.       160
RE DISCPOLR LD6095A       200.       160
RE DISCPOLR LD6095A       300.       160
RE DISCPOLR LD6095A        77.       170
RE DISCPOLR LD6095A       100.       170
RE DISCPOLR LD6095A       200.       170
RE DISCPOLR LD6095A       300.       170
RE DISCPOLR LD6095A        76.       180
RE DISCPOLR LD6095A       100.       180
RE DISCPOLR LD6095A       200.       180
RE DISCPOLR LD6095A       300.       180
RE DISCPOLR LD6095A        77.       190
RE DISCPOLR LD6095A       100.       190
RE DISCPOLR LD6095A       200.       190
RE DISCPOLR LD6095A       300.       190
RE DISCPOLR LD6095A        81.       200
RE DISCPOLR LD6095A       100.       200
RE DISCPOLR LD6095A       200.       200
RE DISCPOLR LD6095A       300.       200
RE DISCPOLR LD6095A        88.       210
RE DISCPOLR LD6095A       100.       210
RE DISCPOLR LD6095A       200.       210
RE DISCPOLR LD6095A       300.       210
RE DISCPOLR LD6095A        95.       220
RE DISCPOLR LD6095A       100.       220
RE DISCPOLR LD6095A       200.       220
RE DISCPOLR LD6095A       300.       220
RE DISCPOLR LD6095A        80.       230
RE DISCPOLR LD6095A       100.       230
RE DISCPOLR LD6095A       200.       230
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RE DISCPOLR LD6095A       300.       230
RE DISCPOLR LD6095A        70.       240
RE DISCPOLR LD6095A       100.       240
RE DISCPOLR LD6095A       200.       240
RE DISCPOLR LD6095A       300.       240
RE DISCPOLR LD6095A        65.       250
RE DISCPOLR LD6095A       100.       250
RE DISCPOLR LD6095A       200.       250
RE DISCPOLR LD6095A       300.       250
RE DISCPOLR LD6095A        62.       260
RE DISCPOLR LD6095A       100.       260
RE DISCPOLR LD6095A       200.       260
RE DISCPOLR LD6095A       300.       260
RE DISCPOLR LD6095A        61.       270
RE DISCPOLR LD6095A       100.       270
RE DISCPOLR LD6095A       200.       270
RE DISCPOLR LD6095A       300.       270
RE DISCPOLR LD6095A        62.       280
RE DISCPOLR LD6095A       100.       280
RE DISCPOLR LD6095A       200.       280
RE DISCPOLR LD6095A       300.       280
RE DISCPOLR LD6095A        65.       290
RE DISCPOLR LD6095A       100.       290
RE DISCPOLR LD6095A       200.       290
RE DISCPOLR LD6095A       300.       290
RE DISCPOLR LD6095A        70.       300
RE DISCPOLR LD6095A       100.       300
RE DISCPOLR LD6095A       200.       300
RE DISCPOLR LD6095A       300.       300
RE DISCPOLR LD6095A        80.       310
RE DISCPOLR LD6095A       100.       310
RE DISCPOLR LD6095A       200.       310
RE DISCPOLR LD6095A       300.       310
RE DISCPOLR LD6095A        95.       320
RE DISCPOLR LD6095A       100.       320
RE DISCPOLR LD6095A       200.       320
RE DISCPOLR LD6095A       300.       320
RE DISCPOLR LD6095A       122.       330
RE DISCPOLR LD6095A       200.       330
RE DISCPOLR LD6095A       300.       330
RE DISCPOLR LD6095A       178.       340
RE DISCPOLR LD6095A       200.       340
RE DISCPOLR LD6095A       300.       340
RE DISCPOLR LD6095A       313.       350
RE DISCPOLR LD6095A       308.       360
RE FINISHED
**
ME STARTING
ME INPUTFIL C:\MET\TPA87D.MET
ME ANEMHGHT    6.700 METERS
ME SURFDATA  12842  1987              TAMPA
ME UAIRDATA  12842  1987              RUSKIN
ME WINDCATS    1.54    3.09    5.14    8.23   10.80
ME FINISHED
**
OU STARTING
OU RECTABLE ALLAVE FIRST
OU FINISHED

***********************************
*** SETUP Finishes Successfully ***
***********************************

  *** ISCST3 - VERSION 99155 ***    *** 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE+COOLING TWR 3/08/00          ***        03/08
                                   *** NATURAL GAS, PM10, BASED ON 60% LOAD 95 DEG.F                      ***        22:00:
**MODELOPTs:                                                                                                        PAGE
CONC                       RURAL  FLAT          DFAULT                                                  NOCMPL

                                        ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Simple Terrain Model is Selected

 Model Is Setup For Calculation of Average CONCentration Values.

  --   SCAVENGING/DEPOSITION LOGIC --
**Model Uses NO DRY DEPLETION.  DDPLETE =  F
```

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**Model Uses NO WET DEPLETION.  WDPLETE =  F
**NO WET SCAVENGING Data Provided.
**NO GAS DRY DEPOSITION Data Provided.
 *Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

**Model Uses RURAL Dispersion.

**Model Uses Regulatory DEFAULT Options:
          1. Final Plume Rise.
          2. Stack-tip Downwash.
          3. Buoyancy-induced Dispersion.
          4. Use Calms Processing Routine.
          5. Not Use Missing Data Processing Routine.
          6. Default Wind Profile Exponents.
          7. Default Vertical Potential Temperature Gradients.
          8. "Upper Bound" Values for Supersquat Buildings.
          9. No Exponential Decay for RURAL Mode

**Model Assumes Receptors on FLAT Terrain.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:  24-HR
    and Calculates PERIOD Averages

**This Run Includes:    12 Source(s);      2 Source Group(s); and     729 Receptor(s)

**The Model Assumes A Pollutant Type of:  GEN

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of PERIOD Averages by Receptor
        Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Anem. Hgt. (m) =     6.70 ;    Decay Coef. =    0.000     ;    Rot. Angle =     0.0
                 Emission Units = (GRAMS/SEC)                                ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = (MICROGRAMS/CUBIC-METER)

**Approximate Storage Requirements of Model =     1.3 MB of RAM.

**Input Runstream File:          PMC2C.I87
**Output Print File:             PMC2C.O87
  *** ISCST3 - VERSION 99155 ***    *** 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE+COOLING TWR 3/08/00          ***        03/08
                                   *** NATURAL GAS, PM10, BASED ON 60% LOAD 95 DEG.F                      ***        22:00:
**MODELOPTs:                                                                                                       PAGE
CONC                      RURAL  FLAT          DFAULT                                                      NOCMPL


                                          *** POINT SOURCE DATA ***

                NUMBER EMISSION RATE                          BASE     STACK   STACK    STACK     STACK    BUILDING EMISSION RATE
   SOURCE        PART. (USER UNITS)      X         Y          ELEV.    HEIGHT  TEMP.   EXIT VEL. DIAMETER  EXISTS   SCALAR VARY
    ID           CATS.                 (METERS)  (METERS)   (METERS) (METERS) (DEG.K) (M/SEC)  (METERS)             BY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

   LD6095A       0   0.18100E+01      0.0       0.0        0.0      41.10   366.00    13.00     5.79      YES
   LD6095B       0   0.18100E+01      0.0      36.6        0.0      41.10   366.00    13.00     5.79      YES
   COOL1         0   0.12000E-01     10.7      189.0       0.0      16.80   300.00     9.88     8.54      YES
   COOL2         0   0.12000E-01     27.1      189.0       0.0      16.80   300.00     9.88     8.54      YES
   COOL3         0   0.12000E-01     43.6      189.0       0.0      16.80   300.00     9.88     8.54      YES
   COOL4         0   0.12000E-01     60.0      189.0       0.0      16.80   300.00     9.88     8.54      YES
   COOL5         0   0.12000E-01     76.5      189.0       0.0      16.80   300.00     9.88     8.54      YES
   COOL6         0   0.12000E-01     10.7      203.0       0.0      16.80   300.00     9.88     8.54      YES
   COOL7         0   0.12000E-01     27.1      203.0       0.0      16.80   300.00     9.88     8.54      YES
   COOL8         0   0.12000E-01     43.6      203.0       0.0      16.80   300.00     9.88     8.54      YES
   COOL9         0   0.12000E-01     60.0      203.0       0.0      16.80   300.00     9.88     8.54      YES
   COOL10        0   0.12000E-01     76.5      203.0       0.0      16.80   300.00     9.88     8.54      YES
  *** ISCST3 - VERSION 99155 ***    *** 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE+COOLING TWR 3/08/00          ***        03/08
                                   *** NATURAL GAS, PM10, BASED ON 60% LOAD 95 DEG.F                      ***        22:00:
**MODELOPTs:                                                                                                       PAGE
```

CONC RURAL FLAT DFAULT NOCMPL

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID SOURCE IDs

COOL COOL1 , COOL2 , COOL3 , COOL4 , COOL5 , COOL6 , COOL7 , COOL8 , COOL9 , COOL10 ,

ALL LD6095A , LD6095B , COOL1 , COOL2 , COOL3 , COOL4 , COOL5 , COOL6 , COOL7 , COOL8 , COOL9 , COOL

**MODELOPTs:
CONC RURAL FLAT DFAULT NOCMPL

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: LD6095A

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	24.4,	32.7,	0	2	29.3,	80.5,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	117
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	117
13	29.3,	113.4,	0	14	24.4,	33.2,	0	15	24.4,	34.0,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	30
19	24.4,	32.7,	0	20	29.3,	80.5,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	117
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	117
31	29.3,	113.4,	0	32	24.4,	33.2,	0	33	24.4,	34.0,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	30

SOURCE ID: LD6095B

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	24.4,	32.7,	0	2	24.4,	33.8,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	117
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	117
13	29.3,	113.4,	0	14	29.3,	105.6,	0	15	29.3,	94.5,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	30
19	24.4,	32.7,	0	20	24.4,	33.8,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	117
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	117
31	29.3,	113.4,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	30

SOURCE ID: COOL1

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	13.7,	85.5,	0	2	13.7,	86.1,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	24.4,	85

SOURCE ID: COOL2

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	24.4,	95.4,	0	2	13.7,	86.1,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	29.3,	94.5,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	24.4,	85

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE+COOLING TWR 3/08/00 *** 03/08
*** NATURAL GAS, PM10, BASED ON 60% LOAD 95 DEG.F *** 22:00:
PAGE
**MODELOPTs:
CONC RURAL FLAT DFAULT NOCMPL

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: COOL3

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	24.4,	95.4,	0	2	24.4,	102.6,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63

13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	29.3,	94.5,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	29.3,	45

SOURCE ID: COOL4

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	29.3,	64.1,	0	2	24.4,	102.6,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	13.7,	84.1,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	29.3,	45

SOURCE ID: COOL5

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	29.3,	64.1,	0	2	29.3,	80.5,	0	3	24.4,	106.7,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	13.7,	84.1,	0	34	13.7,	86.1,	0	35	29.3,	64.1,	0	36	29.3,	45

SOURCE ID: COOL6

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	13.7,	85.5,	0	2	13.7,	86.1,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	24.4,	85

**MODELOPTs:
CONC RURAL FLAT DFAULT NOCMPL

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: COOL7

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	24.4,	95.4,	0	2	13.7,	86.1,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	29.3,	94.5,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	24.4,	85

SOURCE ID: COOL8

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	24.4,	95.4,	0	2	13.7,	86.1,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	13.7,	84.1,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	29.3,	45

SOURCE ID: COOL9

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	29.3,	64.1,	0	2	24.4,	102.6,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	13.7,	84.1,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	29.3,	45

SOURCE ID: COOL10

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	29.3,	64.1,	0	2	29.3,	80.5,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	13.7,	84.1,	0	34	13.7,	86.1,	0	35	29.3,	64.1,	0	36	29.3,	45

**MODELOPTs:
CONC RURAL FLAT DFAULT NOCMPL

*** GRIDDED RECEPTOR NETWORK SUMMARY ***

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

*** ORIGIN FOR POLAR NETWORK ***
X-ORIG = 0.00 ; Y-ORIG = 0.00 (METERS)

*** DISTANCE RANGES OF NETWORK ***
(METERS)

400.0, 500.0, 700.0, 1000.0, 1500.0, 2000.0, 2500.0, 3000.0, 4000.0, 5000.0,
7000.0, 10000.0, 12000.0, 15000.0, 20000.0, 25000.0, 30000.0,

*** DIRECTION RADIALS OF NETWORK ***
(DEGREES)

10.0, 20.0, 30.0, 40.0, 50.0, 60.0, 70.0, 80.0, 90.0, 100.0,
110.0, 120.0, 130.0, 140.0, 150.0, 160.0, 170.0, 180.0, 190.0, 200.0,
210.0, 220.0, 230.0, 240.0, 250.0, 260.0, 270.0, 280.0, 290.0, 300.0,
310.0, 320.0, 330.0, 340.0, 350.0, 360.0,

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE+COOLING TWR 3/08/00 *** 03/08
*** NATURAL GAS, PM10, BASED ON 60% LOAD 95 DEG.F *** 22:00:
PAGE
**MODELOPTs:
CONC RURAL FLAT DFAULT NOCMPL

*** DISCRETE POLAR RECEPTORS ***
ORIGIN: (DIST, DIR, ZELEV, ZFLAG)
SRCID: (METERS,DEG,METERS,METERS)

LD6095A : (	313.0,	10.0,	0.0,	0.0);	LD6095A : (	328.0,	20.0,	0.0,	0.0);
LD6095A : (	280.0,	30.0,	0.0,	0.0);	LD6095A : (	300.0,	30.0,	0.0,	0.0);
LD6095A : (	218.0,	40.0,	0.0,	0.0);	LD6095A : (	300.0,	40.0,	0.0,	0.0);
LD6095A : (	183.0,	50.0,	0.0,	0.0);	LD6095A : (	200.0,	50.0,	0.0,	0.0);
LD6095A : (	300.0,	50.0,	0.0,	0.0);	LD6095A : (	162.0,	60.0,	0.0,	0.0);
LD6095A : (	200.0,	60.0,	0.0,	0.0);	LD6095A : (	300.0,	60.0,	0.0,	0.0);
LD6095A : (	149.0,	70.0,	0.0,	0.0);	LD6095A : (	200.0,	70.0,	0.0,	0.0);
LD6095A : (	300.0,	70.0,	0.0,	0.0);	LD6095A : (	142.0,	80.0,	0.0,	0.0);
LD6095A : (	200.0,	80.0,	0.0,	0.0);	LD6095A : (	300.0,	80.0,	0.0,	0.0);
LD6095A : (	140.0,	90.0,	0.0,	0.0);	LD6095A : (	200.0,	90.0,	0.0,	0.0);
LD6095A : (	300.0,	90.0,	0.0,	0.0);	LD6095A : (	142.0,	100.0,	0.0,	0.0);
LD6095A : (	200.0,	100.0,	0.0,	0.0);	LD6095A : (	300.0,	100.0,	0.0,	0.0);
LD6095A : (	149.0,	110.0,	0.0,	0.0);	LD6095A : (	200.0,	110.0,	0.0,	0.0);
LD6095A : (	300.0,	110.0,	0.0,	0.0);	LD6095A : (	152.0,	120.0,	0.0,	0.0);
LD6095A : (	200.0,	120.0,	0.0,	0.0);	LD6095A : (	300.0,	120.0,	0.0,	0.0);
LD6095A : (	119.0,	130.0,	0.0,	0.0);	LD6095A : (	200.0,	130.0,	0.0,	0.0);
LD6095A : (	300.0,	130.0,	0.0,	0.0);	LD6095A : (	99.0,	140.0,	0.0,	0.0);
LD6095A : (	100.0,	140.0,	0.0,	0.0);	LD6095A : (	200.0,	140.0,	0.0,	0.0);
LD6095A : (	300.0,	140.0,	0.0,	0.0);	LD6095A : (	88.0,	150.0,	0.0,	0.0);
LD6095A : (	100.0,	150.0,	0.0,	0.0);	LD6095A : (	200.0,	150.0,	0.0,	0.0);
LD6095A : (	300.0,	150.0,	0.0,	0.0);	LD6095A : (	81.0,	160.0,	0.0,	0.0);
LD6095A : (	100.0,	160.0,	0.0,	0.0);	LD6095A : (	200.0,	160.0,	0.0,	0.0);
LD6095A : (	300.0,	160.0,	0.0,	0.0);	LD6095A : (	77.0,	170.0,	0.0,	0.0);
LD6095A : (	100.0,	170.0,	0.0,	0.0);	LD6095A : (	200.0,	170.0,	0.0,	0.0);
LD6095A : (	300.0,	170.0,	0.0,	0.0);	LD6095A : (	76.0,	180.0,	0.0,	0.0);
LD6095A : (	100.0,	180.0,	0.0,	0.0);	LD6095A : (	200.0,	180.0,	0.0,	0.0);
LD6095A : (	300.0,	180.0,	0.0,	0.0);	LD6095A : (	77.0,	190.0,	0.0,	0.0);
LD6095A : (	100.0,	190.0,	0.0,	0.0);	LD6095A : (	200.0,	190.0,	0.0,	0.0);

```
   LD6095A : (    300.0,     190.0,       0.0,       0.0);          LD6095A : (     81.0,     200.0,       0.0,       0.0);
   LD6095A : (    100.0,     200.0,       0.0,       0.0);          LD6095A : (    200.0,     200.0,       0.0,       0.0);
   LD6095A : (    300.0,     200.0,       0.0,       0.0);          LD6095A : (     88.0,     210.0,       0.0,       0.0);
   LD6095A : (    100.0,     210.0,       0.0,       0.0);          LD6095A : (    200.0,     210.0,       0.0,       0.0);
   LD6095A : (    300.0,     210.0,       0.0,       0.0);          LD6095A : (     95.0,     220.0,       0.0,       0.0);
   LD6095A : (    100.0,     220.0,       0.0,       0.0);          LD6095A : (    200.0,     220.0,       0.0,       0.0);
   LD6095A : (    300.0,     220.0,       0.0,       0.0);          LD6095A : (     80.0,     230.0,       0.0,       0.0);
   LD6095A : (    100.0,     230.0,       0.0,       0.0);          LD6095A : (    200.0,     230.0,       0.0,       0.0);
   LD6095A : (    300.0,     230.0,       0.0,       0.0);          LD6095A : (     70.0,     240.0,       0.0,       0.0);
   LD6095A : (    100.0,     240.0,       0.0,       0.0);          LD6095A : (    200.0,     240.0,       0.0,       0.0);
   LD6095A : (    300.0,     240.0,       0.0,       0.0);          LD6095A : (     65.0,     250.0,       0.0,       0.0);
   LD6095A : (    100.0,     250.0,       0.0,       0.0);          LD6095A : (    200.0,     250.0,       0.0,       0.0);
   LD6095A : (    300.0,     250.0,       0.0,       0.0);          LD6095A : (     62.0,     260.0,       0.0,       0.0);
   LD6095A : (    100.0,     260.0,       0.0,       0.0);          LD6095A : (    200.0,     260.0,       0.0,       0.0);
   LD6095A : (    300.0,     260.0,       0.0,       0.0);          LD6095A : (     61.0,     270.0,       0.0,       0.0);
   LD6095A : (    100.0,     270.0,       0.0,       0.0);          LD6095A : (    200.0,     270.0,       0.0,       0.0);
   LD6095A : (    300.0,     270.0,       0.0,       0.0);          LD6095A : (     62.0,     280.0,       0.0,       0.0);
 *** ISCST3 - VERSION 99155 ***     *** 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE+COOLING TWR 3/08/00                  ***      03/08
                                   *** NATURAL GAS, PM10, BASED ON 60% LOAD 95 DEG.F                              ***      22:00:
**MODELOPTs:                                                                                                              PAGE
CONC                       RURAL   FLAT          DFAULT                                                                NOCMPL

                                   *** DISCRETE POLAR RECEPTORS ***
                                   ORIGIN: (DIST, DIR, ZELEV, ZFLAG)
                                   SRCID: (METERS,DEG,METERS,METERS)

   LD6095A : (    100.0,     280.0,       0.0,       0.0);          LD6095A : (    200.0,     280.0,       0.0,       0.0);
   LD6095A : (    300.0,     280.0,       0.0,       0.0);          LD6095A : (     65.0,     290.0,       0.0,       0.0);
   LD6095A : (    100.0,     290.0,       0.0,       0.0);          LD6095A : (    200.0,     290.0,       0.0,       0.0);
   LD6095A : (    300.0,     290.0,       0.0,       0.0);          LD6095A : (     70.0,     300.0,       0.0,       0.0);
   LD6095A : (    100.0,     300.0,       0.0,       0.0);          LD6095A : (    200.0,     300.0,       0.0,       0.0);
   LD6095A : (    300.0,     300.0,       0.0,       0.0);          LD6095A : (     80.0,     310.0,       0.0,       0.0);
   LD6095A : (    100.0,     310.0,       0.0,       0.0);          LD6095A : (    200.0,     310.0,       0.0,       0.0);
   LD6095A : (    300.0,     310.0,       0.0,       0.0);          LD6095A : (     95.0,     320.0,       0.0,       0.0);
   LD6095A : (    100.0,     320.0,       0.0,       0.0);          LD6095A : (    200.0,     320.0,       0.0,       0.0);
   LD6095A : (    300.0,     320.0,       0.0,       0.0);          LD6095A : (    122.0,     330.0,       0.0,       0.0);
   LD6095A : (    200.0,     330.0,       0.0,       0.0);          LD6095A : (    300.0,     330.0,       0.0,       0.0);
   LD6095A : (    178.0,     340.0,       0.0,       0.0);          LD6095A : (    200.0,     340.0,       0.0,       0.0);
   LD6095A : (    300.0,     340.0,       0.0,       0.0);          LD6095A : (    313.0,     350.0,       0.0,       0.0);
   LD6095A : (    308.0,     360.0,       0.0,       0.0);
 *** ISCST3 - VERSION 99155 ***     *** 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE+COOLING TWR 3/08/00                  ***      03/08
                                   *** NATURAL GAS, PM10, BASED ON 60% LOAD 95 DEG.F                              ***      22:00:
**MODELOPTs:                                                                                                              PAGE
CONC                       RURAL   FLAT          DFAULT                                                                NOCMPL

                 * SOURCE-RECEPTOR COMBINATIONS FOR WHICH CALCULATIONS MAY NOT BE PERFORMED *
                      LESS THAN 1.0 METER OR 3*ZLB IN DISTANCE, OR WITHIN OPEN PIT SOURCE

                                SOURCE          - - RECEPTOR LOCATION - -          DISTANCE
                                  ID          XR (METERS)    YR (METERS)          (METERS)
                                - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

                                LD6095A            -27.7          -76.1             81.00
                                LD6095A            -61.3          -51.4             80.00
                                LD6095A            -60.6          -35.0             70.00
                                LD6095A            -61.1          -22.2             65.00
                                LD6095A            -61.1          -10.8             62.00
                                LD6095A            -61.0            0.0             61.00
                                LD6095A            -61.1           10.8             62.00
                                LD6095A            -61.1           22.2             65.00
                                LD6095A            -60.6           35.0             70.00
                                LD6095A            -61.3           51.4             80.00
                                LD6095B            -61.1          -22.2             84.81
                                LD6095B            -61.1          -10.8             77.28
                                LD6095B            -61.0            0.0             71.14
                                LD6095B            -61.1           10.8             66.30
                                LD6095B            -61.1           22.2             62.75
                                LD6095B            -60.6           35.0             60.64
                                LD6095B            -86.6           50.0             87.63
                                LD6095B            -61.3           51.4             63.05
                                LD6095B            -76.6           64.3             81.45
                                LD6095B            -61.1           72.8             70.98
                                LD6095B            -64.3           76.6             75.71
 *** ISCST3 - VERSION 99155 ***     *** 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE+COOLING TWR 3/08/00                  ***      03/08
                                   *** NATURAL GAS, PM10, BASED ON 60% LOAD 95 DEG.F                              ***      22:00:
```

**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY	WIND SPEED CATEGORY					
CATEGORY	1	2	3	4	5	6
A	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
B	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
C	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
D	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
E	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00
F	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY	WIND SPEED CATEGORY					
CATEGORY	1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE+COOLING TWR 3/08/00 *** 03/08
*** NATURAL GAS, PM10, BASED ON 60% LOAD 95 DEG.F *** 22:00:
**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

FILE: C:\MET\TPA87D.MET
FORMAT: (4I2,2F9.4,F6.1,I2,2F7.1,f9.4,f10.1,f8.4,i4,f7.2)
SURFACE STATION NO.: 12842 UPPER AIR STATION NO.: 12842
NAME: TAMPA NAME: RUSKIN
YEAR: 1987 YEAR: 1987

YR	MN	DY	HR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-0 (M)	IPCODE	PRATE (mm/HR)
87	01	01	01	341.0	6.17	293.7	4	598.7	598.7	0.0000	0.0	0.0000	0	0.00
87	01	01	02	358.0	4.12	293.2	5	651.8	1306.0	0.0000	0.0	0.0000	0	0.00
[illegible]	01	01	03	34.0	6.17	293.2	4	704.8	704.8	0.0000	0.0	0.0000	0	0.00
[illegible]	01	01	04	73.0	6.69	291.5	4	757.8	757.8	0.0000	0.0	0.0000	0	0.00
87	01	01	05	83.0	7.20	290.9	4	810.8	810.8	0.0000	0.0	0.0000	0	0.00
87	01	01	06	102.0	7.20	290.4	4	863.8	863.8	0.0000	0.0	0.0000	0	0.00
87	01	01	07	105.0	6.69	289.3	4	916.9	916.9	0.0000	0.0	0.0000	0	0.00
87	01	01	08	113.0	7.72	288.7	4	969.9	969.9	0.0000	0.0	0.0000	0	0.00

87 01 01 09	107.0	6.17	288.2	4	1022.9	1022.9	0.0000	0.0	0.0000	0	0.00
87 01 01 10	121.0	6.17	288.2	4	1075.9	1075.9	0.0000	0.0	0.0000	0	0.00
87 01 01 11	114.0	6.69	287.6	4	1128.9	1128.9	0.0000	0.0	0.0000	0	0.00
87 01 01 12	116.0	6.17	287.0	4	1182.0	1182.0	0.0000	0.0	0.0000	0	0.00
87 01 01 13	133.0	7.20	287.6	4	1235.0	1235.0	0.0000	0.0	0.0000	0	0.00
87 01 01 14	119.0	7.72	287.6	4	1288.0	1288.0	0.0000	0.0	0.0000	0	0.00
87 01 01 15	132.0	7.20	288.2	4	1288.0	1288.0	0.0000	0.0	0.0000	0	0.00
87 01 01 16	134.0	7.72	289.3	4	1288.0	1288.0	0.0000	0.0	0.0000	0	0.00
87 01 01 17	141.0	7.20	288.2	4	1288.0	1288.0	0.0000	0.0	0.0000	0	0.00
87 01 01 18	137.0	5.14	287.6	5	1286.4	1238.1	0.0000	0.0	0.0000	0	0.00
87 01 01 19	144.0	3.60	286.5	5	1281.2	1078.6	0.0000	0.0	0.0000	0	0.00
87 01 01 20	117.0	2.06	285.4	6	1276.0	919.0	0.0000	0.0	0.0000	0	0.00
87 01 01 21	110.0	1.54	284.8	7	1270.9	759.5	0.0000	0.0	0.0000	0	0.00
87 01 01 22	112.0	0.00	283.7	7	1265.7	600.0	0.0000	0.0	0.0000	0	0.00
87 01 01 23	120.0	2.57	283.7	6	1260.5	440.5	0.0000	0.0	0.0000	0	0.00
87 01 01 24	130.0	1.54	282.6	7	1255.4	281.0	0.0000	0.0	0.0000	0	0.00

*** NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.
FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE+COOLING TWR 3/08/00 *** 03/08
*** NATURAL GAS, PM10, BASED ON 60% LOAD 95 DEG.F *** 22:00:

**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** THE SUMMARY OF MAXIMUM PERIOD (8760 HRS) RESULTS ***

** CONC OF GEN IN (MICROGRAMS/CUBIC-METER) **

GROUP ID	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
COOL	1ST HIGHEST VALUE IS	0.08600 AT (54.35, 308.24, 0.00, 0.00)	DP	NA
	2ND HIGHEST VALUE IS	0.07714 AT (0.00, 308.00, 0.00, 0.00)	DP	NA
	3RD HIGHEST VALUE IS	0.05428 AT (0.00, 400.00, 0.00, 0.00)	GP	POL
	4TH HIGHEST VALUE IS	0.05236 AT (69.46, 393.92, 0.00, 0.00)	GP	POL
	5TH HIGHEST VALUE IS	0.04254 AT (-54.35, 308.24, 0.00, 0.00)	DP	NA
	6TH HIGHEST VALUE IS	0.04134 AT (0.00, 500.00, 0.00, 0.00)	GP	POL
	7TH HIGHEST VALUE IS	0.04129 AT (112.18, 308.22, 0.00, 0.00)	DP	NA
	8TH HIGHEST VALUE IS	0.03858 AT (-69.46, 393.92, 0.00, 0.00)	GP	POL
	9TH HIGHEST VALUE IS	0.03618 AT (86.82, 492.40, 0.00, 0.00)	GP	POL
	10TH HIGHEST VALUE IS	0.03378 AT (-86.82, 492.40, 0.00, 0.00)	GP	POL
ALL	1ST HIGHEST VALUE IS	0.10377 AT (54.35, 308.24, 0.00, 0.00)	DP	NA
	2ND HIGHEST VALUE IS	0.09631 AT (0.00, 308.00, 0.00, 0.00)	DP	NA
	3RD HIGHEST VALUE IS	0.07792 AT (2000.00, 0.00, 0.00, 0.00)	GP	POL
	4TH HIGHEST VALUE IS	0.07396 AT (1500.00, 0.00, 0.00, 0.00)	GP	POL
	5TH HIGHEST VALUE IS	0.07250 AT (2500.00, 0.00, 0.00, 0.00)	GP	POL
	6TH HIGHEST VALUE IS	0.07044 AT (-2598.08, -1500.00, 0.00, 0.00)	GP	POL
	7TH HIGHEST VALUE IS	0.06923 AT (-3464.10, -2000.00, 0.00, 0.00)	GP	POL
	8TH HIGHEST VALUE IS	0.06902 AT (-2819.08, -1026.06, 0.00, 0.00)	GP	POL
	9TH HIGHEST VALUE IS	0.06892 AT (-2165.06, -1250.00, 0.00, 0.00)	GP	POL
	10TH HIGHEST VALUE IS	0.06882 AT (1969.62, 347.30, 0.00, 0.00)	GP	POL

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE+COOLING TWR 3/08/00 *** 03/08
*** NATURAL GAS, PM10, BASED ON 60% LOAD 95 DEG.F *** 22:00:

**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF GEN IN (MICROGRAMS/CUBIC-METER) **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWOR GRID-I

```
COOL     HIGH  1ST HIGH VALUE IS      2.31081c ON 87011924: AT (     54.35,     308.24,     0.00,     0.00) DP      NA

ALL      HIGH  1ST HIGH VALUE IS      2.84694c ON 87011924: AT (     54.35,     308.24,     0.00,     0.00) DP      NA

* RECEPTOR TYPES:  GC = GRIDCART
                   GP = GRIDPOLR
                   DC = DISCCART
                   DP = DISCPOLR
                   BD = BOUNDARY
  *** ISCST3 - VERSION 99155 ***    *** 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE+COOLING TWR 3/08/00          ***        03/08
                                    *** NATURAL GAS, PM10, BASED ON 60% LOAD 95 DEG.F                      ***        22:00:
**MODELOPTs:                                                                                                        PAGE
CONC                      RURAL  FLAT         DFAULT                                                  NOCMPL

*** Message Summary : ISCST3 Model Execution ***

 --------- Summary of Total Messages --------

A Total of            0 Fatal Error Message(s)
A Total of            0 Warning Message(s)
A Total of          531 Informational Message(s)

A Total of          531 Calm Hours Identified


   ******** FATAL ERROR MESSAGES ********
            *** NONE ***


   ********   WARNING MESSAGES   ********
            *** NONE ***


   ************************************
   *** ISCST3 Finishes Successfully ***
   ************************************
```

ISCBOB3 RELEASE 98056

ISCST3 OUTPUT FILE NUMBER 1 :PMDBC2C.087
ISCST3 OUTPUT FILE NUMBER 2 :PMDBC2C.088
'SCST3 OUTPUT FILE NUMBER 3 :PMDBC2C.089
SCST3 OUTPUT FILE NUMBER 4 :PMDBC2C.090
ISCST3 OUTPUT FILE NUMBER 5 :PMDBC2C.091
First title for last output file is: 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE + COOLING TWR 3/8/00
Second title for last output file is: NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING

AVERAGING TIME	YEAR	CONC (ug/m3)	DIR (deg) or X (m)	DIST (m) or Y (m)	PERIOD ENDING (YYMMDDHH)
SOURCE GROUP ID:	COOL				
Annual					
	1987	0.08600	10.	313.	87123124
	1988	0.15082	10.	313.	88123124
	1989	0.20724	10.	313.	89123124
	1990	0.13461	10.	313.	90123124
	1991	0.09750	10.	313.	91123124
HIGH 24-Hour					
	1987	2.31081	10.	313.	87011924
	1988	2.99178	10.	313.	88112724
	1989	3.39466	10.	313.	89060924
	1990	2.91614	10.	313.	90021024
	1991	2.29155	10.	313.	91030824
SOURCE GROUP ID:	ALL				
Annual					
	1987	0.09174	10.	313.	87123124
	1988	0.16606	10.	313.	88123124
	1989	0.22653	10.	313.	89123124
	1990	0.15272	10.	313.	90123124
	1991	0.12286	10.	313.	91123124
HIGH 24-Hour					
	1987	2.53003	10.	313.	87011924
	1988	3.73816	10.	313.	88112724
	1989	3.85074	10.	313.	89060924
	1990	3.75299	10.	313.	90021024
	1991	3.29366	10.	313.	91030824

All receptor computations reported with respect to a user-specified origin

GRID	0.00	0.00
DISCRETE	0.00	0.00

```
CO STARTING
CO TITLEONE 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE + COOLING TWR  3/8/00
CO TITLETWO NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING
CO MODELOPT DFAULT CONC   RURAL NOCMPL
CO AVERTIME  PERIOD 24
CO POLLUTID GEN
CO DCAYCOEF    .000000
CO RUNORNOT RUN
CO FINISHED

SO STARTING

** Source Location Cards:
**          SRCID SRCTYP        XS            YS            ZS
** MODELING ORIGIN HRSG NO.1 STACK LOCATION
** LOCATION IS USED FOR POLAR DISCRETE RECEPTORS.
**  HRSG STACK NUMBER CODE
** ------------------------
**  A -  HRSG NO. 1
**  B -  HRSG NO. 2
** Source Location Cards:
**          SRCID SRCTYP      XS        YS        ZS
**   UTM                     (m)       (m)       (m)
**
SO LOCATION  BSPD95A  POINT    0.00     0.0       0.0
SO LOCATION  BSPD95B  POINT    0.00    36.6       0.0
**
SO LOCATION  COOL1    POINT   10.70   189.0       0.0
SO LOCATION  COOL2    POINT   27.10   189.0       0.0
SO LOCATION  COOL3    POINT   43.60   189.0       0.0
SO LOCATION  COOL4    POINT   60.00   189.0       0.0
SO LOCATION  COOL5    POINT   76.50   189.0       0.0
SO LOCATION  COOL6    POINT   10.70   203.0       0.0
SO LOCATION  COOL7    POINT   27.10   203.0       0.0
SO LOCATION  COOL8    POINT   43.60   203.0       0.0
SO LOCATION  COOL9    POINT   60.00   203.0       0.0
SO LOCATION  COOL10   POINT   76.50   203.0       0.0

** Source Parameter Cards:
** POINT:   SRCID          QS        HS        TS        VS        DS
**                        (g/s)      (m)       (K)      (m/s)      (m)
**
SO SRCPARAM   BSPD95A    2.830     41.1      366.0      18.3      5.79
SO SRCPARAM   BSPD95B    2.830     41.1      366.0      18.3      5.79
**
SO SRCPARAM   COOL1      0.012     16.8      300.0      9.88      8.54
SO SRCPARAM   COOL2      0.012     16.8      300.0      9.88      8.54
SO SRCPARAM   COOL3      0.012     16.8      300.0      9.88      8.54
SO SRCPARAM   COOL4      0.012     16.8      300.0      9.88      8.54
SO SRCPARAM   COOL5      0.012     16.8      300.0      9.88      8.54
SO SRCPARAM   COOL6      0.012     16.8      300.0      9.88      8.54
SO SRCPARAM   COOL7      0.012     16.8      300.0      9.88      8.54
SO SRCPARAM   COOL8      0.012     16.8      300.0      9.88      8.54
SO SRCPARAM   COOL9      0.012     16.8      300.0      9.88      8.54
SO SRCPARAM   COOL10     0.012     16.8      300.0      9.88      8.54
**
**
SO BUILDHGT BSPD32A-BSPD95A    24.38   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32A-BSPD95A    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32A-BSPD95A    29.26   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT BSPD32A-BSPD95A    24.38   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32A-BSPD95A    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32A-BSPD95A    29.26   24.38   24.38   24.38   24.38   24.38
SO BUILDWID BSPD32A-BSPD95A    32.66   80.49   94.46  105.56  113.44  117.89
SO BUILDWID BSPD32A-BSPD95A   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID BSPD32A-BSPD95A   113.44   33.15   34.02   33.85   32.66   30.48
SO BUILDWID BSPD32A-BSPD95A    32.66   80.49   94.46  105.56  113.44  117.89
SO BUILDWID BSPD32A-BSPD95A   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID BSPD32A-BSPD95A   113.44   33.15   34.02   33.85   32.66   30.48
**
SO BUILDHGT BSPD32B-BSPD95B    24.38   24.38   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32B-BSPD95B    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32B-BSPD95B    29.26   29.26   29.26   24.38   24.38   24.38
SO BUILDHGT BSPD32B-BSPD95B    24.38   24.38   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32B-BSPD95B    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32B-BSPD95B    29.26   29.26   29.26   24.38   24.38   24.38
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SO BUILDWID BSPD32B-BSPD95B     32.66   33.85   94.46  105.56  113.44  117.89
SO BUILDWID BSPD32B-BSPD95B    118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID BSPD32B-BSPD95B    113.44  105.56   94.46   33.85   32.66   30.48
SO BUILDWID BSPD32B-BSPD95B     32.66   33.85   94.46  105.56  113.44  117.89
SO BUILDWID BSPD32B-BSPD95B    118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID BSPD32B-BSPD95B    113.44  105.56   94.46   33.85   32.66   30.48
**
SO BUILDHGT COOL1       13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL1       13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL1       13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL1       13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL1       13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL1       13.72   29.26   29.26   29.26   29.26   24.38
SO BUILDWID COOL1       85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL1       52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL1       72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL1       85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL1       52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL1       72.51  105.56   94.46   80.49   64.08   85.34

SO BUILDHGT COOL2       24.38   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL2       13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL2       13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL2       13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL2       13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL2       13.72   13.72   29.26   29.26   29.26   24.38
SO BUILDWID COOL2       95.43   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL2       52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL2       72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL2       85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL2       52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL2       72.51   79.50   94.46   80.49   64.08   85.34

SO BUILDHGT COOL3       24.38   24.38   13.72   13.72   13.72   13.72
SO BUILDHGT COOL3       13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL3       13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL3       13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL3       13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL3       13.72   13.72   29.26   29.26   29.26   29.26
SO BUILDWID COOL3       95.43  102.61   84.07   79.50   72.51   63.32
SO BUILDWID COOL3       52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL3       72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL3       85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL3       52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL3       72.51   79.50   94.46   80.49   64.08   45.72

SO BUILDHGT COOL4       29.26   24.38   13.72   13.72   13.72   13.72
SO BUILDHGT COOL4       13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL4       13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL4       13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL4       13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL4       13.72   13.72   13.72   29.26   29.26   29.26
SO BUILDWID COOL4       64.08  102.61   84.07   79.50   72.51   63.32
SO BUILDWID COOL4       52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL4       72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL4       85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL4       52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL4       72.51   79.50   84.07   80.49   64.08   45.72

SO BUILDHGT COOL5       29.26   29.26   24.38   13.72   13.72   13.72
SO BUILDHGT COOL5       13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL5       13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL5       13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL5       13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL5       13.72   13.72   13.72   13.72   29.26   29.26
SO BUILDWID COOL5       64.08   80.49  106.68   79.50   72.51   63.32
SO BUILDWID COOL5       52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL5       72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL5       85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL5       52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL5       72.51   79.50   84.07   86.09   64.08   45.72
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SO BUILDHGT COOL6     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL6     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL6     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL6     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL6     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL6     13.72   29.26   29.26   29.26   29.26   24.38
SO BUILDWID COOL6     85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL6     52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL6     72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL6     85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL6     52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL6     72.51  105.56   94.46   80.49   64.08   85.34

SO BUILDHGT COOL7     24.38   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL7     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL7     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL7     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL7     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL7     13.72   13.72   29.26   29.26   29.26   24.38
SO BUILDWID COOL7     95.43   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL7     52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL7     72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL7     85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL7     52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL7     72.51   79.50   94.46   80.49   64.08   85.34

SO BUILDHGT COOL8     24.38   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL8     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL8     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL8     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL8     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL8     13.72   13.72   13.72   29.26   29.26   29.26
SO BUILDWID COOL8     95.43   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL8     52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL8     72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL8     85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL8     52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL8     72.51   79.50   84.07   80.49   64.08   45.72

SO BUILDHGT COOL9     29.26   24.38   13.72   13.72   13.72   13.72
SO BUILDHGT COOL9     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL9     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL9     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL9     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL9     13.72   13.72   13.72   29.26   29.26   29.26
SO BUILDWID COOL9     64.08  102.61   84.07   79.50   72.51   63.32
SO BUILDWID COOL9     52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL9     72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL9     85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL9     52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL9     72.51   79.50   84.07   80.49   64.08   45.72

SO BUILDHGT COOL10    29.26   29.26   13.72   13.72   13.72   13.72
SO BUILDHGT COOL10    13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL10    13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL10    13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL10    13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL10    13.72   13.72   13.72   13.72   29.26   29.26
SO BUILDWID COOL10    64.08   80.49   84.07   79.50   72.51   63.32
SO BUILDWID COOL10    52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL10    72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL10    85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL10    52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL10    72.51   79.50   84.07   86.09   64.08   45.72
**
SO EMISUNIT    .100000E+07 (GRAMS/SEC)          (MICROGRAMS/CUBIC-METER)
SO SRCGROUP COOL    COOL1-COOL10
SO SRCGROUP ALL

SO FINISHED

RE STARTING
RE GRIDPOLR POL STA
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RE GRIDPOLR POL ORIG  0.0   0.0
RE GRIDPOLR POL DIST  400 500 700 1000 1500 2000 2500 3000 4000 5000
RE GRIDPOLR POL DIST  7000 10000 12000 15000 20000 25000 30000
 E GRIDPOLR POL GDIR  36  10.00  10.00
XE GRIDPOLR POL END
RE DISCPOLR BSPD95A       313.        10
RE DISCPOLR BSPD95A       328.        20
RE DISCPOLR BSPD95A       280.        30
RE DISCPOLR BSPD95A       300.        30
RE DISCPOLR BSPD95A       218.        40
RE DISCPOLR BSPD95A       300.        40
RE DISCPOLR BSPD95A       183.        50
RE DISCPOLR BSPD95A       200.        50
RE DISCPOLR BSPD95A       300.        50
RE DISCPOLR BSPD95A       162.        60
RE DISCPOLR BSPD95A       200.        60
RE DISCPOLR BSPD95A       300.        60
RE DISCPOLR BSPD95A       149.        70
RE DISCPOLR BSPD95A       200.        70
RE DISCPOLR BSPD95A       300.        70
RE DISCPOLR BSPD95A       142.        80
RE DISCPOLR BSPD95A       200.        80
RE DISCPOLR BSPD95A       300.        80
RE DISCPOLR BSPD95A       140.        90
RE DISCPOLR BSPD95A       200.        90
RE DISCPOLR BSPD95A       300.        90
RE DISCPOLR BSPD95A       142.       100
RE DISCPOLR BSPD95A       200.       100
RE DISCPOLR BSPD95A       300.       100
RE DISCPOLR BSPD95A       149.       110
RE DISCPOLR BSPD95A       200.       110
RE DISCPOLR BSPD95A       300.       110
RE DISCPOLR BSPD95A       152.       120
RE DISCPOLR BSPD95A       200.       120
RE DISCPOLR BSPD95A       300.       120
RE DISCPOLR BSPD95A       119.       130
RE DISCPOLR BSPD95A       200.       130
 E DISCPOLR BSPD95A       300.       130
RE DISCPOLR BSPD95A        99.       140
RE DISCPOLR BSPD95A       100.       140
RE DISCPOLR BSPD95A       200.       140
RE DISCPOLR BSPD95A       300.       140
RE DISCPOLR BSPD95A        88.       150
RE DISCPOLR BSPD95A       100.       150
RE DISCPOLR BSPD95A       200.       150
RE DISCPOLR BSPD95A       300.       150
RE DISCPOLR BSPD95A        81.       160
RE DISCPOLR BSPD95A       100.       160
RE DISCPOLR BSPD95A       200.       160
RE DISCPOLR BSPD95A       300.       160
RE DISCPOLR BSPD95A        77.       170
RE DISCPOLR BSPD95A       100.       170
RE DISCPOLR BSPD95A       200.       170
RE DISCPOLR BSPD95A       300.       170
RE DISCPOLR BSPD95A        76.       180
RE DISCPOLR BSPD95A       100.       180
RE DISCPOLR BSPD95A       200.       180
RE DISCPOLR BSPD95A       300.       180
RE DISCPOLR BSPD95A        77.       190
RE DISCPOLR BSPD95A       100.       190
RE DISCPOLR BSPD95A       200.       190
RE DISCPOLR BSPD95A       300.       190
RE DISCPOLR BSPD95A        81.       200
RE DISCPOLR BSPD95A       100.       200
RE DISCPOLR BSPD95A       200.       200
RE DISCPOLR BSPD95A       300.       200
RE DISCPOLR BSPD95A        88.       210
RE DISCPOLR BSPD95A       100.       210
RE DISCPOLR BSPD95A       200.       210
RE DISCPOLR BSPD95A       300.       210
?E DISCPOLR BSPD95A        95.       220
 E DISCPOLR BSPD95A       100.       220
RE DISCPOLR BSPD95A       200.       220
RE DISCPOLR BSPD95A       300.       220
RE DISCPOLR BSPD95A        80.       230
RE DISCPOLR BSPD95A       100.       230
RE DISCPOLR BSPD95A       200.       230
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RE DISCPOLR BSPD95A       300.       230
RE DISCPOLR BSPD95A        70.       240
RE DISCPOLR BSPD95A       100.       240
RE DISCPOLR BSPD95A       200.       240
RE DISCPOLR BSPD95A       300.       240
RE DISCPOLR BSPD95A        65.       250
RE DISCPOLR BSPD95A       100.       250
RE DISCPOLR BSPD95A       200.       250
RE DISCPOLR BSPD95A       300.       250
RE DISCPOLR BSPD95A        62.       260
RE DISCPOLR BSPD95A       100.       260
RE DISCPOLR BSPD95A       200.       260
RE DISCPOLR BSPD95A       300.       260
RE DISCPOLR BSPD95A        61.       270
RE DISCPOLR BSPD95A       100.       270
RE DISCPOLR BSPD95A       200.       270
RE DISCPOLR BSPD95A       300.       270
RE DISCPOLR BSPD95A        62.       280
RE DISCPOLR BSPD95A       100.       280
RE DISCPOLR BSPD95A       200.       280
RE DISCPOLR BSPD95A       300.       280
RE DISCPOLR BSPD95A        65.       290
RE DISCPOLR BSPD95A       100.       290
RE DISCPOLR BSPD95A       200.       290
RE DISCPOLR BSPD95A       300.       290
RE DISCPOLR BSPD95A        70.       300
RE DISCPOLR BSPD95A       100.       300
RE DISCPOLR BSPD95A       200.       300
RE DISCPOLR BSPD95A       300.       300
RE DISCPOLR BSPD95A        80.       310
RE DISCPOLR BSPD95A       100.       310
RE DISCPOLR BSPD95A       200.       310
RE DISCPOLR BSPD95A       300.       310
RE DISCPOLR BSPD95A        95.       320
RE DISCPOLR BSPD95A       100.       320
RE DISCPOLR BSPD95A       200.       320
RE DISCPOLR BSPD95A       300.       320
RE DISCPOLR BSPD95A       122.       330
RE DISCPOLR BSPD95A       200.       330
RE DISCPOLR BSPD95A       300.       330
RE DISCPOLR BSPD95A       178.       340
RE DISCPOLR BSPD95A       200.       340
RE DISCPOLR BSPD95A       300.       340
RE DISCPOLR BSPD95A       313.       350
RE DISCPOLR BSPD95A       308.       360
RE FINISHED
**
ME STARTING
ME INPUTFIL C:\MET\TPA87D.MET
ME ANEMHGHT    6.700 METERS
ME SURFDATA  12842  1987            TAMPA
ME UAIRDATA  12842  1987            RUSKIN
ME WINDCATS    1.54    3.09    5.14    8.23   10.80
ME FINISHED
**
OU STARTING
OU RECTABLE ALLAVE FIRST
OU FINISHED

************************************
*** SETUP Finishes Successfully ***
************************************

  *** ISCST3 - VERSION 99155 ***    *** 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE + COOLING TWR  3/8/00        ***        03/08
                                   *** NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING     ***        17:43:
**MODELOPTs:                                                                                                      PAGE
CONC                      RURAL  FLAT         DFAULT                                                    NOCMPL

                                        ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Simple Terrain Model is Selected

**Model Is Setup For Calculation of Average CONCentration Values.

  -- SCAVENGING/DEPOSITION LOGIC --
**Model Uses NO DRY DEPLETION.  DDPLETE =  F
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**Model Uses NO WET DEPLETION.  WDPLETE =  F
**NO WET SCAVENGING Data Provided.
**NO GAS DRY DEPOSITION Data Provided.
**Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

**Model Uses RURAL Dispersion.

**Model Uses Regulatory DEFAULT Options:
          1. Final Plume Rise.
          2. Stack-tip Downwash.
          3. Buoyancy-induced Dispersion.
          4. Use Calms Processing Routine.
          5. Not Use Missing Data Processing Routine.
          6. Default Wind Profile Exponents.
          7. Default Vertical Potential Temperature Gradients.
          8. "Upper Bound" Values for Supersquat Buildings.
          9. No Exponential Decay for RURAL Mode

**Model Assumes Receptors on FLAT Terrain.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:  24-HR
    and Calculates PERIOD Averages

**This Run Includes:    12 Source(s);      2 Source Group(s); and     729 Receptor(s)

**The Model Assumes A Pollutant Type of:  GEN

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of PERIOD Averages by Receptor
        Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Anem. Hgt. (m) =     6.70 ;    Decay Coef. =    0.000     ;    Rot. Angle =     0.0
                 Emission Units = (GRAMS/SEC)                                ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = (MICROGRAMS/CUBIC-METER)

**Approximate Storage Requirements of Model =     1.3 MB of RAM.

**Input Runstream File:          PMDBC2C.I87
**Output Print File:             PMDBC2C.O87
  *** ISCST3 - VERSION 99155 ***    *** 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE + COOLING TWR  3/8/00          ***        03/08
                                    *** NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING       ***        17:43:
**MODELOPTs:                                                                                                          PAGE
CONC                        RURAL  FLAT          DFAULT                                                    NOCMPL
```

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (USER UNITS)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSION RATE SCALAR VARY BY
BSPD95A	0	0.28300E+01	0.0	0.0	0.0	41.10	366.00	18.30	5.79	YES	
BSPD95B	0	0.28300E+01	0.0	36.6	0.0	41.10	366.00	18.30	5.79	YES	
COOL1	0	0.12000E-01	10.7	189.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL2	0	0.12000E-01	27.1	189.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL3	0	0.12000E-01	43.6	189.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL4	0	0.12000E-01	60.0	189.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL5	0	0.12000E-01	76.5	189.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL6	0	0.12000E-01	10.7	203.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL7	0	0.12000E-01	27.1	203.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL8	0	0.12000E-01	43.6	203.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL9	0	0.12000E-01	60.0	203.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL10	0	0.12000E-01	76.5	203.0	0.0	16.80	300.00	9.88	8.54	YES	


```
  *** ISCST3 - VERSION 99155 ***    *** 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE + COOLING TWR  3/8/00          ***        03/08
                                    *** NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING       ***        17:43:
**MODELOPTs:                                                                                                          PAGE
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CONC RURAL FLAT DFAULT NOCMPL

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID SOURCE IDs

COOL COOL1 , COOL2 , COOL3 , COOL4 , COOL5 , COOL6 , COOL7 , COOL8 , COOL9 , COOL10 ,

ALL BSPD95A , BSPD95B , COOL1 , COOL2 , COOL3 , COOL4 , COOL5 , COOL6 , COOL7 , COOL8 , COOL9 , COOL

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: BSPD95A

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	24.4,	32.7,	0	2	29.3,	80.5,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	117
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	117
13	29.3,	113.4,	0	14	24.4,	33.2,	0	15	24.4,	34.0,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	30
19	24.4,	32.7,	0	20	29.3,	80.5,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	117
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	117
31	29.3,	113.4,	0	32	24.4,	33.2,	0	33	24.4,	34.0,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	30

SOURCE ID: BSPD95B

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	24.4,	32.7,	0	2	24.4,	33.8,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	117
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	117
13	29.3,	113.4,	0	14	29.3,	105.6,	0	15	29.3,	94.5,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	30
19	24.4,	32.7,	0	20	24.4,	33.8,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	117
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	117
31	29.3,	113.4,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	30

SOURCE ID: COOL1

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	13.7,	85.5,	0	2	13.7,	86.1,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	24.4,	85

SOURCE ID: COOL2

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	24.4,	95.4,	0	2	13.7,	86.1,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	29.3,	94.5,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	24.4,	85

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE + COOLING TWR 3/8/00 *** 03/08
*** NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING *** 17:43:
**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: COOL3

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	24.4,	95.4,	0	2	24.4,	102.6,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63

13	13.7,	72.5, 0	14	13.7,	79.5, 0	15	13.7,	84.1, 0	16	13.7,	86.1, 0	17	13.7,	85.5, 0	18	13.7,	82
19	13.7,	85.5, 0	20	13.7,	86.1, 0	21	13.7,	84.1, 0	22	13.7,	79.5, 0	23	13.7,	72.5, 0	24	13.7,	63
25	13.7,	52.2, 0	26	13.7,	39.5, 0	27	13.7,	25.6, 0	28	13.7,	39.5, 0	29	13.7,	52.2, 0	30	13.7,	63
31	13.7,	72.5, 0	32	13.7,	79.5, 0	33	29.3,	94.5, 0	34	29.3,	80.5, 0	35	29.3,	64.1, 0	36	29.3,	45

SOURCE ID: COOL4

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	29.3,	64.1,	0	2	24.4,	102.6,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	13.7,	84.1,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	29.3,	45

SOURCE ID: COOL5

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	29.3,	64.1,	0	2	29.3,	80.5,	0	3	24.4,	106.7,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	13.7,	84.1,	0	34	13.7,	86.1,	0	35	29.3,	64.1,	0	36	29.3,	45

SOURCE ID: COOL6

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	13.7,	85.5,	0	2	13.7,	86.1,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	24.4,	85

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE + COOLING TWR 3/8/00 *** 03/08
*** NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING *** 17:43:

**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: COOL7

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	24.4,	95.4,	0	2	13.7,	86.1,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	29.3,	94.5,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	24.4,	85

SOURCE ID: COOL8

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	24.4,	95.4,	0	2	13.7,	86.1,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	13.7,	84.1,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	29.3,	45

SOURCE ID: COOL9

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	29.3,	64.1,	0	2	24.4,	102.6,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	13.7,	84.1,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	29.3,	45

SOURCE ID: COOL10

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	29.3,	64.1,	0	2	29.3,	80.5,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	13.7,	84.1,	0	34	13.7,	86.1,	0	35	29.3,	64.1,	0	36	29.3,	45

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE + COOLING TWR 3/8/00 *** 03/08
*** NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING *** 17:43:
**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** GRIDDED RECEPTOR NETWORK SUMMARY ***

*** NETWORK ID: POL ; NETWORK TYPE: GRIDPOLR ***

*** ORIGIN FOR POLAR NETWORK ***
X-ORIG = 0.00 ; Y-ORIG = 0.00 (METERS)

*** DISTANCE RANGES OF NETWORK ***
(METERS)

400.0, 500.0, 700.0, 1000.0, 1500.0, 2000.0, 2500.0, 3000.0, 4000.0, 5000.0,
7000.0, 10000.0, 12000.0, 15000.0, 20000.0, 25000.0, 30000.0,

*** DIRECTION RADIALS OF NETWORK ***
(DEGREES)

10.0, 20.0, 30.0, 40.0, 50.0, 60.0, 70.0, 80.0, 90.0, 100.0,
110.0, 120.0, 130.0, 140.0, 150.0, 160.0, 170.0, 180.0, 190.0, 200.0,
210.0, 220.0, 230.0, 240.0, 250.0, 260.0, 270.0, 280.0, 290.0, 300.0,
310.0, 320.0, 330.0, 340.0, 350.0, 360.0,

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE + COOLING TWR 3/8/00 *** 03/08
*** NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING *** 17:43:
**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** DISCRETE POLAR RECEPTORS ***
ORIGIN: (DIST, DIR, ZELEV, ZFLAG)
SRCID: (METERS,DEG,METERS,METERS)

BSPD95A : (	313.0,	10.0,	0.0,	0.0);	BSPD95A : (	328.0,	20.0,	0.0,	0.0);
BSPD95A : (	280.0,	30.0,	0.0,	0.0);	BSPD95A : (	300.0,	30.0,	0.0,	0.0);
BSPD95A : (	218.0,	40.0,	0.0,	0.0);	BSPD95A : (	300.0,	40.0,	0.0,	0.0);
BSPD95A : (	183.0,	50.0,	0.0,	0.0);	BSPD95A : (	200.0,	50.0,	0.0,	0.0);
BSPD95A : (	300.0,	50.0,	0.0,	0.0);	BSPD95A : (	162.0,	60.0,	0.0,	0.0);
BSPD95A : (	200.0,	60.0,	0.0,	0.0);	BSPD95A : (	300.0,	60.0,	0.0,	0.0);
BSPD95A : (	149.0,	70.0,	0.0,	0.0);	BSPD95A : (	200.0,	70.0,	0.0,	0.0);
BSPD95A : (	300.0,	70.0,	0.0,	0.0);	BSPD95A : (	142.0,	80.0,	0.0,	0.0);
BSPD95A : (	200.0,	80.0,	0.0,	0.0);	BSPD95A : (	300.0,	80.0,	0.0,	0.0);
BSPD95A : (	140.0,	90.0,	0.0,	0.0);	BSPD95A : (	200.0,	90.0,	0.0,	0.0);
BSPD95A : (	300.0,	90.0,	0.0,	0.0);	BSPD95A : (	142.0,	100.0,	0.0,	0.0);
BSPD95A : (	200.0,	100.0,	0.0,	0.0);	BSPD95A : (	300.0,	100.0,	0.0,	0.0);
BSPD95A : (	149.0,	110.0,	0.0,	0.0);	BSPD95A : (	200.0,	110.0,	0.0,	0.0);
BSPD95A : (	300.0,	110.0,	0.0,	0.0);	BSPD95A : (	152.0,	120.0,	0.0,	0.0);
BSPD95A : (	200.0,	120.0,	0.0,	0.0);	BSPD95A : (	300.0,	120.0,	0.0,	0.0);
BSPD95A : (	119.0,	130.0,	0.0,	0.0);	BSPD95A : (	200.0,	130.0,	0.0,	0.0);
BSPD95A : (	300.0,	130.0,	0.0,	0.0);	BSPD95A : (	99.0,	140.0,	0.0,	0.0);
BSPD95A : (	100.0,	140.0,	0.0,	0.0);	BSPD95A : (	200.0,	140.0,	0.0,	0.0);
BSPD95A : (	300.0,	140.0,	0.0,	0.0);	BSPD95A : (	88.0,	150.0,	0.0,	0.0);
BSPD95A : (	100.0,	150.0,	0.0,	0.0);	BSPD95A : (	200.0,	150.0,	0.0,	0.0);
BSPD95A : (	300.0,	150.0,	0.0,	0.0);	BSPD95A : (	81.0,	160.0,	0.0,	0.0);
BSPD95A : (	100.0,	160.0,	0.0,	0.0);	BSPD95A : (	200.0,	160.0,	0.0,	0.0);
BSPD95A : (	300.0,	160.0,	0.0,	0.0);	BSPD95A : (	77.0,	170.0,	0.0,	0.0);
BSPD95A : (	100.0,	170.0,	0.0,	0.0);	BSPD95A : (	200.0,	170.0,	0.0,	0.0);
BSPD95A : (	300.0,	170.0,	0.0,	0.0);	BSPD95A : (	76.0,	180.0,	0.0,	0.0);
BSPD95A : (	100.0,	180.0,	0.0,	0.0);	BSPD95A : (	200.0,	180.0,	0.0,	0.0);
BSPD95A : (	300.0,	180.0,	0.0,	0.0);	BSPD95A : (	77.0,	190.0,	0.0,	0.0);
BSPD95A : (	100.0,	190.0,	0.0,	0.0);	BSPD95A : (	200.0,	190.0,	0.0,	0.0);

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   BSPD95A : (    300.0,     190.0,       0.0,       0.0);          BSPD95A : (     81.0,     200.0,       0.0,       0.0);
   BSPD95A : (    100.0,     200.0,       0.0,       0.0);          BSPD95A : (    200.0,     200.0,       0.0,       0.0);
   BSPD95A : (    300.0,     200.0,       0.0,       0.0);          BSPD95A : (     88.0,     210.0,       0.0,       0.0);
   BSPD95A : (    100.0,     210.0,       0.0,       0.0);          BSPD95A : (    200.0,     210.0,       0.0,       0.0);
   BSPD95A : (    300.0,     210.0,       0.0,       0.0);          BSPD95A : (     95.0,     220.0,       0.0,       0.0);
   BSPD95A : (    100.0,     220.0,       0.0,       0.0);          BSPD95A : (    200.0,     220.0,       0.0,       0.0);
   BSPD95A : (    300.0,     220.0,       0.0,       0.0);          BSPD95A : (     80.0,     230.0,       0.0,       0.0);
   BSPD95A : (    100.0,     230.0,       0.0,       0.0);          BSPD95A : (    200.0,     230.0,       0.0,       0.0);
   BSPD95A : (    300.0,     230.0,       0.0,       0.0);          BSPD95A : (     70.0,     240.0,       0.0,       0.0);
   BSPD95A : (    100.0,     240.0,       0.0,       0.0);          BSPD95A : (    200.0,     240.0,       0.0,       0.0);
   BSPD95A : (    300.0,     240.0,       0.0,       0.0);          BSPD95A : (     65.0,     250.0,       0.0,       0.0);
   BSPD95A : (    100.0,     250.0,       0.0,       0.0);          BSPD95A : (    200.0,     250.0,       0.0,       0.0);
   BSPD95A : (    300.0,     250.0,       0.0,       0.0);          BSPD95A : (     62.0,     260.0,       0.0,       0.0);
   BSPD95A : (    100.0,     260.0,       0.0,       0.0);          BSPD95A : (    200.0,     260.0,       0.0,       0.0);
   BSPD95A : (    300.0,     260.0,       0.0,       0.0);          BSPD95A : (     61.0,     270.0,       0.0,       0.0);
   BSPD95A : (    100.0,     270.0,       0.0,       0.0);          BSPD95A : (    200.0,     270.0,       0.0,       0.0);
   BSPD95A : (    300.0,     270.0,       0.0,       0.0);          BSPD95A : (     62.0,     280.0,       0.0,       0.0);
 *** ISCST3 - VERSION 99155 ***     *** 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE + COOLING TWR  3/8/00          ***      03/08
                                   *** NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING       ***      17:43:
**MODELOPTs:                                                                                                       PAGE
CONC                       RURAL  FLAT          DFAULT                                                    NOCMPL

                                   *** DISCRETE POLAR RECEPTORS ***
                                   ORIGIN: (DIST, DIR, ZELEV, ZFLAG)
                                   SRCID: (METERS,DEG,METERS,METERS)

   BSPD95A : (    100.0,     280.0,       0.0,       0.0);          BSPD95A : (    200.0,     280.0,       0.0,       0.0);
   BSPD95A : (    300.0,     280.0,       0.0,       0.0);          BSPD95A : (     65.0,     290.0,       0.0,       0.0);
   BSPD95A : (    100.0,     290.0,       0.0,       0.0);          BSPD95A : (    200.0,     290.0,       0.0,       0.0);
   BSPD95A : (    300.0,     290.0,       0.0,       0.0);          BSPD95A : (     70.0,     300.0,       0.0,       0.0);
   BSPD95A : (    100.0,     300.0,       0.0,       0.0);          BSPD95A : (    200.0,     300.0,       0.0,       0.0);
   BSPD95A : (    300.0,     300.0,       0.0,       0.0);          BSPD95A : (     80.0,     310.0,       0.0,       0.0);
   BSPD95A : (    100.0,     310.0,       0.0,       0.0);          BSPD95A : (    200.0,     310.0,       0.0,       0.0);
   BSPD95A : (    300.0,     310.0,       0.0,       0.0);          BSPD95A : (     95.0,     320.0,       0.0,       0.0);
   BSPD95A : (    100.0,     320.0,       0.0,       0.0);          BSPD95A : (    200.0,     320.0,       0.0,       0.0);
   BSPD95A : (    300.0,     320.0,       0.0,       0.0);          BSPD95A : (    122.0,     330.0,       0.0,       0.0);
   BSPD95A : (    200.0,     330.0,       0.0,       0.0);          BSPD95A : (    300.0,     330.0,       0.0,       0.0);
   BSPD95A : (    178.0,     340.0,       0.0,       0.0);          BSPD95A : (    200.0,     340.0,       0.0,       0.0);
   BSPD95A : (    300.0,     340.0,       0.0,       0.0);          BSPD95A : (    313.0,     350.0,       0.0,       0.0);
   BSPD95A : (    308.0,     360.0,       0.0,       0.0);
 *** ISCST3 - VERSION 99155 ***     *** 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE + COOLING TWR  3/8/00          ***      03/08
                                   *** NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING       ***      17:43:
**MODELOPTs:                                                                                                       PAGE
CONC                       RURAL  FLAT          DFAULT                                                    NOCMPL

                  * SOURCE-RECEPTOR COMBINATIONS FOR WHICH CALCULATIONS MAY NOT BE PERFORMED *
                      LESS THAN 1.0 METER OR 3*ZLB IN DISTANCE, OR WITHIN OPEN PIT SOURCE

                                SOURCE          - - RECEPTOR LOCATION - -          DISTANCE
                                  ID          XR (METERS)    YR (METERS)          (METERS)
                                - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

                                BSPD95A           -27.7          -76.1              81.00
                                BSPD95A           -61.3          -51.4              80.00
                                BSPD95A           -60.6          -35.0              70.00
                                BSPD95A           -61.1          -22.2              65.00
                                BSPD95A           -61.1          -10.8              62.00
                                BSPD95A           -61.0            0.0              61.00
                                BSPD95A           -61.1           10.8              62.00
                                BSPD95A           -61.1           22.2              65.00
                                BSPD95A           -60.6           35.0              70.00
                                BSPD95A           -61.3           51.4              80.00
                                BSPD95B           -61.1          -22.2              84.81
                                BSPD95B           -61.1          -10.8              77.28
                                BSPD95B           -61.0            0.0              71.14
                                BSPD95B           -61.1           10.8              66.30
                                BSPD95B           -61.1           22.2              62.75
                                BSPD95B           -60.6           35.0              60.64
                                BSPD95B           -86.6           50.0              87.63
                                BSPD95B           -61.3           51.4              63.05
                                BSPD95B           -76.6           64.3              81.45
                                BSPD95B           -61.1           72.8              70.98
                                BSPD95B           -64.3           76.6              75.71
 *** ISCST3 - VERSION 99155 ***     *** 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE + COOLING TWR  3/8/00          ***      03/08
                                   *** NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING       ***      17:43:
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**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
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NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
B	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
C	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
D	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
E	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00
F	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE + COOLING TWR 3/8/00 *** 03/08
*** NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING *** 17:43:
**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

FILE: C:\MET\TPA87D.MET
FORMAT: (4I2,2F9.4,F6.1,I2,2F7.1,f9.4,f10.1,f8.4,i4,f7.2)
SURFACE STATION NO.: 12842 UPPER AIR STATION NO.: 12842
NAME: TAMPA NAME: RUSKIN
YEAR: 1987 YEAR: 1987

YR	MN	DY	HR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-0 (M)	IPCODE	PRATE (mm/HR)
87	01	01	01	341.0	6.17	293.7	4	598.7	598.7	0.0000	0.0	0.0000	0	0.00
87	01	01	02	358.0	4.12	293.2	5	651.8	1306.0	0.0000	0.0	0.0000	0	0.00
[illegible]	01	01	03	34.0	6.17	293.2	4	704.8	704.8	0.0000	0.0	0.0000	0	0.00
[illegible]	01	01	04	73.0	6.69	291.5	4	757.8	757.8	0.0000	0.0	0.0000	0	0.00
[illegible]	01	01	05	83.0	7.20	290.9	4	810.8	810.8	0.0000	0.0	0.0000	0	0.00
87	01	01	06	102.0	7.20	290.4	4	863.8	863.8	0.0000	0.0	0.0000	0	0.00
87	01	01	07	105.0	6.69	289.3	4	916.9	916.9	0.0000	0.0	0.0000	0	0.00
87	01	01	08	113.0	7.72	288.7	4	969.9	969.9	0.0000	0.0	0.0000	0	0.00

87 01 01 09	107.0	6.17	288.2	4	1022.9	1022.9	0.0000	0.0	0.0000	0	0.00
87 01 01 10	121.0	6.17	288.2	4	1075.9	1075.9	0.0000	0.0	0.0000	0	0.00
87 01 01 11	114.0	6.69	287.6	4	1128.9	1128.9	0.0000	0.0	0.0000	0	0.00
87 01 01 12	116.0	6.17	287.0	4	1182.0	1182.0	0.0000	0.0	0.0000	0	0.00
87 01 01 13	133.0	7.20	287.6	4	1235.0	1235.0	0.0000	0.0	0.0000	0	0.00
87 01 01 14	119.0	7.72	287.6	4	1288.0	1288.0	0.0000	0.0	0.0000	0	0.00
87 01 01 15	132.0	7.20	288.2	4	1288.0	1288.0	0.0000	0.0	0.0000	0	0.00
87 01 01 16	134.0	7.72	289.3	4	1288.0	1288.0	0.0000	0.0	0.0000	0	0.00
87 01 01 17	141.0	7.20	288.2	4	1288.0	1288.0	0.0000	0.0	0.0000	0	0.00
87 01 01 18	137.0	5.14	287.6	5	1286.4	1238.1	0.0000	0.0	0.0000	0	0.00
87 01 01 19	144.0	3.60	286.5	5	1281.2	1078.6	0.0000	0.0	0.0000	0	0.00
87 01 01 20	117.0	2.06	285.4	6	1276.0	919.0	0.0000	0.0	0.0000	0	0.00
87 01 01 21	110.0	1.54	284.8	7	1270.9	759.5	0.0000	0.0	0.0000	0	0.00
87 01 01 22	112.0	0.00	283.7	7	1265.7	600.0	0.0000	0.0	0.0000	0	0.00
87 01 01 23	120.0	2.57	283.7	6	1260.5	440.5	0.0000	0.0	0.0000	0	0.00
87 01 01 24	130.0	1.54	282.6	7	1255.4	281.0	0.0000	0.0	0.0000	0	0.00

*** NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.
FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.

**MODELOPTs:
CONC RURAL FLAT DFAULT NOCMPL

*** THE SUMMARY OF MAXIMUM PERIOD (8760 HRS) RESULTS ***

** CONC OF GEN IN (MICROGRAMS/CUBIC-METER) **

GROUP ID	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
COOL	1ST HIGHEST VALUE IS	0.08600 AT (54.35, 308.24, 0.00, 0.00)	DP	NA
	2ND HIGHEST VALUE IS	0.07714 AT (0.00, 308.00, 0.00, 0.00)	DP	NA
	3RD HIGHEST VALUE IS	0.05428 AT (0.00, 400.00, 0.00, 0.00)	GP	POL
	4TH HIGHEST VALUE IS	0.05236 AT (69.46, 393.92, 0.00, 0.00)	GP	POL
	5TH HIGHEST VALUE IS	0.04254 AT (-54.35, 308.24, 0.00, 0.00)	DP	NA
	6TH HIGHEST VALUE IS	0.04134 AT (0.00, 500.00, 0.00, 0.00)	GP	POL
	7TH HIGHEST VALUE IS	0.04129 AT (112.18, 308.22, 0.00, 0.00)	DP	NA
	8TH HIGHEST VALUE IS	0.03858 AT (-69.46, 393.92, 0.00, 0.00)	GP	POL
	9TH HIGHEST VALUE IS	0.03618 AT (86.82, 492.40, 0.00, 0.00)	GP	POL
	10TH HIGHEST VALUE IS	0.03378 AT (-86.82, 492.40, 0.00, 0.00)	GP	POL
ALL	1ST HIGHEST VALUE IS	0.09174 AT (54.35, 308.24, 0.00, 0.00)	DP	NA
	2ND HIGHEST VALUE IS	0.08311 AT (0.00, 308.00, 0.00, 0.00)	DP	NA
	3RD HIGHEST VALUE IS	0.07594 AT (2500.00, 0.00, 0.00, 0.00)	GP	POL
	4TH HIGHEST VALUE IS	0.07521 AT (2000.00, 0.00, 0.00, 0.00)	GP	POL
	5TH HIGHEST VALUE IS	0.07151 AT (3000.00, 0.00, 0.00, 0.00)	GP	POL
	6TH HIGHEST VALUE IS	0.06866 AT (1969.62, 347.30, 0.00, 0.00)	GP	POL
	7TH HIGHEST VALUE IS	0.06700 AT (2462.02, 434.12, 0.00, 0.00)	GP	POL
	8TH HIGHEST VALUE IS	0.06303 AT (-3464.10, -2000.00, 0.00, 0.00)	GP	POL
	9TH HIGHEST VALUE IS	0.06281 AT (1500.00, 0.00, 0.00, 0.00)	GP	POL
	10TH HIGHEST VALUE IS	0.06210 AT (2954.42, 520.94, 0.00, 0.00)	GP	POL

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE + COOLING TWR 3/8/00 *** 03/08
*** NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING *** 17:43:
PAGE

**MODELOPTs:
CONC RURAL FLAT DFAULT NOCMPL

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF GEN IN (MICROGRAMS/CUBIC-METER) **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWOR GRID-I

```
COOL     HIGH  1ST HIGH VALUE IS      2.31081c ON 87011924: AT (     54.35,     308.24,     0.00,     0.00) DP      NA

ALL      HIGH  1ST HIGH VALUE IS      2.53003c ON 87011924: AT (     54.35,     308.24,     0.00,     0.00) DP      NA

* RECEPTOR TYPES:  GC = GRIDCART
                   GP = GRIDPOLR
                   DC = DISCCART
                   DP = DISCPOLR
                   BD = BOUNDARY
  *** ISCST3 - VERSION 99155 ***     *** 1987 OSPREY E.C. 2 CTS/COMBINED CYCLE + COOLING TWR  3/8/00          ***          03/08
                                     *** NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING       ***          17:43:
**MODELOPTs:                                                                                                             PAGE
CONC                       RURAL  FLAT          DFAULT                                                    NOCMPL

*** Message Summary : ISCST3 Model Execution ***

 --------- Summary of Total Messages --------

A Total of           0 Fatal Error Message(s)
A Total of           0 Warning Message(s)
A Total of         531 Informational Message(s)

A Total of         531 Calm Hours Identified


   ******** FATAL ERROR MESSAGES ********
            ***  NONE  ***


   ********   WARNING MESSAGES   ********
            ***  NONE  ***


   ************************************
   *** ISCST3 Finishes Successfully ***
   ************************************
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ISCB0B3 RELEASE 98056

ISCST3 OUTPUT FILE NUMBER 1 :OSPC1C.087
ISCST3 OUTPUT FILE NUMBER 2 :OSPC1C.088
ISCST3 OUTPUT FILE NUMBER 3 :OSPC1C.089
ISCST3 OUTPUT FILE NUMBER 4 :OSPC1C.090
ISCST3 OUTPUT FILE NUMBER 5 :OSPC1C.091
First title for last output file is: 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00
Second title for last output file is: NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB

AVERAGING TIME	YEAR	CONC (ug/m3)	DIR (deg) or X (m)	DIST (m) or Y (m)	PERIOD ENDING (YYMMDDHH)
SOURCE GROUP ID:	BASE32				
Annual					
	1987	0.00717	340300.	3165700.	87123124
	1988	0.00853	340300.	3167700.	88123124
	1989	0.00872	343700.	3178300.	89123124
	1990	0.00732	340300.	3165700.	90123124
	1991	0.00974	340300.	3169800.	91123124
HIGH 24-Hour					
	1987	0.15772	343700.	3178300.	87022724
	1988	0.20355	340300.	3165700.	88071224
	1989	0.13446	340300.	3167700.	89042024
	1990	0.10619	341100.	3183400.	90031524
	1991	0.13138	340300.	3169800.	91091824
HIGH 8-Hour					
	1987	0.42686	343700.	3178300.	87022708
	1988	0.43307	341100.	3183400.	88123108
	1989	0.40338	340300.	3167700.	89042008
	1990	0.35807	340300.	3167700.	90091108
	1991	0.38546	340300.	3169800.	91080308
HIGH 3-Hour					
	1987	0.68784	342400.	3180600.	87022706
	1988	0.74353	340300.	3169800.	88102706
	1989	0.81413	340300.	3165700.	89072103
	1990	0.71615	340300.	3167700.	90091103
	1991	0.70954	340300.	3169800.	91061403
HIGH 1-Hour					
	1987	1.32436	340300.	3165700.	87081701
	1988	1.30697	343700.	3178300.	88082103
	1989	1.33719	340300.	3165700.	89072101
	1990	1.29069	340300.	3167700.	90081922
	1991	1.32833	340300.	3165700.	91061903
SOURCE GROUP ID:	BASE59				
Annual					
	1987	0.00736	340300.	3165700.	87123124
	1988	0.00869	340300.	3167700.	88123124
	1989	0.00888	343700.	3178300.	89123124
	1990	0.00744	340300.	3165700.	90123124
	1991	0.00997	340300.	3169800.	91123124
HIGH 24-Hour					
	1987	0.16260	343700.	3178300.	87022724
	1988	0.20844	340300.	3165700.	88071224
	1989	0.13873	340300.	3167700.	89042024
	1990	0.10868	341100.	3183400.	90031524
	1991	0.13503	340300.	3169800.	91091824
HIGH 8-Hour					
	1987	0.44008	343700.	3178300.	87022708
	1988	0.44833	341100.	3183400.	88123108
	1989	0.41618	340300.	3167700.	89042008
	1990	0.36847	340300.	3167700.	90091108
	1991	0.39971	340300.	3169800.	91080308
HIGH 3-Hour					
	1987	0.71065	342400.	3180600.	87022706
	1988	0.76421	340300.	3169800.	88102706
	1989	0.83434	340300.	3165700.	89072103
	1990	0.73693	340300.	3167700.	90091103
	1991	0.73013	340300.	3169800.	91061403
HIGH 1-Hour					
	1987	1.35758	340300.	3165700.	87081701
	1988	1.33864	343700.	3178300.	88082103
	1989	1.37038	340300.	3165700.	89072101
	1990	1.32255	340300.	3167700.	90081922
	1991	1.36154	340300.	3165700.	91061903
SOURCE GROUP ID:	BASE95				

Annual					
	1987	0.00765	340300.	3165700.	87123124
	1988	0.00904	340300.	3167700.	88123124
	1989	0.00924	343700.	3178300.	89123124
	1990	0.00762	340300.	3165700.	90123124
	1991	0.01036	340300.	3169800.	91123124
HIGH 24-Hour					
	1987	0.17105	343700.	3178300.	87022724
	1988	0.21689	340300.	3165700.	88071224
	1989	0.14899	340300.	3167700.	89042024
	1990	0.11298	341100.	3183400.	90031524
	1991	0.14135	340300.	3169800.	91091824
HIGH 8-Hour					
	1987	0.46297	343700.	3178300.	87022708
	1988	0.47596	341100.	3183400.	88123108
	1989	0.44696	340300.	3167700.	89042008
	1990	0.38635	340300.	3167700.	90091108
	1991	0.42451	340300.	3169800.	91080308
HIGH 3-Hour					
	1987	0.75019	342400.	3180600.	87022706
	1988	0.81662	340300.	3169800.	88102706
	1989	0.89889	340300.	3165700.	89072103
	1990	0.77270	340300.	3167700.	90091103
	1991	0.76556	340300.	3169800.	91061403
HIGH 1-Hour					
	1987	1.46475	340300.	3165700.	87081701
	1988	1.43970	343700.	3178300.	88082103
	1989	1.47640	340300.	3165700.	89072101
	1990	1.42737	342000.	3174000.	90020201
	1991	1.46835	340300.	3165700.	91061903
SOURCE GROUP ID:	LD7532				
Annual					
	1987	0.00767	340300.	3165700.	87123124
	1988	0.00906	340300.	3167700.	88123124
	1989	0.00926	343700.	3178300.	89123124
	1990	0.00764	340300.	3165700.	90123124
	1991	0.01037	340300.	3169800.	91123124
HIGH 24-Hour					
	1987	0.17163	343700.	3178300.	87022724
	1988	0.21746	340300.	3165700.	88071224
	1989	0.14971	340300.	3167700.	89042024
	1990	0.11328	341100.	3183400.	90031524
	1991	0.14179	340300.	3169800.	91091824
HIGH 8-Hour					
	1987	0.46454	343700.	3178300.	87022708
	1988	0.47786	341100.	3183400.	88123108
	1989	0.44913	340300.	3167700.	89042008
	1990	0.38757	340300.	3167700.	90091108
	1991	0.42621	340300.	3169800.	91080308
HIGH 3-Hour					
	1987	0.75289	342400.	3180600.	87022706
	1988	0.82029	340300.	3169800.	88102706
	1989	0.90378	340300.	3165700.	89072103
	1990	0.77514	340300.	3167700.	90091103
	1991	0.76797	340300.	3169800.	91061403
HIGH 1-Hour					
	1987	1.47277	340300.	3165700.	87081701
	1988	1.44735	343700.	3178300.	88082103
	1989	1.48444	340300.	3165700.	89072101
	1990	1.43516	342000.	3174000.	90020201
	1991	1.47638	340300.	3165700.	91061903
SOURCE GROUP ID:	LD7559				
Annual					
	1987	0.00774	340300.	3165700.	87123124
	1988	0.00921	340300.	3167700.	88123124
	1989	0.00943	343700.	3178300.	89123124
	1990	0.00779	340300.	3165700.	90123124
	1991	0.01051	340300.	3169800.	91123124
HIGH 24-Hour					
	1987	0.17514	343700.	3178300.	87022724
	1988	0.22096	340300.	3165700.	88071224
	1989	0.15413	340300.	3167700.	89042024
	1990	0.11506	341100.	3183400.	90031524
	1991	0.14441	340300.	3169800.	91091824
HIGH 8-Hour					
	1987	0.47405	343700.	3178300.	87022708
	1988	0.48942	341100.	3183400.	88123108

	1989	0.46239	340300.	3167700.	89042008
	1990	0.39494	340300.	3167700.	90091108
	1991	0.43655	340300.	3169800.	91080308
HIGH 3-Hour					
	1987	0.76930	342400.	3180600.	87022706
	1988	0.84267	340300.	3169800.	88102706
	1989	0.93372	340300.	3165700.	89072103
	1990	0.78988	340300.	3167700.	90091103
	1991	0.78257	340300.	3169800.	91061403
HIGH 1-Hour					
	1987	1.52190	340300.	3165700.	87081701
	1988	1.49416	343700.	3178300.	88082103
	1989	1.53362	340300.	3165700.	89072101
	1990	1.48286	342000.	3174000.	90020201
	1991	1.52552	340300.	3165700.	91061903
SOURCE GROUP ID:	LD7595				
Annual					
	1987	0.00784	340300.	3165700.	87123124
	1988	0.00938	340300.	3167700.	88123124
	1989	0.00980	343700.	3178300.	89123124
	1990	0.00791	340300.	3165700.	90123124
	1991	0.01068	340300.	3169800.	91123124
HIGH 24-Hour					
	1987	0.17993	343700.	3178300.	87022724
	1988	0.22570	340300.	3165700.	88071224
	1989	0.16021	340300.	3167700.	89042024
	1990	0.11749	341100.	3183400.	90031524
	1991	0.14798	340300.	3169800.	91091824
HIGH 8-Hour					
	1987	0.48701	343700.	3178300.	87022708
	1988	0.50525	341100.	3183400.	88123108
	1989	0.48063	340300.	3167700.	89042008
	1990	0.40494	340300.	3167700.	90091108
	1991	0.45066	340300.	3169800.	91080308
HIGH 3-Hour					
	1987	0.79167	342400.	3180600.	87022706
	1988	0.87345	340300.	3169800.	88102706
	1989	0.97512	340300.	3165700.	89072103
	1990	0.80987	340300.	3167700.	90091103
	1991	0.80239	340300.	3169800.	91061403
HIGH 1-Hour					
	1987	1.58982	340300.	3165700.	87081701
	1988	1.55881	343700.	3178300.	88082103
	1989	1.60160	340300.	3165700.	89072101
	1990	1.54879	342000.	3174000.	90020201
	1991	1.59346	340300.	3165700.	91061903
SOURCE GROUP ID:	LD6032				
Annual					
	1987	0.00836	340300.	3165700.	87123124
	1988	0.00968	340300.	3167700.	88123124
	1989	0.01013	343700.	3178300.	89123124
	1990	0.00815	340300.	3165700.	90123124
	1991	0.01098	340300.	3169800.	91123124
HIGH 24-Hour					
	1987	0.18796	343700.	3178300.	87022724
	1988	0.23409	340300.	3165700.	88071224
	1989	0.17057	340300.	3167700.	89042024
	1990	0.12157	341100.	3183400.	90031524
	1991	0.15397	340300.	3169800.	91091824
HIGH 8-Hour					
	1987	0.50877	343700.	3178300.	87022708
	1988	0.53199	341100.	3183400.	88123108
	1989	0.51170	340300.	3167700.	89042008
	1990	0.42161	340300.	3167700.	90091108
	1991	0.47441	340300.	3169800.	91080308
HIGH 3-Hour					
	1987	0.82921	342400.	3180600.	87022706
	1988	0.92580	340300.	3169800.	88102706
	1989	1.04597	340300.	3165700.	89072103
	1990	0.84322	340300.	3167700.	90091103
	1991	0.83542	340300.	3169800.	91061403
HIGH 1-Hour					
	1987	1.70615	340300.	3165700.	87081701
	1988	1.67149	340300.	3165700.	88032604
	1989	1.71798	340300.	3165700.	89072101
	1990	1.66172	342000.	3174000.	90020201
	1991	1.70980	340300.	3165700.	91061903

SOURCE GROUP ID: LD6059

Annual					
	1987	0.00841	340300.	3165700.	87123124
	1988	0.00977	340300.	3167700.	88123124
	1989	0.01024	343700.	3178300.	89123124
	1990	0.00821	340300.	3165700.	90123124
	1991	0.01106	340300.	3169800.	91123124
HIGH 24-Hour					
	1987	0.19050	343700.	3178300.	87022724
	1988	0.23674	340300.	3165700.	88071224
	1989	0.17387	340300.	3167700.	89042024
	1990	0.12286	341100.	3183400.	90031524
	1991	0.15586	340300.	3169800.	91091824
HIGH 8-Hour					
	1987	0.51564	343700.	3178300.	87022708
	1988	0.54047	341100.	3183400.	88123108
	1989	0.52162	340300.	3167700.	89042008
	1990	0.42684	340300.	3167700.	90091108
	1991	0.48193	340300.	3169800.	91080308
HIGH 3-Hour					
	1987	0.84106	342400.	3180600.	87022706
	1988	0.94250	340300.	3169800.	88102706
	1989	1.06868	340300.	3165700.	89072103
	1990	0.85369	340300.	3167700.	90091103
	1991	0.84580	340300.	3169800.	91061403
HIGH 1-Hour					
	1987	1.74346	340300.	3165700.	87081701
	1988	1.70878	340300.	3165700.	88032604
	1989	1.75528	340300.	3165700.	89072101
	1990	1.69794	342000.	3174000.	90020201
	1991	1.74711	340300.	3165700.	91061903

SOURCE GROUP ID: LD6095

Annual					
	1987	0.00850	340300.	3165700.	87123124
	1988	0.00991	340300.	3167700.	88123124
	1989	0.01050	343700.	3178300.	89123124
	1990	0.00829	340300.	3165700.	90123124
	1991	0.01125	340300.	3169800.	91123124
GH 24-Hour					
	1987	0.19437	343700.	3178300.	87022724
	1988	0.24075	340300.	3165700.	88071224
	1989	0.17894	340300.	3167700.	89042024
	1990	0.12482	341100.	3183400.	90031524
	1991	0.15874	340300.	3169800.	91091824
HIGH 8-Hour					
	1987	0.52611	343700.	3178300.	87022708
	1988	0.55342	341100.	3183400.	88123108
	1989	0.53683	340300.	3167700.	89042008
	1990	0.43479	340300.	3167700.	90091108
	1991	0.49339	340300.	3169800.	91080308
HIGH 3-Hour					
	1987	0.85910	342400.	3180600.	87022706
	1988	0.96808	340300.	3169800.	88102706
	1989	1.10358	340300.	3165700.	89072103
	1990	0.86957	340300.	3167700.	90091103
	1991	0.86154	340300.	3169800.	91061403
HIGH 1-Hour					
	1987	1.80079	340300.	3165700.	87081701
	1988	1.76614	340300.	3165700.	88032604
	1989	1.81260	340300.	3165700.	89072101
	1990	1.75362	342000.	3174000.	90020201
	1991	1.80444	340300.	3165700.	91061903

SOURCE GROUP ID: BSPD95

Annual					
	1987	0.00736	340300.	3165700.	87123124
	1988	0.00869	340300.	3167700.	88123124
	1989	0.00888	343700.	3178300.	89123124
	1990	0.00744	340300.	3165700.	90123124
	1991	0.00997	340300.	3169800.	91123124
HIGH 24-Hour					
	1987	0.16260	343700.	3178300.	87022724
	1988	0.20844	340300.	3165700.	88071224
	1989	0.13873	340300.	3167700.	89042024
	1990	0.10868	341100.	3183400.	90031524
	1991	0.13503	340300.	3169800.	91091824
HIGH 8-Hour					
	1987	0.44008	343700.	3178300.	87022708

	1988	0.44833	341100.	3183400.	88123108
	1989	0.41618	340300.	3167700.	89042008
	1990	0.36847	340300.	3167700.	90091108
	1991	0.39971	340300.	3169800.	91080308
HIGH 3-Hour					
	1987	0.71065	342400.	3180600.	87022706
	1988	0.76421	340300.	3169800.	88102706
	1989	0.83434	340300.	3165700.	89072103
	1990	0.73693	340300.	3167700.	90091103
	1991	0.73013	340300.	3169800.	91061403
HIGH 1-Hour					
	1987	1.35758	340300.	3165700.	87081701
	1988	1.33864	343700.	3178300.	88082103
	1989	1.37038	340300.	3165700.	89072101
	1990	1.32255	340300.	3167700.	90081922
	1991	1.36154	340300.	3165700.	91061903

All receptor computations reported with respect to a user-specified origin

GRID	0.00	0.00
DISCRETE	0.00	0.00

ISCB083 RELEASE 98056

ISCST3 OUTPUT FILE NUMBER 1 :PMC1C.087
ISCST3 OUTPUT FILE NUMBER 2 :PMC1C.088
ISCST3 OUTPUT FILE NUMBER 3 :PMC1C.089
ISCST3 OUTPUT FILE NUMBER 4 :PMC1C.090
ISCST3 OUTPUT FILE NUMBER 5 :PMC1C.091
First title for last output file is: 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00
Second title for last output file is: NATURAL GAS, PM CTs & COOLING TOWER 32 DEG.F BASE LOAD

AVERAGING TIME	YEAR	CONC (ug/m3)	DIR (deg) or X (m)	DIST (m) or Y (m)	PERIOD ENDING (YYMMDDHH)
SOURCE GROUP ID:	COOL				
Annual					
	1987	0.00018	340300.	3165700.	87123124
	1988	0.00023	340300.	3167700.	88123124
	1989	0.00025	343700.	3178300.	89123124
	1990	0.00018	340300.	3165700.	90123124
	1991	0.00026	340300.	3169800.	91123124
HIGH 24-Hour					
	1987	0.00469	343700.	3178300.	87022724
	1988	0.00616	340300.	3165700.	88071224
	1989	0.00519	340300.	3169800.	89091424
	1990	0.00360	340700.	3171900.	90080324
	1991	0.00462	340300.	3169800.	91080324
SOURCE GROUP ID:	ALL				
Annual					
	1987	0.00422	340300.	3165700.	87123124
	1988	0.00502	340300.	3167700.	88123124
	1989	0.00515	343700.	3178300.	89123124
	1990	0.00429	340300.	3165700.	90123124
	1991	0.00574	340300.	3169800.	91123124
HIGH 24-Hour					
	1987	0.09333	343700.	3178300.	87022724
	1988	0.12055	340300.	3165700.	88071224
	1989	0.08060	340300.	3167700.	89042024
	1990	0.06294	341100.	3183400.	90031524
	1991	0.07792	340300.	3169800.	91091824

All receptor computations reported with respect to a user-specified origin

GRID	0.00	0.00
DISCRETE	0.00	0.00

```
CO STARTING
CO TITLEONE 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00
CO TITLETWO NATURAL GAS, PM CTs & COOLING TOWER  32 DEG.F BASE LOAD
 O MODELOPT DFAULT CONC   RURAL NOCMPL
CO AVERTIME  PERIOD 24
CO POLLUTID GEN
CO DCAYCOEF    .000000
CO RUNORNOT RUN
CO FINISHED

SO STARTING

** Source Location Cards:
**  HRSG STACK NUMBER CODE
** ------------------------
**  A -  HRSG NO. 1
**  B -  HRSG NO. 2
** Source Location Cards:
**           SRCID SRCTYP      XS        YS       ZS
**   UTM                     (m)       (m)      (m)
SO LOCATION  BASE32A  POINT  421000. 3103200.   0.0
SO LOCATION  BASE32B  POINT  421000. 3103200.   0.0
**
SO LOCATION  COOL1    POINT  421000. 3103200.   0.0
SO LOCATION  COOL2    POINT  421000. 3103200.   0.0
SO LOCATION  COOL3    POINT  421000. 3103200.   0.0
SO LOCATION  COOL4    POINT  421000. 3103200.   0.0
SO LOCATION  COOL5    POINT  421000. 3103200.   0.0
SO LOCATION  COOL6    POINT  421000. 3103200.   0.0
SO LOCATION  COOL7    POINT  421000. 3103200.   0.0
SO LOCATION  COOL8    POINT  421000. 3103200.   0.0
SO LOCATION  COOL9    POINT  421000. 3103200.   0.0
SO LOCATION  COOL10   POINT  421000. 3103200.   0.0
**
** Source Parameter Cards:
** POINT:   SRCID          QS       HS        TS        VS        DS
**                       (g/s)      (m)       (K)      (m/s)      (m)
SO SRCPARAM   BASE32A     2.810     41.1     366.0      19.2      5.79
SO SRCPARAM   BASE32B     2.810     41.1     366.0      19.2      5.79
**
SO SRCPARAM   COOL1      0.012     16.8     300.0      9.88      8.54
SO SRCPARAM   COOL2      0.012     16.8     300.0      9.88      8.54
SO SRCPARAM   COOL3      0.012     16.8     300.0      9.88      8.54
SO SRCPARAM   COOL4      0.012     16.8     300.0      9.88      8.54
SO SRCPARAM   COOL5      0.012     16.8     300.0      9.88      8.54
SO SRCPARAM   COOL6      0.012     16.8     300.0      9.88      8.54
SO SRCPARAM   COOL7      0.012     16.8     300.0      9.88      8.54
SO SRCPARAM   COOL8      0.012     16.8     300.0      9.88      8.54
SO SRCPARAM   COOL9      0.012     16.8     300.0      9.88      8.54
SO SRCPARAM   COOL10     0.012     16.8     300.0      9.88      8.54
**
**
SO BUILDHGT BASE32A-BASE95A    24.38   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BASE32A-BASE95A    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BASE32A-BASE95A    29.26   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT BASE32A-BASE95A    24.38   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BASE32A-BASE95A    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BASE32A-BASE95A    29.26   24.38   24.38   24.38   24.38   24.38
SO BUILDWID BASE32A-BASE95A    32.66   80.49   94.46  105.56  113.44  117.89
SO BUILDWID BASE32A-BASE95A   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID BASE32A-BASE95A   113.44   33.15   34.02   33.85   32.66   30.48
SO BUILDWID BASE32A-BASE95A    32.66   80.49   94.46  105.56  113.44  117.89
SO BUILDWID BASE32A-BASE95A   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID BASE32A-BASE95A   113.44   33.15   34.02   33.85   32.66   30.48
**
SO BUILDHGT BASE32B-BASE95B    24.38   24.38   29.26   29.26   29.26   29.26
SO BUILDHGT BASE32B-BASE95B    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BASE32B-BASE95B    29.26   29.26   29.26   24.38   24.38   24.38
SO BUILDHGT BASE32B-BASE95B    24.38   24.38   29.26   29.26   29.26   29.26
SO BUILDHGT BASE32B-BASE95B    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BASE32B-BASE95B    29.26   29.26   29.26   24.38   24.38   24.38
SO BUILDWID BASE32B-BASE95B    32.66   33.85   94.46  105.56  113.44  117.89
SO BUILDWID BASE32B-BASE95B   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID BASE32B-BASE95B   113.44  105.56   94.46   33.85   32.66   30.48
SO BUILDWID BASE32B-BASE95B    32.66   33.85   94.46  105.56  113.44  117.89
SO BUILDWID BASE32B-BASE95B   118.75  116.00  109.73  116.00  118.75  117.89
```

```
SO BUILDWID BASE32B-BASE95B   113.44   105.56    94.46    33.85    32.66    30.48
**
SO BUILDHGT COOL1     13.72    13.72    13.72    13.72    13.72    13.72
SO BUILDHGT COOL1     13.72    13.72    13.72    13.72    13.72    13.72
SO BUILDHGT COOL1     13.72    13.72    13.72    13.72    13.72    13.72
SO BUILDHGT COOL1     13.72    13.72    13.72    13.72    13.72    13.72
SO BUILDHGT COOL1     13.72    13.72    13.72    13.72    13.72    13.72
SO BUILDHGT COOL1     13.72    29.26    29.26    29.26    29.26    24.38
SO BUILDWID COOL1     85.49    86.09    84.07    79.50    72.51    63.32
SO BUILDWID COOL1     52.21    39.50    25.60    39.50    52.21    63.32
SO BUILDWID COOL1     72.51    79.50    84.07    86.09    85.49    82.30
SO BUILDWID COOL1     85.49    86.09    84.07    79.50    72.51    63.32
SO BUILDWID COOL1     52.21    39.50    25.60    39.50    52.21    63.32
SO BUILDWID COOL1     72.51   105.56    94.46    80.49    64.08    85.34

SO BUILDHGT COOL2     24.38    13.72    13.72    13.72    13.72    13.72
SO BUILDHGT COOL2     13.72    13.72    13.72    13.72    13.72    13.72
SO BUILDHGT COOL2     13.72    13.72    13.72    13.72    13.72    13.72
SO BUILDHGT COOL2     13.72    13.72    13.72    13.72    13.72    13.72
SO BUILDHGT COOL2     13.72    13.72    13.72    13.72    13.72    13.72
SO BUILDHGT COOL2     13.72    13.72    29.26    29.26    29.26    24.38
SO BUILDWID COOL2     95.43    86.09    84.07    79.50    72.51    63.32
SO BUILDWID COOL2     52.21    39.50    25.60    39.50    52.21    63.32
SO BUILDWID COOL2     72.51    79.50    84.07    86.09    85.49    82.30
SO BUILDWID COOL2     85.49    86.09    84.07    79.50    72.51    63.32
SO BUILDWID COOL2     52.21    39.50    25.60    39.50    52.21    63.32
SO BUILDWID COOL2     72.51    79.50    94.46    80.49    64.08    85.34

SO BUILDHGT COOL3     24.38    24.38    13.72    13.72    13.72    13.72
SO BUILDHGT COOL3     13.72    13.72    13.72    13.72    13.72    13.72
SO BUILDHGT COOL3     13.72    13.72    13.72    13.72    13.72    13.72
SO BUILDHGT COOL3     13.72    13.72    13.72    13.72    13.72    13.72
SO BUILDHGT COOL3     13.72    13.72    13.72    13.72    13.72    13.72
SO BUILDHGT COOL3     13.72    13.72    29.26    29.26    29.26    29.26
SO BUILDWID COOL3     95.43   102.61    84.07    79.50    72.51    63.32
SO BUILDWID COOL3     52.21    39.50    25.60    39.50    52.21    63.32
SO BUILDWID COOL3     72.51    79.50    84.07    86.09    85.49    82.30
SO BUILDWID COOL3     85.49    86.09    84.07    79.50    72.51    63.32
SO BUILDWID COOL3     52.21    39.50    25.60    39.50    52.21    63.32
SO BUILDWID COOL3     72.51    79.50    94.46    80.49    64.08    45.72

SO BUILDHGT COOL4     29.26    24.38    13.72    13.72    13.72    13.72
SO BUILDHGT COOL4     13.72    13.72    13.72    13.72    13.72    13.72
SO BUILDHGT COOL4     13.72    13.72    13.72    13.72    13.72    13.72
SO BUILDHGT COOL4     13.72    13.72    13.72    13.72    13.72    13.72
SO BUILDHGT COOL4     13.72    13.72    13.72    13.72    13.72    13.72
SO BUILDHGT COOL4     13.72    13.72    13.72    29.26    29.26    29.26
SO BUILDWID COOL4     64.08   102.61    84.07    79.50    72.51    63.32
SO BUILDWID COOL4     52.21    39.50    25.60    39.50    52.21    63.32
SO BUILDWID COOL4     72.51    79.50    84.07    86.09    85.49    82.30
SO BUILDWID COOL4     85.49    86.09    84.07    79.50    72.51    63.32
SO BUILDWID COOL4     52.21    39.50    25.60    39.50    52.21    63.32
SO BUILDWID COOL4     72.51    79.50    84.07    80.49    64.08    45.72

SO BUILDHGT COOL5     29.26    29.26    24.38    13.72    13.72    13.72
SO BUILDHGT COOL5     13.72    13.72    13.72    13.72    13.72    13.72
SO BUILDHGT COOL5     13.72    13.72    13.72    13.72    13.72    13.72
SO BUILDHGT COOL5     13.72    13.72    13.72    13.72    13.72    13.72
SO BUILDHGT COOL5     13.72    13.72    13.72    13.72    13.72    13.72
SO BUILDHGT COOL5     13.72    13.72    13.72    13.72    29.26    29.26
SO BUILDWID COOL5     64.08    80.49   106.68    79.50    72.51    63.32
SO BUILDWID COOL5     52.21    39.50    25.60    39.50    52.21    63.32
SO BUILDWID COOL5     72.51    79.50    84.07    86.09    85.49    82.30
SO BUILDWID COOL5     85.49    86.09    84.07    79.50    72.51    63.32
SO BUILDWID COOL5     52.21    39.50    25.60    39.50    52.21    63.32
SO BUILDWID COOL5     72.51    79.50    84.07    86.09    64.08    45.72

SO BUILDHGT COOL6     13.72    13.72    13.72    13.72    13.72    13.72
SO BUILDHGT COOL6     13.72    13.72    13.72    13.72    13.72    13.72
SO BUILDHGT COOL6     13.72    13.72    13.72    13.72    13.72    13.72
SO BUILDHGT COOL6     13.72    13.72    13.72    13.72    13.72    13.72
SO BUILDHGT COOL6     13.72    13.72    13.72    13.72    13.72    13.72
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SO BUILDHGT COOL6     13.72   29.26   29.26   29.26   29.26   24.38
SO BUILDWID COOL6     85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL6     52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL6     72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL6     85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL6     52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL6     72.51  105.56   94.46   80.49   64.08   85.34

SO BUILDHGT COOL7     24.38   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL7     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL7     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL7     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL7     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL7     13.72   13.72   29.26   29.26   29.26   24.38
SO BUILDWID COOL7     95.43   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL7     52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL7     72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL7     85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL7     52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL7     72.51   79.50   94.46   80.49   64.08   85.34

SO BUILDHGT COOL8     24.38   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL8     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL8     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL8     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL8     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL8     13.72   13.72   13.72   29.26   29.26   29.26
SO BUILDWID COOL8     95.43   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL8     52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL8     72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL8     85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL8     52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL8     72.51   79.50   84.07   80.49   64.08   45.72

SO BUILDHGT COOL9     29.26   24.38   13.72   13.72   13.72   13.72
SO BUILDHGT COOL9     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL9     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL9     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL9     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL9     13.72   13.72   13.72   29.26   29.26   29.26
SO BUILDWID COOL9     64.08  102.61   84.07   79.50   72.51   63.32
SO BUILDWID COOL9     52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL9     72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL9     85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL9     58.10   37.24   15.24   37.24   58.10   77.2
SO BUILDWID COOL9     72.51   79.50   84.07   80.49   64.08   45.72

SO BUILDHGT COOL10    29.26   29.26   13.72   13.72   13.72   13.72
SO BUILDHGT COOL10    13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL10    13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL10    13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL10    13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL10    13.72   13.72   13.72   13.72   29.26   29.26
SO BUILDWID COOL10    64.08   80.49   84.07   79.50   72.51   63.32
SO BUILDWID COOL10    52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL10    72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL10    85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL10    52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL10    72.51   79.50   84.07   86.09   64.08   45.72
**
SO EMISUNIT    .100000E+07 (GRAMS/SEC)          (MICROGRAMS/CUBIC-METER)
SO SRCGROUP COOL    COOL1-COOL10
SO SRCGROUP ALL
**
SO FINISHED

RE STARTING
RE DISCCART  340300 3165700
RE DISCCART  340300 3167700
RE DISCCART  340300 3169800
RE DISCCART  340700 3171900
RE DISCCART  342000 3174000
RE DISCCART  343000 3176200
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RE DISCCART  343700 3178300
RE DISCCART  342400 3180600
RE DISCCART  341100 3183400
RE DISCCART  339000 3183400
RE DISCCART  336500 3183400
RE DISCCART  334000 3183400
RE DISCCART  331500 3183400
RE FINISHED
**
ME STARTING
ME INPUTFIL C:\MET\TPA87D.MET
ME ANEMHGHT    6.700 METERS
ME SURFDATA  12842  1987            TAMPA
ME UAIRDATA  12842  1987            RUSKIN
ME WINDCATS    1.54    3.09    5.14    8.23   10.80
ME FINISHED
**
OU STARTING
OU RECTABLE ALLAVE FIRST
OU FINISHED

***********************************
*** SETUP Finishes Successfully ***
***********************************

  *** ISCST3 - VERSION 99155 ***    *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00        ***        03/08
                                  *** NATURAL GAS, PM CTs & COOLING TOWER  32 DEG.F BASE LOAD              ***        23:38:
**MODELOPTs:                                                                                                          PAGE
CONC                    RURAL  FLAT          DFAULT                                                    NOCMPL

                                        ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Simple Terrain Model is Selected

**Model Is Setup For Calculation of Average CONCentration Values.

  --  SCAVENGING/DEPOSITION LOGIC --
**Model Uses NO DRY DEPLETION.  DDPLETE =  F
**Model Uses NO WET DEPLETION.  WDPLETE =  F
**NO WET SCAVENGING Data Provided.
**NO GAS DRY DEPOSITION Data Provided.
**Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

**Model Uses RURAL Dispersion.

**Model Uses Regulatory DEFAULT Options:
          1. Final Plume Rise.
          2. Stack-tip Downwash.
          3. Buoyancy-induced Dispersion.
          4. Use Calms Processing Routine.
          5. Not Use Missing Data Processing Routine.
          6. Default Wind Profile Exponents.
          7. Default Vertical Potential Temperature Gradients.
          8. "Upper Bound" Values for Supersquat Buildings.
          9. No Exponential Decay for RURAL Mode

**Model Assumes Receptors on FLAT Terrain.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:  24-HR
    and Calculates PERIOD Averages

**This Run Includes:    12 Source(s);      2 Source Group(s); and      13 Receptor(s)

**The Model Assumes A Pollutant Type of:  GEN

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of PERIOD Averages by Receptor
        Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours
```

**Misc. Inputs: Anem. Hgt. (m) = 6.70 ; Decay Coef. = 0.000 ; Rot. Angle = 0.0
Emission Units = (GRAMS/SEC) ; Emission Rate Unit Factor = 0.10000E+07
Output Units = (MICROGRAMS/CUBIC-METER)

**Approximate Storage Requirements of Model = 1.2 MB of RAM.

**Input Runstream File: PMC1C.I87
**Output Print File: PMC1C.O87
*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00 *** 03/08
*** NATURAL GAS, PM CTs & COOLING TOWER 32 DEG.F BASE LOAD *** 23:38:
**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (USER UNITS)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSION RATE SCALAR VARY BY
BASE32A	0	0.28100E+01	421000.0	3103200.0	0.0	41.10	366.00	19.20	5.79	YES	
BASE32B	0	0.28100E+01	421000.0	3103200.0	0.0	41.10	366.00	19.20	5.79	YES	
COOL1	0	0.12000E-01	421000.0	3103200.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL2	0	0.12000E-01	421000.0	3103200.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL3	0	0.12000E-01	421000.0	3103200.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL4	0	0.12000E-01	421000.0	3103200.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL5	0	0.12000E-01	421000.0	3103200.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL6	0	0.12000E-01	421000.0	3103200.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL7	0	0.12000E-01	421000.0	3103200.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL8	0	0.12000E-01	421000.0	3103200.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL9	0	0.12000E-01	421000.0	3103200.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL10	0	0.12000E-01	421000.0	3103200.0	0.0	16.80	300.00	9.88	8.54	YES	

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00 *** 03/08
*** NATURAL GAS, PM CTs & COOLING TOWER 32 DEG.F BASE LOAD *** 23:38:
**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
COOL	COOL1 , COOL2 , COOL3 , COOL4 , COOL5 , COOL6 , COOL7 , COOL8 , COOL9 , COOL10 ,
ALL	BASE32A , BASE32B , COOL1 , COOL2 , COOL3 , COOL4 , COOL5 , COOL6 , COOL7 , COOL8 , COOL9 , COOL

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00 *** 03/08
*** NATURAL GAS, PM CTs & COOLING TOWER 32 DEG.F BASE LOAD *** 23:38:
**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: BASE32A

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	24.4,	32.7,	0	2	29.3,	80.5,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	117
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	117
13	29.3,	113.4,	0	14	24.4,	33.2,	0	15	24.4,	34.0,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	30
19	24.4,	32.7,	0	20	29.3,	80.5,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	117
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	117
31	29.3,	113.4,	0	32	24.4,	33.2,	0	33	24.4,	34.0,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	30

SOURCE ID: BASE32B

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	24.4,	32.7,	0	2	24.4,	33.8,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	117
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	117
13	29.3,	113.4,	0	14	29.3,	105.6,	0	15	29.3,	94.5,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	30

19	24.4,	32.7, 0	20	24.4,	33.8, 0	21	29.3,	94.5, 0	22	29.3,	105.6, 0	23	29.3,	113.4, 0	24	29.3,	117
25	29.3,	118.8, 0	26	29.3,	116.0, 0	27	29.3,	109.7, 0	28	29.3,	116.0, 0	29	29.3,	118.8, 0	30	29.3,	117
31	29.3,	113.4, 0	32	29.3,	105.6, 0	33	29.3,	94.5, 0	34	24.4,	33.8, 0	35	24.4,	32.7, 0	36	24.4,	30

SOURCE ID: COOL1

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	13.7,	85.5,	0	2	13.7,	86.1,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	24.4,	85

SOURCE ID: COOL2

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	24.4,	95.4,	0	2	13.7,	86.1,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	29.3,	94.5,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	24.4,	85

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: COOL3

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	24.4,	95.4,	0	2	24.4,	102.6,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	29.3,	94.5,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	29.3,	45

SOURCE ID: COOL4

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	29.3,	64.1,	0	2	24.4,	102.6,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	13.7,	84.1,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	29.3,	45

SOURCE ID: COOL5

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	29.3,	64.1,	0	2	29.3,	80.5,	0	3	24.4,	106.7,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	13.7,	84.1,	0	34	13.7,	86.1,	0	35	29.3,	64.1,	0	36	29.3,	45

SOURCE ID: COOL6

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	13.7,	85.5,	0	2	13.7,	86.1,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	24.4,	85

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00 *** 03/08
*** NATURAL GAS, PM CTs & COOLING TOWER 32 DEG.F BASE LOAD *** 23:38:
**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: COOL7

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	24.4,	95.4,	0	2	13.7,	86.1,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	29.3,	94.5,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	24.4,	85

SOURCE ID: COOL8

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	24.4,	95.4,	0	2	13.7,	86.1,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	13.7,	84.1,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	29.3,	45

SOURCE ID: COOL9

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	29.3,	64.1,	0	2	24.4,	102.6,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	58.1,	0	26	13.7,	37.2,	0	27	13.7,	15.2,	0	28	13.7,	37.2,	0	29	13.7,	58.1,	0	30	13.7,	77
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	13.7,	84.1,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	29.3,	45

SOURCE ID: COOL10

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	29.3,	64.1,	0	2	29.3,	80.5,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	13.7,	84.1,	0	34	13.7,	86.1,	0	35	29.3,	64.1,	0	36	29.3,	45

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00 *** 03/08
*** NATURAL GAS, PM CTs & COOLING TOWER 32 DEG.F BASE LOAD *** 23:38:
**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZFLAG)
(METERS)

(340300.0,	3165700.0,	0.0,	0.0);	(340300.0,	3167700.0,	0.0,	0.0);
(340300.0,	3169800.0,	0.0,	0.0);	(340700.0,	3171900.0,	0.0,	0.0);
(342000.0,	3174000.0,	0.0,	0.0);	(343000.0,	3176200.0,	0.0,	0.0);
(343700.0,	3178300.0,	0.0,	0.0);	(342400.0,	3180600.0,	0.0,	0.0);
(341100.0,	3183400.0,	0.0,	0.0);	(339000.0,	3183400.0,	0.0,	0.0);
(336500.0,	3183400.0,	0.0,	0.0);	(334000.0,	3183400.0,	0.0,	0.0);
(331500.0,	3183400.0,	0.0,	0.0);				

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00 *** 03/08
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**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
B	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
C	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
D	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
E	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00
F	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

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*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

FILE: C:\MET\TPA87D.MET
FORMAT: (4I2,2F9.4,F6.1,I2,2F7.1,f9.4,f10.1,f8.4,i4,f7.2)
SURFACE STATION NO.: 12842 UPPER AIR STATION NO.: 12842
NAME: TAMPA NAME: RUSKIN
YEAR: 1987 YEAR: 1987

YR MN DY HR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-0 (M)	IPCODE	PRATE (mm/HR)
87 01 01 01	341.0	6.17	293.7	4	598.7	598.7	0.0000	0.0	0.0000	0	0.00
87 01 01 02	358.0	4.12	293.2	5	651.8	1306.0	0.0000	0.0	0.0000	0	0.00
87 01 01 03	34.0	6.17	293.2	4	704.8	704.8	0.0000	0.0	0.0000	0	0.00
87 01 01 04	73.0	6.69	291.5	4	757.8	757.8	0.0000	0.0	0.0000	0	0.00
87 01 01 05	83.0	7.20	290.9	4	810.8	810.8	0.0000	0.0	0.0000	0	0.00
87 01 01 06	102.0	7.20	290.4	4	863.8	863.8	0.0000	0.0	0.0000	0	0.00
87 01 01 07	105.0	6.69	289.3	4	916.9	916.9	0.0000	0.0	0.0000	0	0.00
87 01 01 08	113.0	7.72	288.7	4	969.9	969.9	0.0000	0.0	0.0000	0	0.00
87 01 01 09	107.0	6.17	288.2	4	1022.9	1022.9	0.0000	0.0	0.0000	0	0.00
[illegible] 01 01 10	121.0	6.17	288.2	4	1075.9	1075.9	0.0000	0.0	0.0000	0	0.00
[illegible] 01 01 11	114.0	6.69	287.6	4	1128.9	1128.9	0.0000	0.0	0.0000	0	0.00
87 01 01 12	116.0	6.17	287.0	4	1182.0	1182.0	0.0000	0.0	0.0000	0	0.00
87 01 01 13	133.0	7.20	287.6	4	1235.0	1235.0	0.0000	0.0	0.0000	0	0.00
87 01 01 14	119.0	7.72	287.6	4	1288.0	1288.0	0.0000	0.0	0.0000	0	0.00

87	01	01	15	132.0	7.20	288.2	4	1288.0	1288.0	0.0000	0.0	0.0000	0	0.00
87	01	01	16	134.0	7.72	289.3	4	1288.0	1288.0	0.0000	0.0	0.0000	0	0.00
87	01	01	17	141.0	7.20	288.2	4	1288.0	1288.0	0.0000	0.0	0.0000	0	0.00
87	01	01	18	137.0	5.14	287.6	5	1286.4	1238.1	0.0000	0.0	0.0000	0	0.00
87	01	01	19	144.0	3.60	286.5	5	1281.2	1078.6	0.0000	0.0	0.0000	0	0.00
87	01	01	20	117.0	2.06	285.4	6	1276.0	919.0	0.0000	0.0	0.0000	0	0.00
87	01	01	21	110.0	1.54	284.8	7	1270.9	759.5	0.0000	0.0	0.0000	0	0.00
87	01	01	22	112.0	0.00	283.7	7	1265.7	600.0	0.0000	0.0	0.0000	0	0.00
87	01	01	23	120.0	2.57	283.7	6	1260.5	440.5	0.0000	0.0	0.0000	0	0.00
87	01	01	24	130.0	1.54	282.6	7	1255.4	281.0	0.0000	0.0	0.0000	0	0.00

*** NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.
FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00 *** 03/08
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**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** THE SUMMARY OF MAXIMUM PERIOD (8760 HRS) RESULTS ***

** CONC OF GEN IN (MICROGRAMS/CUBIC-METER) **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
COOL	1ST HIGHEST VALUE IS	0.00018 AT (340300.00, 3165700.00, 0.00, 0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.00017 AT (340300.00, 3167700.00, 0.00, 0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.00016 AT (340300.00, 3169800.00, 0.00, 0.00)	DC	NA
	4TH HIGHEST VALUE IS	0.00014 AT (342000.00, 3174000.00, 0.00, 0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.00014 AT (340700.00, 3171900.00, 0.00, 0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.00014 AT (343000.00, 3176200.00, 0.00, 0.00)	DC	NA
	7TH HIGHEST VALUE IS	0.00013 AT (343700.00, 3178300.00, 0.00, 0.00)	DC	NA
	8TH HIGHEST VALUE IS	0.00013 AT (334000.00, 3183400.00, 0.00, 0.00)	DC	NA
	9TH HIGHEST VALUE IS	0.00013 AT (342400.00, 3180600.00, 0.00, 0.00)	DC	NA
	10TH HIGHEST VALUE IS	0.00012 AT (336500.00, 3183400.00, 0.00, 0.00)	DC	NA
ALL	1ST HIGHEST VALUE IS	0.00422 AT (340300.00, 3165700.00, 0.00, 0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.00404 AT (340300.00, 3167700.00, 0.00, 0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.00375 AT (340300.00, 3169800.00, 0.00, 0.00)	DC	NA
	4TH HIGHEST VALUE IS	0.00360 AT (343000.00, 3176200.00, 0.00, 0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.00355 AT (342000.00, 3174000.00, 0.00, 0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.00350 AT (340700.00, 3171900.00, 0.00, 0.00)	DC	NA
	7TH HIGHEST VALUE IS	0.00349 AT (343700.00, 3178300.00, 0.00, 0.00)	DC	NA
	8TH HIGHEST VALUE IS	0.00337 AT (342400.00, 3180600.00, 0.00, 0.00)	DC	NA
	9TH HIGHEST VALUE IS	0.00327 AT (336500.00, 3183400.00, 0.00, 0.00)	DC	NA
	10TH HIGHEST VALUE IS	0.00325 AT (339000.00, 3183400.00, 0.00, 0.00)	DC	NA

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00 *** 03/08
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**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF GEN IN (MICROGRAMS/CUBIC-METER) **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWOR GRID-I
COOL	HIGH 1ST HIGH VALUE IS	0.00469c	ON 87022724: AT (343700.00, 3178300.00, 0.00, 0.00)	DC	NA
ALL	HIGH 1ST HIGH VALUE IS	0.09333c	ON 87022724: AT (343700.00, 3178300.00, 0.00, 0.00)	DC	NA

*** RECEPTOR TYPES: GC = GRIDCART

GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00 *** 03/08
*** NATURAL GAS, PM CTs & COOLING TOWER 32 DEG.F BASE LOAD *** 23:38:

MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** Message Summary : ISCST3 Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 0 Warning Message(s)
A Total of 531 Informational Message(s)

A Total of 531 Calm Hours Identified

******** FATAL ERROR MESSAGES ********
*** NONE ***

******** WARNING MESSAGES ********
*** NONE ***

****
*** ISCST3 Finishes Successfully ***
****

ISC8083 RELEASE 98056

ISCST3 OUTPUT FILE NUMBER 1 :PMDBC1C.087
ISCST3 OUTPUT FILE NUMBER 2 :PMDBC1C.088
ISCST3 OUTPUT FILE NUMBER 3 :PMDBC1C.089
SCST3 OUTPUT FILE NUMBER 4 :PMDBC1C.090
SCST3 OUTPUT FILE NUMBER 5 :PMDBC1C.091
First title for last output file is: 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00
Second title for last output file is: NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING

AVERAGING TIME	YEAR	CONC (ug/m3)	DIR (deg) or X (m)	DIST (m) or Y (m)	PERIOD ENDING (YYMMDDHH)
SOURCE GROUP ID:	COOL				
Annual					
	1987	0.00018	340300.	3165700.	87123124
	1988	0.00023	340300.	3167700.	88123124
	1989	0.00025	343700.	3178300.	89123124
	1990	0.00018	340300.	3165700.	90123124
	1991	0.00026	340300.	3169800.	91123124
HIGH 24-Hour					
	1987	0.00469	343700.	3178300.	87022724
	1988	0.00616	340300.	3165700.	88071224
	1989	0.00519	340300.	3169800.	89091424
	1990	0.00360	340700.	3171900.	90080324
	1991	0.00462	340300.	3169800.	91080324
SOURCE GROUP ID:	ALL				
Annual					
	1987	0.00435	340300.	3165700.	87123124
	1988	0.00514	340300.	3167700.	88123124
	1989	0.00527	343700.	3178300.	89123124
	1990	0.00439	340300.	3165700.	90123124
	1991	0.00590	340300.	3169800.	91123124
HIGH 24-Hour					
	1987	0.09672	343700.	3178300.	87022724
	1988	0.12414	340300.	3165700.	88071224
	1989	0.08355	340300.	3167700.	89042024
	1990	0.06478	341100.	3183400.	90031524
	1991	0.08051	340300.	3169800.	91091824

All receptor computations reported with respect to a user-specified origin

GRID	0.00	0.00
DISCRETE	0.00	0.00

```
CO STARTING
CO TITLEONE 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00
CO TITLETWO NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB
CO MODELOPT DFAULT CONC   RURAL NOCMPL
CO AVERTIME  PERIOD 24 8 3 1
CO POLLUTID GEN
CO DCAYCOEF    .000000
CO RUNORNOT RUN
CO FINISHED

SO STARTING

** Source Location Cards:
**          SRCID SRCTYP        XS            YS            ZS
****  HRSG STACK NUMBER CODE
** ------------------------
**  A -  HRSG NO. 1
**  B -  HRSG NO. 2
** Source Location Cards:
**          SRCID SRCTYP      XS        YS        ZS
**   UTM                     (m)       (m)       (m)
SO LOCATION  BASE32A  POINT  421000. 3103200.   0.0
SO LOCATION  BASE32B  POINT  421000. 3103200.   0.0
**
SO LOCATION  BASE59A  POINT  421000. 3103200.   0.0
SO LOCATION  BASE59B  POINT  421000. 3103200.   0.0
**
SO LOCATION  BASE95A  POINT  421000. 3103200.   0.0
SO LOCATION  BASE95B  POINT  421000. 3103200.   0.0
**
SO LOCATION  LD7532A  POINT  421000. 3103200.   0.0
SO LOCATION  LD7532B  POINT  421000. 3103200.   0.0
**
SO LOCATION  LD7559A  POINT  421000. 3103200.   0.0
SO LOCATION  LD7559B  POINT  421000. 3103200.   0.0
**
SO LOCATION  LD7595A  POINT  421000. 3103200.   0.0
SO LOCATION  LD7595B  POINT  421000. 3103200.   0.0
**
SO LOCATION  LD6032A  POINT  421000. 3103200.   0.0
SO LOCATION  LD6032B  POINT  421000. 3103200.   0.0
**
SO LOCATION  LD6059A  POINT  421000. 3103200.   0.0
SO LOCATION  LD6059B  POINT  421000. 3103200.   0.0
**
SO LOCATION  LD6095A  POINT  421000. 3103200.   0.0
SO LOCATION  LD6095B  POINT  421000. 3103200.   0.0
**
SO LOCATION  BSPD95A  POINT  421000. 3103200.   0.0
SO LOCATION  BSPD95B  POINT  421000. 3103200.   0.0
**
** Source Parameter Cards:
** POINT:   SRCID          QS       HS        TS        VS        DS
**                        (g/s)     (m)       (K)      (m/s)     (m)
SO SRCPARAM   BASE32A     5.000     41.1      366.0     19.2      5.79
SO SRCPARAM   BASE32B     5.000     41.1      366.0     19.2      5.79
**
SO SRCPARAM   BASE59A     5.000     41.1      366.0     18.3      5.79
SO SRCPARAM   BASE59B     5.000     41.1      366.0     18.3      5.79
**
SO SRCPARAM   BASE95A     5.000     41.1      366.0     16.8      5.79
SO SRCPARAM   BASE95B     5.000     41.1      366.0     16.8      5.79
**
SO SRCPARAM   LD7532A     5.000     41.1      366.0     16.7      5.79
SO SRCPARAM   LD7532B     5.000     41.1      366.0     16.7      5.79
**
SO SRCPARAM   LD7559A     5.000     41.1      366.0     16.1      5.79
SO SRCPARAM   LD7559B     5.000     41.1      366.0     16.1      5.79
**
SO SRCPARAM   LD7595A     5.000     41.1      366.0     15.3      5.79
SO SRCPARAM   LD7595B     5.000     41.1      366.0     15.3      5.79
**
SO SRCPARAM   LD6032A     5.000     41.1      366.0     14.0      5.79
SO SRCPARAM   LD6032B     5.000     41.1      366.0     14.0      5.79
**
SO SRCPARAM   LD6059A     5.000     41.1      366.0     13.6      5.79
```

```
SO SRCPARAM    LD6059B     5.000    41.1      366.0      13.6      5.79
**
SO SRCPARAM    LD6095A     5.000    41.1      366.0      13.0      5.79
SO SRCPARAM    LD6095B     5.000    41.1      366.0      13.0      5.79
**
SO SRCPARAM    BSPD95A     5.000    41.1      366.0      18.3      5.79
SO SRCPARAM    BSPD95B     5.000    41.1      366.0      18.3      5.79
**
**
SO BUILDHGT BASE32A-BASE95A    24.38   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BASE32A-BASE95A    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BASE32A-BASE95A    29.26   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT BASE32A-BASE95A    24.38   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BASE32A-BASE95A    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BASE32A-BASE95A    29.26   24.38   24.38   24.38   24.38   24.38
SO BUILDWID BASE32A-BASE95A    32.66   80.49   94.46  105.56  113.44  117.89
SO BUILDWID BASE32A-BASE95A   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID BASE32A-BASE95A   113.44   33.15   34.02   33.85   32.66   30.48
SO BUILDWID BASE32A-BASE95A    32.66   80.49   94.46  105.56  113.44  117.89
SO BUILDWID BASE32A-BASE95A   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID BASE32A-BASE95A   113.44   33.15   34.02   33.85   32.66   30.48
**
SO BUILDHGT LD6032A-LD7595A    24.38   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT LD6032A-LD7595A    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT LD6032A-LD7595A    29.26   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT LD6032A-LD7595A    24.38   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT LD6032A-LD7595A    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT LD6032A-LD7595A    29.26   24.38   24.38   24.38   24.38   24.38
SO BUILDWID LD6032A-LD7595A    32.66   80.49   94.46  105.56  113.44  117.89
SO BUILDWID LD6032A-LD7595A   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID LD6032A-LD7595A   113.44   33.15   34.02   33.85   32.66   30.48
SO BUILDWID LD6032A-LD7595A    32.66   80.49   94.46  105.56  113.44  117.89
SO BUILDWID LD6032A-LD7595A   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID LD6032A-LD7595A   113.44   33.15   34.02   33.85   32.66   30.48
**
SO BUILDHGT BASE32B-BASE95B    24.38   24.38   29.26   29.26   29.26   29.26
SO BUILDHGT BASE32B-BASE95B    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BASE32B-BASE95B    29.26   29.26   29.26   24.38   24.38   24.38
SO BUILDHGT BASE32B-BASE95B    24.38   24.38   29.26   29.26   29.26   29.26
SO BUILDHGT BASE32B-BASE95B    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BASE32B-BASE95B    29.26   29.26   29.26   24.38   24.38   24.38
SO BUILDWID BASE32B-BASE95B    32.66   33.85   94.46  105.56  113.44  117.89
SO BUILDWID BASE32B-BASE95B   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID BASE32B-BASE95B   113.44  105.56   94.46   33.85   32.66   30.48
SO BUILDWID BASE32B-BASE95B    32.66   33.85   94.46  105.56  113.44  117.89
SO BUILDWID BASE32B-BASE95B   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID BASE32B-BASE95B   113.44  105.56   94.46   33.85   32.66   30.48
**
SO BUILDHGT LD6032B-LD7595B    24.38   24.38   29.26   29.26   29.26   29.26
SO BUILDHGT LD6032B-LD7595B    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT LD6032B-LD7595B    29.26   29.26   29.26   24.38   24.38   24.38
SO BUILDHGT LD6032B-LD7595B    24.38   24.38   29.26   29.26   29.26   29.26
SO BUILDHGT LD6032B-LD7595B    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT LD6032B-LD7595B    29.26   29.26   29.26   24.38   24.38   24.38
SO BUILDWID LD6032B-LD7595B    32.66   33.85   94.46  105.56  113.44  117.89
SO BUILDWID LD6032B-LD7595B   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID LD6032B-LD7595B   113.44  105.56   94.46   33.85   32.66   30.48
SO BUILDWID LD6032B-LD7595B    32.66   33.85   94.46  105.56  113.44  117.89
SO BUILDWID LD6032B-LD7595B   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID LD6032B-LD7595B   113.44  105.56   94.46   33.85   32.66   30.48
**
SO BUILDHGT BSPD32A-BSPD95A    24.38   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32A-BSPD95A    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32A-BSPD95A    29.26   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT BSPD32A-BSPD95A    24.38   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32A-BSPD95A    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32A-BSPD95A    29.26   24.38   24.38   24.38   24.38   24.38
SO BUILDWID BSPD32A-BSPD95A    32.66   80.49   94.46  105.56  113.44  117.89
SO BUILDWID BSPD32A-BSPD95A   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID BSPD32A-BSPD95A   113.44   33.15   34.02   33.85   32.66   30.48
SO BUILDWID BSPD32A-BSPD95A    32.66   80.49   94.46  105.56  113.44  117.89
SO BUILDWID BSPD32A-BSPD95A   118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID BSPD32A-BSPD95A   113.44   33.15   34.02   33.85   32.66   30.48
**
SO BUILDHGT BSPD32B-BSPD95B    24.38   24.38   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32B-BSPD95B    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32B-BSPD95B    29.26   29.26   29.26   24.38   24.38   24.38
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SO BUILDHGT BSPD32B-BSPD95B     24.38   24.38   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32B-BSPD95B     29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32B-BSPD95B     29.26   29.26   29.26   24.38   24.38   24.38
SO BUILDWID BSPD32B-BSPD95B     32.66   33.85   94.46  105.56  113.44  117.89
SO BUILDWID BSPD32B-BSPD95B    118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID BSPD32B-BSPD95B    113.44  105.56   94.46   33.85   32.66   30.48
SO BUILDWID BSPD32B-BSPD95B     32.66   33.85   94.46  105.56  113.44  117.89
SO BUILDWID BSPD32B-BSPD95B    118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID BSPD32B-BSPD95B    113.44  105.56   94.46   33.85   32.66   30.48
**
SO EMISUNIT    .100000E+07 (GRAMS/SEC)          (MICROGRAMS/CUBIC-METER)
SO SRCGROUP BASE32 BASE32A BASE32B
SO SRCGROUP BASE59 BASE59A BASE59B
SO SRCGROUP BASE95 BASE95A BASE95B
SO SRCGROUP LD7532 LD7532A LD7532B
SO SRCGROUP LD7559 LD7559A LD7559B
SO SRCGROUP LD7595 LD7595A LD7595B
SO SRCGROUP LD6032 LD6032A LD6032B
SO SRCGROUP LD6059 LD6059A LD6059B
SO SRCGROUP LD6095 LD6095A LD6095B
SO SRCGROUP BSPD95 BSPD95A BSPD95B
**
SO FINISHED

RE STARTING
RE DISCCART  340300 3165700
RE DISCCART  340300 3167700
RE DISCCART  340300 3169800
RE DISCCART  340700 3171900
RE DISCCART  342000 3174000
RE DISCCART  343000 3176200
RE DISCCART  343700 3178300
RE DISCCART  342400 3180600
RE DISCCART  341100 3183400
RE DISCCART  339000 3183400
RE DISCCART  336500 3183400
RE DISCCART  334000 3183400
RE DISCCART  331500 3183400
RE FINISHED

ME STARTING
ME INPUTFIL C:\MET\TPA87D.MET
ME ANEMHGHT    6.700 METERS
ME SURFDATA  12842  1987            TAMPA
ME UAIRDATA  12842  1987            RUSKIN
ME WINDCATS    1.54    3.09    5.14    8.23   10.80
ME FINISHED
**
OU STARTING
OU RECTABLE ALLAVE FIRST
OU FINISHED

***********************************
*** SETUP Finishes Successfully ***
***********************************

  *** ISCST3 - VERSION 99155 ***    *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00       ***        03/0
                                   *** NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB      ***        23:36
**MODELOPTs:                                                                                                        PAGE
CONC                      RURAL  FLAT          DFAULT                                                        NOCMPL

                                        ***    MODEL SETUP OPTIONS SUMMARY      ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Simple Terrain Model is Selected

**Model Is Setup For Calculation of Average CONCentration Values.

  --  SCAVENGING/DEPOSITION LOGIC --
**Model Uses NO DRY DEPLETION.  DDPLETE =  F
**Model Uses NO WET DEPLETION.  WDPLETE =  F
**NO WET SCAVENGING Data Provided.
**NO GAS DRY DEPOSITION Data Provided.
**Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

**Model Uses RURAL Dispersion.
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**Model Uses Regulatory DEFAULT Options:
        1. Final Plume Rise.
        2. Stack-tip Downwash.
        3. Buoyancy-induced Dispersion.
        4. Use Calms Processing Routine.
        5. Not Use Missing Data Processing Routine.
        6. Default Wind Profile Exponents.
        7. Default Vertical Potential Temperature Gradients.
        8. "Upper Bound" Values for Supersquat Buildings.
        9. No Exponential Decay for RURAL Mode

**Model Assumes Receptors on FLAT Terrain.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  4 Short Term Average(s) of:  24-HR   8-HR   3-HR   1-HR
    and Calculates PERIOD Averages

**This Run Includes:    20 Source(s);     10 Source Group(s); and     13 Receptor(s)

**The Model Assumes A Pollutant Type of:  GEN

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of PERIOD Averages by Receptor
        Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Anem. Hgt. (m) =     6.70 ;    Decay Coef. =    0.000     ;    Rot. Angle =     0.0
                 Emission Units = (GRAMS/SEC)                                ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = (MICROGRAMS/CUBIC-METER)

**Approximate Storage Requirements of Model =     1.2 MB of RAM.

**Input Runstream File:          OSPC1C.I87
**Output Print File:             OSPC1C.O87
  *** ISCST3 - VERSION 99155 ***    *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00       ***        03/0
                                    *** NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB      ***        23:36
**MODELOPTs:                                                                                                          PAGE
CONC                       RURAL  FLAT          DFAULT                                                    NOCMPL
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*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (USER UNITS)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSION RATE SCALAR VARY BY
BASE32A	0	0.50000E+01	421000.0	3103200.0	0.0	41.10	366.00	19.20	5.79	YES	
BASE32B	0	0.50000E+01	421000.0	3103200.0	0.0	41.10	366.00	19.20	5.79	YES	
BASE59A	0	0.50000E+01	421000.0	3103200.0	0.0	41.10	366.00	18.30	5.79	YES	
BASE59B	0	0.50000E+01	421000.0	3103200.0	0.0	41.10	366.00	18.30	5.79	YES	
BASE95A	0	0.50000E+01	421000.0	3103200.0	0.0	41.10	366.00	16.80	5.79	YES	
BASE95B	0	0.50000E+01	421000.0	3103200.0	0.0	41.10	366.00	16.80	5.79	YES	
LD7532A	0	0.50000E+01	421000.0	3103200.0	0.0	41.10	366.00	16.70	5.79	YES	
LD7532B	0	0.50000E+01	421000.0	3103200.0	0.0	41.10	366.00	16.70	5.79	YES	
LD7559A	0	0.50000E+01	421000.0	3103200.0	0.0	41.10	366.00	16.10	5.79	YES	
LD7559B	0	0.50000E+01	421000.0	3103200.0	0.0	41.10	366.00	16.10	5.79	YES	
LD7595A	0	0.50000E+01	421000.0	3103200.0	0.0	41.10	366.00	15.30	5.79	YES	
LD7595B	0	0.50000E+01	421000.0	3103200.0	0.0	41.10	366.00	15.30	5.79	YES	
LD6032A	0	0.50000E+01	421000.0	3103200.0	0.0	41.10	366.00	14.00	5.79	YES	
LD6032B	0	0.50000E+01	421000.0	3103200.0	0.0	41.10	366.00	14.00	5.79	YES	
LD6059A	0	0.50000E+01	421000.0	3103200.0	0.0	41.10	366.00	13.60	5.79	YES	
LD6059B	0	0.50000E+01	421000.0	3103200.0	0.0	41.10	366.00	13.60	5.79	YES	
LD6095A	0	0.50000E+01	421000.0	3103200.0	0.0	41.10	366.00	13.00	5.79	YES	
LD6095B	0	0.50000E+01	421000.0	3103200.0	0.0	41.10	366.00	13.00	5.79	YES	
BSPD95A	0	0.50000E+01	421000.0	3103200.0	0.0	41.10	366.00	18.30	5.79	YES	
BSPD95B	0	0.50000E+01	421000.0	3103200.0	0.0	41.10	366.00	18.30	5.79	YES	

**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
BASE32	BASE32A , BASE32B ,
BASE59	BASE59A , BASE59B ,
BASE95	BASE95A , BASE95B ,
LD7532	LD7532A , LD7532B ,
LD7559	LD7559A , LD7559B ,
LD7595	LD7595A , LD7595B ,
LD6032	LD6032A , LD6032B ,
LD6059	LD6059A , LD6059B ,
LD6095	LD6095A , LD6095B ,
BSPD95	BSPD95A , BSPD95B ,

**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: BASE32A

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	24.4,	32.7,	0	2	29.3,	80.5,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11	
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11	
13	29.3,	113.4,	0	14	24.4,	33.2,	0	15	24.4,	34.0,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3	
19	24.4,	32.7,	0	20	29.3,	80.5,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11	
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11	
31	29.3,	113.4,	0	32	24.4,	33.2,	0	33	24.4,	34.0,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3	

SOURCE ID: BASE32B

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	24.4,	32.7,	0	2	24.4,	33.8,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11	
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11	
13	29.3,	113.4,	0	14	29.3,	105.6,	0	15	29.3,	94.5,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3	
19	24.4,	32.7,	0	20	24.4,	33.8,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11	
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11	
31	29.3,	113.4,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3	

SOURCE ID: BASE59A

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	24.4,	32.7,	0	2	29.3,	80.5,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11	
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11	
13	29.3,	113.4,	0	14	24.4,	33.2,	0	15	24.4,	34.0,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3	
19	24.4,	32.7,	0	20	29.3,	80.5,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11	
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11	
31	29.3,	113.4,	0	32	24.4,	33.2,	0	33	24.4,	34.0,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3	

SOURCE ID: BASE59B

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH
1	24.4,	32.7,	0	2	24.4,	33.8,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3, 11
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3, 11
13	29.3,	113.4,	0	14	29.3,	105.6,	0	15	29.3,	94.5,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4, 3
19	24.4,	32.7,	0	20	24.4,	33.8,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3, 11
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3, 11
31	29.3,	113.4,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4, 3

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00 *** 03/0
*** NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB *** 23:36

**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: BASE95A

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH
1	24.4,	32.7,	0	2	29.3,	80.5,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3, 11
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3, 11
13	29.3,	113.4,	0	14	24.4,	33.2,	0	15	24.4,	34.0,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4, 3
19	24.4,	32.7,	0	20	29.3,	80.5,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3, 11
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3, 11
31	29.3,	113.4,	0	32	24.4,	33.2,	0	33	24.4,	34.0,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4, 3

SOURCE ID: BASE95B

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH
1	24.4,	32.7,	0	2	24.4,	33.8,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3, 11
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3, 11
13	29.3,	113.4,	0	14	29.3,	105.6,	0	15	29.3,	94.5,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4, 3
19	24.4,	32.7,	0	20	24.4,	33.8,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3, 11
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3, 11
31	29.3,	113.4,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4, 3

SOURCE ID: LD7532A

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH
1	24.4,	32.7,	0	2	29.3,	80.5,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3, 11
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3, 11
13	29.3,	113.4,	0	14	24.4,	33.2,	0	15	24.4,	34.0,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4, 3
19	24.4,	32.7,	0	20	29.3,	80.5,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3, 11
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3, 11
31	29.3,	113.4,	0	32	24.4,	33.2,	0	33	24.4,	34.0,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4, 3

SOURCE ID: LD7532B

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH
1	24.4,	32.7,	0	2	24.4,	33.8,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3, 11
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3, 11
13	29.3,	113.4,	0	14	29.3,	105.6,	0	15	29.3,	94.5,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4, 3
19	24.4,	32.7,	0	20	24.4,	33.8,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3, 11
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3, 11
31	29.3,	113.4,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4, 3

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00 *** 03/0
*** NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB *** 23:36

**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: LD7559A

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH
1	24.4,	32.7,	0	2	29.3,	80.5,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3, 11
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3, 11
13	29.3,	113.4,	0	14	24.4,	33.2,	0	15	24.4,	34.0,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4, 3

19	24.4,	32.7, 0	20	29.3,	80.5, 0	21	29.3,	94.5, 0	22	29.3,	105.6, 0	23	29.3,	113.4, 0	24	29.3,	11
25	29.3,	118.8, 0	26	29.3,	116.0, 0	27	29.3,	109.7, 0	28	29.3,	116.0, 0	29	29.3,	118.8, 0	30	29.3,	11
31	29.3,	113.4, 0	32	24.4,	33.2, 0	33	24.4,	34.0, 0	34	24.4,	33.8, 0	35	24.4,	32.7, 0	36	24.4,	3

SOURCE ID: LD7559B

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	
1	24.4,	32.7,	0	2	24.4,	33.8,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11
13	29.3,	113.4,	0	14	29.3,	105.6,	0	15	29.3,	94.5,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3
19	24.4,	32.7,	0	20	24.4,	33.8,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11
31	29.3,	113.4,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3

SOURCE ID: LD7595A

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	
1	24.4,	32.7,	0	2	29.3,	80.5,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11
13	29.3,	113.4,	0	14	24.4,	33.2,	0	15	24.4,	34.0,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3
19	24.4,	32.7,	0	20	29.3,	80.5,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11
31	29.3,	113.4,	0	32	24.4,	33.2,	0	33	24.4,	34.0,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3

SOURCE ID: LD7595B

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	
1	24.4,	32.7,	0	2	24.4,	33.8,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11
13	29.3,	113.4,	0	14	29.3,	105.6,	0	15	29.3,	94.5,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3
19	24.4,	32.7,	0	20	24.4,	33.8,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11
31	29.3,	113.4,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3

CONC RURAL FLAT DFAULT NOCMPL

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: LD6032A

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	
1	24.4,	32.7,	0	2	29.3,	80.5,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11
13	29.3,	113.4,	0	14	24.4,	33.2,	0	15	24.4,	34.0,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3
19	24.4,	32.7,	0	20	29.3,	80.5,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11
31	29.3,	113.4,	0	32	24.4,	33.2,	0	33	24.4,	34.0,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3

SOURCE ID: LD6032B

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	
1	24.4,	32.7,	0	2	24.4,	33.8,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11
13	29.3,	113.4,	0	14	29.3,	105.6,	0	15	29.3,	94.5,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3
19	24.4,	32.7,	0	20	24.4,	33.8,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11
31	29.3,	113.4,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3

SOURCE ID: LD6059A

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	
1	24.4,	32.7,	0	2	29.3,	80.5,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11
13	29.3,	113.4,	0	14	24.4,	33.2,	0	15	24.4,	34.0,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3
19	24.4,	32.7,	0	20	29.3,	80.5,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11
31	29.3,	113.4,	0	32	24.4,	33.2,	0	33	24.4,	34.0,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3

SOURCE ID: LD6059B

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH
1	24.4,	32.7,	0	2	24.4,	33.8,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11
13	29.3,	113.4,	0	14	29.3,	105.6,	0	15	29.3,	94.5,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3
19	24.4,	32.7,	0	20	24.4,	33.8,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11
31	29.3,	113.4,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: LD6095A

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	
1	24.4,	32.7,	0	2	29.3,	80.5,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11
13	29.3,	113.4,	0	14	24.4,	33.2,	0	15	24.4,	34.0,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3
19	24.4,	32.7,	0	20	29.3,	80.5,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11
31	29.3,	113.4,	0	32	24.4,	33.2,	0	33	24.4,	34.0,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3

SOURCE ID: LD6095B

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	
1	24.4,	32.7,	0	2	24.4,	33.8,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11
13	29.3,	113.4,	0	14	29.3,	105.6,	0	15	29.3,	94.5,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3
19	24.4,	32.7,	0	20	24.4,	33.8,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11
31	29.3,	113.4,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3

SOURCE ID: BSPD95A

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	
1	24.4,	32.7,	0	2	29.3,	80.5,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11
13	29.3,	113.4,	0	14	24.4,	33.2,	0	15	24.4,	34.0,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3
19	24.4,	32.7,	0	20	29.3,	80.5,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11
31	29.3,	113.4,	0	32	24.4,	33.2,	0	33	24.4,	34.0,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3

SOURCE ID: BSPD95B

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	
1	24.4,	32.7,	0	2	24.4,	33.8,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	11
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	11
13	29.3,	113.4,	0	14	29.3,	105.6,	0	15	29.3,	94.5,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	3
19	24.4,	32.7,	0	20	24.4,	33.8,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	11
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	11
31	29.3,	113.4,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	3

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00 *** 03/0
*** NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB *** 23:36
**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZFLAG)
(METERS)

(	340300.0,	3165700.0,	0.0, 0.0);	(	340300.0,	3167700.0,	0.0, 0.0);
(	340300.0,	3169800.0,	0.0, 0.0);	(	340700.0,	3171900.0,	0.0, 0.0);
(	342000.0,	3174000.0,	0.0, 0.0);	(	343000.0,	3176200.0,	0.0, 0.0);
(	343700.0,	3178300.0,	0.0, 0.0);	(	342400.0,	3180600.0,	0.0, 0.0);

```
( 341100.0, 3183400.0,      0.0,      0.0);    ( 339000.0, 3183400.0,      0.0,      0.0);
( 336500.0, 3183400.0,      0.0,      0.0);    ( 334000.0, 3183400.0,      0.0,      0.0);
( 331500.0, 3183400.0,      0.0,      0.0);
```

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*** ISCST3 - VERSION 99155 ***   *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00     ***     03/0
                                 *** NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB    ***     23:36
**MODELOPTs:                                                                                                   PAGE
CONC                     RURAL  FLAT          DFAULT                                              NOCMPL
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*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

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1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY	WIND SPEED CATEGORY					
CATEGORY	1	2	3	4	5	6
A	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
B	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
C	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
D	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
E	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00
F	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY	WIND SPEED CATEGORY					
CATEGORY	1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01


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*** ISCST3 - VERSION 99155 ***   *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00     ***     03/0
                                 *** NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB    ***     23:36
**MODELOPTs:                                                                                                   PAGE
CONC                     RURAL  FLAT          DFAULT                                              NOCMPL
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*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

```
FILE:    C:\MET\TPA87D.MET
FORMAT: (4I2,2F9.4,F6.1,I2,2F7.1,f9.4,f10.1,f8.4,i4,f7.2)
SURFACE STATION NO.:  12842                    UPPER AIR STATION NO.:  12842
                NAME: TAMPA                                      NAME: RUSKIN
                YEAR:   1987                                     YEAR:   1987
```

YR	MN	DY	HR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-0 (M)	IPCODE	PRATE (mm/HR)
87	01	01	01	341.0	6.17	293.7	4	598.7	598.7	0.0000	0.0	0.0000	0	0.00
87	01	01	02	358.0	4.12	293.2	5	651.8	1306.0	0.0000	0.0	0.0000	0	0.00
87	01	01	03	34.0	6.17	293.2	4	704.8	704.8	0.0000	0.0	0.0000	0	0.00

87	01	01	04	73.0	6.69	291.5	4	757.8	757.8	0.0000	0.0	0.0000	0	0.00
87	01	01	05	83.0	7.20	290.9	4	810.8	810.8	0.0000	0.0	0.0000	0	0.00
87	01	01	06	102.0	7.20	290.4	4	863.8	863.8	0.0000	0.0	0.0000	0	0.00
87	01	01	07	105.0	6.69	289.3	4	916.9	916.9	0.0000	0.0	0.0000	0	0.00
37	01	01	08	113.0	7.72	288.7	4	969.9	969.9	0.0000	0.0	0.0000	0	0.00
87	01	01	09	107.0	6.17	288.2	4	1022.9	1022.9	0.0000	0.0	0.0000	0	0.00
87	01	01	10	121.0	6.17	288.2	4	1075.9	1075.9	0.0000	0.0	0.0000	0	0.00
87	01	01	11	114.0	6.69	287.6	4	1128.9	1128.9	0.0000	0.0	0.0000	0	0.00
87	01	01	12	116.0	6.17	287.0	4	1182.0	1182.0	0.0000	0.0	0.0000	0	0.00
87	01	01	13	133.0	7.20	287.6	4	1235.0	1235.0	0.0000	0.0	0.0000	0	0.00
87	01	01	14	119.0	7.72	287.6	4	1288.0	1288.0	0.0000	0.0	0.0000	0	0.00
87	01	01	15	132.0	7.20	288.2	4	1288.0	1288.0	0.0000	0.0	0.0000	0	0.00
87	01	01	16	134.0	7.72	289.3	4	1288.0	1288.0	0.0000	0.0	0.0000	0	0.00
87	01	01	17	141.0	7.20	288.2	4	1288.0	1288.0	0.0000	0.0	0.0000	0	0.00
87	01	01	18	137.0	5.14	287.6	5	1286.4	1238.1	0.0000	0.0	0.0000	0	0.00
87	01	01	19	144.0	3.60	286.5	5	1281.2	1078.6	0.0000	0.0	0.0000	0	0.00
87	01	01	20	117.0	2.06	285.4	6	1276.0	919.0	0.0000	0.0	0.0000	0	0.00
87	01	01	21	110.0	1.54	284.8	7	1270.9	759.5	0.0000	0.0	0.0000	0	0.00
87	01	01	22	112.0	0.00	283.7	7	1265.7	600.0	0.0000	0.0	0.0000	0	0.00
87	01	01	23	120.0	2.57	283.7	6	1260.5	440.5	0.0000	0.0	0.0000	0	0.00
87	01	01	24	130.0	1.54	282.6	7	1255.4	281.0	0.0000	0.0	0.0000	0	0.00

*** NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.
FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00 *** 03/0
*** NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB *** 23:36
PAGE

**MODELOPTs:
CONC RURAL FLAT DFAULT NOCMPL

*** THE SUMMARY OF MAXIMUM PERIOD (8760 HRS) RESULTS ***

** CONC OF GEN IN (MICROGRAMS/CUBIC-METER) **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
BASE32	1ST HIGHEST VALUE IS	0.00717 AT (340300.00, 3165700.00, 0.00, 0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.00687 AT (340300.00, 3167700.00, 0.00, 0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.00640 AT (340300.00, 3169800.00, 0.00, 0.00)	DC	NA
BASE59	1ST HIGHEST VALUE IS	0.00736 AT (340300.00, 3165700.00, 0.00, 0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.00703 AT (340300.00, 3167700.00, 0.00, 0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.00652 AT (340300.00, 3169800.00, 0.00, 0.00)	DC	NA
BASE95	1ST HIGHEST VALUE IS	0.00765 AT (340300.00, 3165700.00, 0.00, 0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.00732 AT (340300.00, 3167700.00, 0.00, 0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.00679 AT (340300.00, 3169800.00, 0.00, 0.00)	DC	NA
LD7532	1ST HIGHEST VALUE IS	0.00767 AT (340300.00, 3165700.00, 0.00, 0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.00733 AT (340300.00, 3167700.00, 0.00, 0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.00680 AT (340300.00, 3169800.00, 0.00, 0.00)	DC	NA
LD7559	1ST HIGHEST VALUE IS	0.00774 AT (340300.00, 3165700.00, 0.00, 0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.00740 AT (340300.00, 3167700.00, 0.00, 0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.00687 AT (340300.00, 3169800.00, 0.00, 0.00)	DC	NA
LD7595	1ST HIGHEST VALUE IS	0.00784 AT (340300.00, 3165700.00, 0.00, 0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.00749 AT (340300.00, 3167700.00, 0.00, 0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.00695 AT (340300.00, 3169800.00, 0.00, 0.00)	DC	NA
LD6032	1ST HIGHEST VALUE IS	0.00836 AT (340300.00, 3165700.00, 0.00, 0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.00797 AT (340300.00, 3167700.00, 0.00, 0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.00736 AT (340300.00, 3169800.00, 0.00, 0.00)	DC	NA
LD6059	1ST HIGHEST VALUE IS	0.00841 AT (340300.00, 3165700.00, 0.00, 0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.00802 AT (340300.00, 3167700.00, 0.00, 0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.00741 AT (340300.00, 3169800.00, 0.00, 0.00)	DC	NA
LD6095	1ST HIGHEST VALUE IS	0.00850 AT (340300.00, 3165700.00, 0.00, 0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.00809 AT (340300.00, 3167700.00, 0.00, 0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.00747 AT (340300.00, 3169800.00, 0.00, 0.00)	DC	NA
BSPD95	1ST HIGHEST VALUE IS	0.00736 AT (340300.00, 3165700.00, 0.00, 0.00)	DC	NA

2ND HIGHEST VALUE IS 0.00703 AT (340300.00, 3167700.00, 0.00, 0.00) DC NA
3RD HIGHEST VALUE IS 0.00652 AT (340300.00, 3169800.00, 0.00, 0.00) DC NA

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00 *** 03/0
*** NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB *** 23:36
**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF GEN IN (MICROGRAMS/CUBIC-METER) **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWO GRID-
BASE32 HIGH 1ST HIGH VALUE IS	0.15772c	ON 87022724:	AT (343700.00, 3178300.00, 0.00, 0.00)	DC	NA
BASE59 HIGH 1ST HIGH VALUE IS	0.16260c	ON 87022724:	AT (343700.00, 3178300.00, 0.00, 0.00)	DC	NA
BASE95 HIGH 1ST HIGH VALUE IS	0.17105c	ON 87022724:	AT (343700.00, 3178300.00, 0.00, 0.00)	DC	NA
LD7532 HIGH 1ST HIGH VALUE IS	0.17163c	ON 87022724:	AT (343700.00, 3178300.00, 0.00, 0.00)	DC	NA
LD7559 HIGH 1ST HIGH VALUE IS	0.17514c	ON 87022724:	AT (343700.00, 3178300.00, 0.00, 0.00)	DC	NA
LD7595 HIGH 1ST HIGH VALUE IS	0.17993c	ON 87022724:	AT (343700.00, 3178300.00, 0.00, 0.00)	DC	NA
LD6032 HIGH 1ST HIGH VALUE IS	0.18796c	ON 87022724:	AT (343700.00, 3178300.00, 0.00, 0.00)	DC	NA
LD6059 HIGH 1ST HIGH VALUE IS	0.19050c	ON 87022724:	AT (343700.00, 3178300.00, 0.00, 0.00)	DC	NA
6095 HIGH 1ST HIGH VALUE IS	0.19437c	ON 87022724:	AT (343700.00, 3178300.00, 0.00, 0.00)	DC	NA
BSPD95 HIGH 1ST HIGH VALUE IS	0.16260c	ON 87022724:	AT (343700.00, 3178300.00, 0.00, 0.00)	DC	NA

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00 *** 03/0
*** NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB *** 23:36
**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** THE SUMMARY OF HIGHEST 8-HR RESULTS ***

** CONC OF GEN IN (MICROGRAMS/CUBIC-METER) **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWO GRID-
BASE32 HIGH 1ST HIGH VALUE IS	0.42686	ON 87022708:	AT (343700.00, 3178300.00, 0.00, 0.00)	DC	NA
BASE59 HIGH 1ST HIGH VALUE IS	0.44008	ON 87022708:	AT (343700.00, 3178300.00, 0.00, 0.00)	DC	NA
BASE95 HIGH 1ST HIGH VALUE IS	0.46297	ON 87022708:	AT (343700.00, 3178300.00, 0.00, 0.00)	DC	NA
LD7532 HIGH 1ST HIGH VALUE IS	0.46454	ON 87022708:	AT (343700.00, 3178300.00, 0.00, 0.00)	DC	NA
LD7559 HIGH 1ST HIGH VALUE IS	0.47405	ON 87022708:	AT (343700.00, 3178300.00, 0.00, 0.00)	DC	NA
7595 HIGH 1ST HIGH VALUE IS	0.48701	ON 87022708:	AT (343700.00, 3178300.00, 0.00, 0.00)	DC	NA
LD6032 HIGH 1ST HIGH VALUE IS	0.50877	ON 87022708:	AT (343700.00, 3178300.00, 0.00, 0.00)	DC	NA

LD6059	HIGH	1ST HIGH VALUE IS	0.51564	ON 87022708: AT (	343700.00,	3178300.00,	0.00,	0.00)	DC	NA
LD6095	HIGH	1ST HIGH VALUE IS	0.52611	ON 87022708: AT (	343700.00,	3178300.00,	0.00,	0.00)	DC	NA
BSPD95	HIGH	1ST HIGH VALUE IS	0.44008	ON 87022708: AT (	343700.00,	3178300.00,	0.00,	0.00)	DC	NA

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

**MODELOPTs:
CONC RURAL FLAT DFAULT NOCMPL

*** THE SUMMARY OF HIGHEST 3-HR RESULTS ***

** CONC OF GEN IN (MICROGRAMS/CUBIC-METER) **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWO GRID-
BASE32 HIGH 1ST HIGH VALUE IS	0.68784	ON 87022706: AT (342400.00, 3180600.00, 0.00, 0.00)		DC	NA
BASE59 HIGH 1ST HIGH VALUE IS	0.71065	ON 87022706: AT (342400.00, 3180600.00, 0.00, 0.00)		DC	NA
BASE95 HIGH 1ST HIGH VALUE IS	0.75019	ON 87022706: AT (342400.00, 3180600.00, 0.00, 0.00)		DC	NA
LD7532 HIGH 1ST HIGH VALUE IS	0.75289	ON 87022706: AT (342400.00, 3180600.00, 0.00, 0.00)		DC	NA
LD7559 HIGH 1ST HIGH VALUE IS	0.76930	ON 87022706: AT (342400.00, 3180600.00, 0.00, 0.00)		DC	NA
LD7595 HIGH 1ST HIGH VALUE IS	0.79167	ON 87022706: AT (342400.00, 3180600.00, 0.00, 0.00)		DC	NA
LD6032 HIGH 1ST HIGH VALUE IS	0.82921	ON 87022706: AT (342400.00, 3180600.00, 0.00, 0.00)		DC	NA
LD6059 HIGH 1ST HIGH VALUE IS	0.84106	ON 87022706: AT (342400.00, 3180600.00, 0.00, 0.00)		DC	NA
LD6095 HIGH 1ST HIGH VALUE IS	0.85910	ON 87022706: AT (342400.00, 3180600.00, 0.00, 0.00)		DC	NA
BSPD95 HIGH 1ST HIGH VALUE IS	0.71065	ON 87022706: AT (342400.00, 3180600.00, 0.00, 0.00)		DC	NA

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

**MODELOPTs:
CONC RURAL FLAT DFAULT NOCMPL

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF GEN IN (MICROGRAMS/CUBIC-METER) **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWO GRID-
BASE32 HIGH 1ST HIGH VALUE IS	1.32436	ON 87081701: AT (340300.00, 3165700.00, 0.00, 0.00)		DC	NA
BASE59 HIGH 1ST HIGH VALUE IS	1.35758	ON 87081701: AT (340300.00, 3165700.00, 0.00, 0.00)		DC	NA
BASE95 HIGH 1ST HIGH VALUE IS	1.46475	ON 87081701: AT (340300.00, 3165700.00, 0.00, 0.00)		DC	NA
LD7532 HIGH 1ST HIGH VALUE IS	1.47277	ON 87081701: AT (340300.00, 3165700.00, 0.00, 0.00)		DC	NA
LD7559 HIGH 1ST HIGH VALUE IS	1.52190	ON 87081701: AT (340300.00, 3165700.00, 0.00, 0.00)		DC	NA
LD7595 HIGH 1ST HIGH VALUE IS	1.58982	ON 87081701: AT (340300.00, 3165700.00, 0.00, 0.00)		DC	NA

```
LD6032   HIGH  1ST HIGH VALUE IS      1.70615  ON 87081701: AT (  340300.00,  3165700.00,      0.00,      0.00) DC      NA
LD6059   HIGH  1ST HIGH VALUE IS      1.74346  ON 87081701: AT (  340300.00,  3165700.00,      0.00,      0.00) DC      NA
 095     HIGH  1ST HIGH VALUE IS      1.80079  ON 87081701: AT (  340300.00,  3165700.00,      0.00,      0.00) DC      NA
BSPD95   HIGH  1ST HIGH VALUE IS      1.35758  ON 87081701: AT (  340300.00,  3165700.00,      0.00,      0.00) DC      NA

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
                      BD = BOUNDARY
  *** ISCST3 - VERSION 99155 ***    *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00      ***        03/0
                                    *** NATURAL GAS, GENERIC EMISSION RATES, 3 LOADS X 3 TEMP; PA & DB     ***        23:36
**MODELOPTs:                                                                                                        PAGE
CONC                      RURAL  FLAT          DFAULT                                                      NOCMPL

*** Message Summary : ISCST3 Model Execution ***

 --------- Summary of Total Messages --------

A Total of            0 Fatal Error Message(s)
A Total of            0 Warning Message(s)
A Total of          531 Informational Message(s)

A Total of          531 Calm Hours Identified


   ******** FATAL ERROR MESSAGES ********
            ***  NONE  ***


   ********   WARNING MESSAGES   ********
            ***  NONE  ***


   ************************************
   *** ISCST3 Finishes Successfully ***
   ************************************
```

```
CO STARTING
CO TITLEONE 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00
CO TITLETWO NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING
 O MODELOPT DFAULT CONC   RURAL NOCMPL
CO AVERTIME  PERIOD 24
CO POLLUTID GEN
CO DCAYCOEF     .000000
CO RUNORNOT RUN
CO FINISHED

SO STARTING

** Source Location Cards:
**  HRSG STACK NUMBER CODE
** ------------------------
**  A -  HRSG NO. 1
**  B -  HRSG NO. 2
** Source Location Cards:
**           SRCID SRCTYP      XS        YS       ZS
**   UTM                      (m)       (m)      (m)
SO LOCATION  BSPD95A  POINT  421000. 3103200.   0.0
SO LOCATION  BSPD95B  POINT  421000. 3103200.   0.0
**
SO LOCATION  COOL1    POINT  421000. 3103200.   0.0
SO LOCATION  COOL2    POINT  421000. 3103200.   0.0
SO LOCATION  COOL3    POINT  421000. 3103200.   0.0
SO LOCATION  COOL4    POINT  421000. 3103200.   0.0
SO LOCATION  COOL5    POINT  421000. 3103200.   0.0
SO LOCATION  COOL6    POINT  421000. 3103200.   0.0
SO LOCATION  COOL7    POINT  421000. 3103200.   0.0
SO LOCATION  COOL8    POINT  421000. 3103200.   0.0
SO LOCATION  COOL9    POINT  421000. 3103200.   0.0
SO LOCATION  COOL10   POINT  421000. 3103200.   0.0
**
** Source Parameter Cards:
** POINT:   SRCID          QS      HS       TS       VS       DS
**                        (g/s)    (m)      (K)     (m/s)    (m)
 O SRCPARAM   BSPD95A     2.830    41.1     366.0    18.3     5.79
SO SRCPARAM   BSPD95B     2.830    41.1     366.0    18.3     5.79
**
SO SRCPARAM   COOL1       0.012    16.8     300.0    9.88     8.54
SO SRCPARAM   COOL2       0.012    16.8     300.0    9.88     8.54
SO SRCPARAM   COOL3       0.012    16.8     300.0    9.88     8.54
SO SRCPARAM   COOL4       0.012    16.8     300.0    9.88     8.54
SO SRCPARAM   COOL5       0.012    16.8     300.0    9.88     8.54
SO SRCPARAM   COOL6       0.012    16.8     300.0    9.88     8.54
SO SRCPARAM   COOL7       0.012    16.8     300.0    9.88     8.54
SO SRCPARAM   COOL8       0.012    16.8     300.0    9.88     8.54
SO SRCPARAM   COOL9       0.012    16.8     300.0    9.88     8.54
SO SRCPARAM   COOL10      0.012    16.8     300.0    9.88     8.54
**
**
SO BUILDHGT BSPD32A-BSPD95A    24.38   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32A-BSPD95A    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32A-BSPD95A    29.26   24.38   24.38   24.38   24.38   24.38
SO BUILDHGT BSPD32A-BSPD95A    24.38   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32A-BSPD95A    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32A-BSPD95A    29.26   24.38   24.38   24.38   24.38   24.38
SO BUILDWID BSPD32A-BSPD95A    32.66   80.49   94.46   105.56  113.44  117.89
SO BUILDWID BSPD32A-BSPD95A    118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID BSPD32A-BSPD95A    113.44  33.15   34.02   33.85   32.66   30.48
SO BUILDWID BSPD32A-BSPD95A    32.66   80.49   94.46   105.56  113.44  117.89
SO BUILDWID BSPD32A-BSPD95A    118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID BSPD32A-BSPD95A    113.44  33.15   34.02   33.85   32.66   30.48
**
SO BUILDHGT BSPD32B-BSPD95B    24.38   24.38   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32B-BSPD95B    29.26   29.26   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32B-BSPD95B    29.26   29.26   29.26   24.38   24.38   24.38
SO BUILDHGT BSPD32B-BSPD95B    24.38   24.38   29.26   29.26   29.26   29.26
SO BUILDHGT BSPD32B-BSPD95B    29.26   29.26   29.26   29.26   29.26   29.26
 O BUILDHGT BSPD32B-BSPD95B    29.26   29.26   29.26   24.38   24.38   24.38
SO BUILDWID BSPD32B-BSPD95B    32.66   33.85   94.46   105.56  113.44  117.89
SO BUILDWID BSPD32B-BSPD95B    118.75  116.00  109.73  116.00  118.75  117.89
SO BUILDWID BSPD32B-BSPD95B    113.44  105.56  94.46   33.85   32.66   30.48
SO BUILDWID BSPD32B-BSPD95B    32.66   33.85   94.46   105.56  113.44  117.89
SO BUILDWID BSPD32B-BSPD95B    118.75  116.00  109.73  116.00  118.75  117.89
```

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SO BUILDWID BSPD32B-BSPD95B    113.44  105.56   94.46   33.85   32.66   30.48
**
SO BUILDHGT COOL1      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL1      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL1      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL1      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL1      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL1      13.72   29.26   29.26   29.26   29.26   24.38
SO BUILDWID COOL1      85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL1      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL1      72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL1      85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL1      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL1      72.51  105.56   94.46   80.49   64.08   85.34

SO BUILDHGT COOL2      24.38   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL2      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL2      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL2      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL2      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL2      13.72   13.72   29.26   29.26   29.26   24.38
SO BUILDWID COOL2      95.43   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL2      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL2      72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL2      85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL2      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL2      72.51   79.50   94.46   80.49   64.08   85.34

SO BUILDHGT COOL3      24.38   24.38   13.72   13.72   13.72   13.72
SO BUILDHGT COOL3      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL3      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL3      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL3      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL3      13.72   13.72   29.26   29.26   29.26   29.26
SO BUILDWID COOL3      95.43  102.61   84.07   79.50   72.51   63.32
SO BUILDWID COOL3      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL3      72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL3      85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL3      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL3      72.51   79.50   94.46   80.49   64.08   45.72

SO BUILDHGT COOL4      29.26   24.38   13.72   13.72   13.72   13.72
SO BUILDHGT COOL4      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL4      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL4      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL4      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL4      13.72   13.72   13.72   29.26   29.26   29.26
SO BUILDWID COOL4      64.08  102.61   84.07   79.50   72.51   63.32
SO BUILDWID COOL4      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL4      72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL4      85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL4      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL4      72.51   79.50   84.07   80.49   64.08   45.72

SO BUILDHGT COOL5      29.26   29.26   24.38   13.72   13.72   13.72
SO BUILDHGT COOL5      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL5      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL5      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL5      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL5      13.72   13.72   13.72   13.72   29.26   29.26
SO BUILDWID COOL5      64.08   80.49  106.68   79.50   72.51   63.32
SO BUILDWID COOL5      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL5      72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL5      85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL5      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL5      72.51   79.50   84.07   86.09   64.08   45.72

SO BUILDHGT COOL6      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL6      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL6      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL6      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL6      13.72   13.72   13.72   13.72   13.72   13.72
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SO BUILDHGT COOL6      13.72   29.26   29.26   29.26   29.26   24.38
SO BUILDWID COOL6      85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL6      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL6      72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL6      85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL6      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL6      72.51  105.56   94.46   80.49   64.08   85.34

SO BUILDHGT COOL7      24.38   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL7      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL7      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL7      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL7      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL7      13.72   13.72   29.26   29.26   29.26   24.38
SO BUILDWID COOL7      95.43   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL7      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL7      72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL7      85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL7      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL7      72.51   79.50   94.46   80.49   64.08   85.34

SO BUILDHGT COOL8      24.38   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL8      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL8      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL8      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL8      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL8      13.72   13.72   13.72   29.26   29.26   29.26
SO BUILDWID COOL8      95.43   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL8      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL8      72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL8      85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL8      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL8      72.51   79.50   84.07   80.49   64.08   45.72

SO BUILDHGT COOL9      29.26   24.38   13.72   13.72   13.72   13.72
SO BUILDHGT COOL9      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL9      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL9      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL9      13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL9      13.72   13.72   13.72   29.26   29.26   29.26
SO BUILDWID COOL9      64.08  102.61   84.07   79.50   72.51   63.32
SO BUILDWID COOL9      52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL9      72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL9      85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL9      58.10   37.24   15.24   37.24   58.10   77.21
SO BUILDWID COOL9      72.51   79.50   84.07   80.49   64.08   45.72

SO BUILDHGT COOL10     29.26   29.26   13.72   13.72   13.72   13.72
SO BUILDHGT COOL10     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL10     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL10     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL10     13.72   13.72   13.72   13.72   13.72   13.72
SO BUILDHGT COOL10     13.72   13.72   13.72   13.72   29.26   29.26
SO BUILDWID COOL10     64.08   80.49   84.07   79.50   72.51   63.32
SO BUILDWID COOL10     52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL10     72.51   79.50   84.07   86.09   85.49   82.30
SO BUILDWID COOL10     85.49   86.09   84.07   79.50   72.51   63.32
SO BUILDWID COOL10     52.21   39.50   25.60   39.50   52.21   63.32
SO BUILDWID COOL10     72.51   79.50   84.07   86.09   64.08   45.72
**
SO EMISUNIT    .100000E+07 (GRAMS/SEC)          (MICROGRAMS/CUBIC-METER)
SO SRCGROUP COOL    COOL1-COOL10
SO SRCGROUP ALL
**
SO FINISHED

RE STARTING
 E DISCCART  340300 3165700
.E DISCCART  340300 3167700
RE DISCCART  340300 3169800
RE DISCCART  340700 3171900
RE DISCCART  342000 3174000
RE DISCCART  343000 3176200
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RE DISCCART  343700 3178300
RE DISCCART  342400 3180600
RE DISCCART  341100 3183400
RE DISCCART  339000 3183400
RE DISCCART  336500 3183400
RE DISCCART  334000 3183400
RE DISCCART  331500 3183400
RE FINISHED
**
ME STARTING
ME INPUTFIL C:\MET\TPA87D.MET
ME ANEMHGHT    6.700 METERS
ME SURFDATA  12842  1987            TAMPA
ME UAIRDATA  12842  1987            RUSKIN
ME WINDCATS    1.54    3.09    5.14    8.23   10.80
ME FINISHED
**
OU STARTING
OU RECTABLE ALLAVE FIRST
OU FINISHED

***********************************
*** SETUP Finishes Successfully ***
***********************************

  *** ISCST3 - VERSION 99155 ***    *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00       ***        03/08
                                   *** NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING      ***        23:39:
**MODELOPTs:                                                                                                          PAGE
CONC                    - RURAL  FLAT          DFAULT                                                      NOCMPL

                                        ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Simple Terrain Model is Selected

**Model Is Setup For Calculation of Average CONCentration Values.

  --  SCAVENGING/DEPOSITION LOGIC --
**Model Uses NO DRY DEPLETION.  DDPLETE =  F
**Model Uses NO WET DEPLETION.  WDPLETE =  F
**NO WET SCAVENGING Data Provided.
**NO GAS DRY DEPOSITION Data Provided.
**Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

**Model Uses RURAL Dispersion.

**Model Uses Regulatory DEFAULT Options:
          1. Final Plume Rise.
          2. Stack-tip Downwash.
          3. Buoyancy-induced Dispersion.
          4. Use Calms Processing Routine.
          5. Not Use Missing Data Processing Routine.
          6. Default Wind Profile Exponents.
          7. Default Vertical Potential Temperature Gradients.
          8. "Upper Bound" Values for Supersquat Buildings.
          9. No Exponential Decay for RURAL Mode

**Model Assumes Receptors on FLAT Terrain.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:  24-HR
    and Calculates PERIOD Averages

**This Run Includes:    12 Source(s);      2 Source Group(s); and      13 Receptor(s)

**The Model Assumes A Pollutant Type of:  GEN

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of PERIOD Averages by Receptor
        Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours
```

**Misc. Inputs: Anem. Hgt. (m) = 6.70 ; Decay Coef. = 0.000 ; Rot. Angle = 0.0
Emission Units = (GRAMS/SEC) ; Emission Rate Unit Factor = 0.10000E+07
Output Units = (MICROGRAMS/CUBIC-METER)

*Approximate Storage Requirements of Model = 1.2 MB of RAM.

**Input Runstream File: PMDBC1C.187
**Output Print File: PMDBC1C.087

**MODELOPTs:
CONC RURAL FLAT DFAULT NOCMPL

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (USER UNITS)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSION RATE SCALAR VARY BY
BSPD95A	0	0.28300E+01	421000.0	3103200.0	0.0	41.10	366.00	18.30	5.79	YES	
BSPD95B	0	0.28300E+01	421000.0	3103200.0	0.0	41.10	366.00	18.30	5.79	YES	
COOL1	0	0.12000E-01	421000.0	3103200.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL2	0	0.12000E-01	421000.0	3103200.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL3	0	0.12000E-01	421000.0	3103200.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL4	0	0.12000E-01	421000.0	3103200.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL5	0	0.12000E-01	421000.0	3103200.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL6	0	0.12000E-01	421000.0	3103200.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL7	0	0.12000E-01	421000.0	3103200.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL8	0	0.12000E-01	421000.0	3103200.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL9	0	0.12000E-01	421000.0	3103200.0	0.0	16.80	300.00	9.88	8.54	YES	
COOL10	0	0.12000E-01	421000.0	3103200.0	0.0	16.80	300.00	9.88	8.54	YES	

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00 *** 03/08
*** NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING *** 23:39:
PAGE
*MODELOPTs:
CONC RURAL FLAT DFAULT NOCMPL

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
COOL	COOL1 , COOL2 , COOL3 , COOL4 , COOL5 , COOL6 , COOL7 , COOL8 , COOL9 , COOL10 ,
ALL	BSPD95A , BSPD95B , COOL1 , COOL2 , COOL3 , COOL4 , COOL5 , COOL6 , COOL7 , COOL8 , COOL9 , COOL

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00 *** 03/08
*** NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING *** 23:39:
PAGE
**MODELOPTs:
CONC RURAL FLAT DFAULT NOCMPL

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: BSPD95A

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	24.4,	32.7,	0	2	29.3,	80.5,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	117
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	117
13	29.3,	113.4,	0	14	24.4,	33.2,	0	15	24.4,	34.0,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	30
19	24.4,	32.7,	0	20	29.3,	80.5,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	117
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	117
31	29.3,	113.4,	0	32	24.4,	33.2,	0	33	24.4,	34.0,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	30

SOURCE ID: BSPD95B

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	24.4,	32.7,	0	2	24.4,	33.8,	0	3	29.3,	94.5,	0	4	29.3,	105.6,	0	5	29.3,	113.4,	0	6	29.3,	117
7	29.3,	118.8,	0	8	29.3,	116.0,	0	9	29.3,	109.7,	0	10	29.3,	116.0,	0	11	29.3,	118.8,	0	12	29.3,	117
13	29.3,	113.4,	0	14	29.3,	105.6,	0	15	29.3,	94.5,	0	16	24.4,	33.8,	0	17	24.4,	32.7,	0	18	24.4,	30

19	24.4,	32.7,	0	20	24.4,	33.8,	0	21	29.3,	94.5,	0	22	29.3,	105.6,	0	23	29.3,	113.4,	0	24	29.3,	117
25	29.3,	118.8,	0	26	29.3,	116.0,	0	27	29.3,	109.7,	0	28	29.3,	116.0,	0	29	29.3,	118.8,	0	30	29.3,	117
31	29.3,	113.4,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	24.4,	33.8,	0	35	24.4,	32.7,	0	36	24.4,	30

RCE ID: COOL1

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	13.7,	85.5,	0	2	13.7,	86.1,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	24.4,	85

SOURCE ID: COOL2

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	24.4,	95.4,	0	2	13.7,	86.1,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	29.3,	94.5,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	24.4,	85

**MODELOPTs:
CONC RURAL FLAT DFAULT NOCMPL

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: COOL3

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	24.4,	95.4,	0	2	24.4,	102.6,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	29.3,	94.5,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	29.3,	45

SOURCE ID: COOL4

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	29.3,	64.1,	0	2	24.4,	102.6,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	13.7,	84.1,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	29.3,	45

SOURCE ID: COOL5

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	29.3,	64.1,	0	2	29.3,	80.5,	0	3	24.4,	106.7,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	13.7,	84.1,	0	34	13.7,	86.1,	0	35	29.3,	64.1,	0	36	29.3,	45

SOURCE ID: COOL6

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	13.7,	85.5,	0	2	13.7,	86.1,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	29.3,	105.6,	0	33	29.3,	94.5,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	24.4,	85

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00 *** 03/08
*** NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING *** 23:39:
**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: COOL7

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	24.4,	95.4,	0	2	13.7,	86.1,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	29.3,	94.5,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	24.4,	85

SOURCE ID: COOL8

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	24.4,	95.4,	0	2	13.7,	86.1,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	13.7,	84.1,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	29.3,	45

SOURCE ID: COOL9

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	29.3,	64.1,	0	2	24.4,	102.6,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	58.1,	0	26	13.7,	37.2,	0	27	13.7,	15.2,	0	28	13.7,	37.2,	0	29	13.7,	58.1,	0	30	13.7,	77
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	13.7,	84.1,	0	34	29.3,	80.5,	0	35	29.3,	64.1,	0	36	29.3,	45

SOURCE ID: COOL10

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	B
1	29.3,	64.1,	0	2	29.3,	80.5,	0	3	13.7,	84.1,	0	4	13.7,	79.5,	0	5	13.7,	72.5,	0	6	13.7,	63
7	13.7,	52.2,	0	8	13.7,	39.5,	0	9	13.7,	25.6,	0	10	13.7,	39.5,	0	11	13.7,	52.2,	0	12	13.7,	63
13	13.7,	72.5,	0	14	13.7,	79.5,	0	15	13.7,	84.1,	0	16	13.7,	86.1,	0	17	13.7,	85.5,	0	18	13.7,	82
19	13.7,	85.5,	0	20	13.7,	86.1,	0	21	13.7,	84.1,	0	22	13.7,	79.5,	0	23	13.7,	72.5,	0	24	13.7,	63
25	13.7,	52.2,	0	26	13.7,	39.5,	0	27	13.7,	25.6,	0	28	13.7,	39.5,	0	29	13.7,	52.2,	0	30	13.7,	63
31	13.7,	72.5,	0	32	13.7,	79.5,	0	33	13.7,	84.1,	0	34	13.7,	86.1,	0	35	29.3,	64.1,	0	36	29.3,	45

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00 *** 03/08
*** NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING *** 23:39:
**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZFLAG)
(METERS)

(340300.0,	3165700.0,	0.0,	0.0);	(340300.0,	3167700.0,	0.0,	0.0);
(340300.0,	3169800.0,	0.0,	0.0);	(340700.0,	3171900.0,	0.0,	0.0);
(342000.0,	3174000.0,	0.0,	0.0);	(343000.0,	3176200.0,	0.0,	0.0);
(343700.0,	3178300.0,	0.0,	0.0);	(342400.0,	3180600.0,	0.0,	0.0);
(341100.0,	3183400.0,	0.0,	0.0);	(339000.0,	3183400.0,	0.0,	0.0);
(336500.0,	3183400.0,	0.0,	0.0);	(334000.0,	3183400.0,	0.0,	0.0);
(331500.0,	3183400.0,	0.0,	0.0);				

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00 *** 03/08
*** NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING *** 23:39:
**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

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1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
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NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
B	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
C	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
D	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
E	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00
F	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00 *** 03/08
*** NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING *** 23:39:
**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

FILE: C:\MET\TPA87D.MET
FORMAT: (4I2,2F9.4,F6.1,I2,2F7.1,f9.4,f10.1,f8.4,i4,f7.2)
SURFACE STATION NO.: 12842 UPPER AIR STATION NO.: 12842
NAME: TAMPA NAME: RUSKIN
YEAR: 1987 YEAR: 1987

YR MN DY HR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-0 (M)	IPCODE	PRATE (mm/HR)
87 01 01 01	341.0	6.17	293.7	4	598.7	598.7	0.0000	0.0	0.0000	0	0.00
87 01 01 02	358.0	4.12	293.2	5	651.8	1306.0	0.0000	0.0	0.0000	0	0.00
87 01 01 03	34.0	6.17	293.2	4	704.8	704.8	0.0000	0.0	0.0000	0	0.00
87 01 01 04	73.0	6.69	291.5	4	757.8	757.8	0.0000	0.0	0.0000	0	0.00
87 01 01 05	83.0	7.20	290.9	4	810.8	810.8	0.0000	0.0	0.0000	0	0.00
87 01 01 06	102.0	7.20	290.4	4	863.8	863.8	0.0000	0.0	0.0000	0	0.00
87 01 01 07	105.0	6.69	289.3	4	916.9	916.9	0.0000	0.0	0.0000	0	0.00
87 01 01 08	113.0	7.72	288.7	4	969.9	969.9	0.0000	0.0	0.0000	0	0.00
87 01 01 09	107.0	6.17	288.2	4	1022.9	1022.9	0.0000	0.0	0.0000	0	0.00
01 01 10	121.0	6.17	288.2	4	1075.9	1075.9	0.0000	0.0	0.0000	0	0.00
01 01 11	114.0	6.69	287.6	4	1128.9	1128.9	0.0000	0.0	0.0000	0	0.00
01 01 12	116.0	6.17	287.0	4	1182.0	1182.0	0.0000	0.0	0.0000	0	0.00
87 01 01 13	133.0	7.20	287.6	4	1235.0	1235.0	0.0000	0.0	0.0000	0	0.00
87 01 01 14	119.0	7.72	287.6	4	1288.0	1288.0	0.0000	0.0	0.0000	0	0.00

87 01 01 15	132.0	7.20	288.2	4	1288.0	1288.0	0.0000	0.0	0.0000	0	0.00
87 01 01 16	134.0	7.72	289.3	4	1288.0	1288.0	0.0000	0.0	0.0000	0	0.00
87 01 01 17	141.0	7.20	288.2	4	1288.0	1288.0	0.0000	0.0	0.0000	0	0.00
87 01 01 18	137.0	5.14	287.6	5	1286.4	1238.1	0.0000	0.0	0.0000	0	0.00
87 01 01 19	144.0	3.60	286.5	5	1281.2	1078.6	0.0000	0.0	0.0000	0	0.00
87 01 01 20	117.0	2.06	285.4	6	1276.0	919.0	0.0000	0.0	0.0000	0	0.00
87 01 01 21	110.0	1.54	284.8	7	1270.9	759.5	0.0000	0.0	0.0000	0	0.00
87 01 01 22	112.0	0.00	283.7	7	1265.7	600.0	0.0000	0.0	0.0000	0	0.00
87 01 01 23	120.0	2.57	283.7	6	1260.5	440.5	0.0000	0.0	0.0000	0	0.00
87 01 01 24	130.0	1.54	282.6	7	1255.4	281.0	0.0000	0.0	0.0000	0	0.00

*** NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.
FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00 *** 03/08
*** NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING *** 23:39:

**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** THE SUMMARY OF MAXIMUM PERIOD (8760 HRS) RESULTS ***

** CONC OF GEN IN (MICROGRAMS/CUBIC-METER) **

GROUP ID	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
COOL	1ST HIGHEST VALUE IS	0.00018 AT (340300.00, 3165700.00, 0.00, 0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.00017 AT (340300.00, 3167700.00, 0.00, 0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.00016 AT (340300.00, 3169800.00, 0.00, 0.00)	DC	NA
	4TH HIGHEST VALUE IS	0.00014 AT (342000.00, 3174000.00, 0.00, 0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.00014 AT (340700.00, 3171900.00, 0.00, 0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.00014 AT (343000.00, 3176200.00, 0.00, 0.00)	DC	NA
	7TH HIGHEST VALUE IS	0.00013 AT (343700.00, 3178300.00, 0.00, 0.00)	DC	NA
	8TH HIGHEST VALUE IS	0.00013 AT (334000.00, 3183400.00, 0.00, 0.00)	DC	NA
	9TH HIGHEST VALUE IS	0.00013 AT (342400.00, 3180600.00, 0.00, 0.00)	DC	NA
	10TH HIGHEST VALUE IS	0.00012 AT (336500.00, 3183400.00, 0.00, 0.00)	DC	NA
ALL	1ST HIGHEST VALUE IS	0.00435 AT (340300.00, 3165700.00, 0.00, 0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.00415 AT (340300.00, 3167700.00, 0.00, 0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.00385 AT (340300.00, 3169800.00, 0.00, 0.00)	DC	NA
	4TH HIGHEST VALUE IS	0.00366 AT (343000.00, 3176200.00, 0.00, 0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.00362 AT (342000.00, 3174000.00, 0.00, 0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.00358 AT (340700.00, 3171900.00, 0.00, 0.00)	DC	NA
	7TH HIGHEST VALUE IS	0.00355 AT (343700.00, 3178300.00, 0.00, 0.00)	DC	NA
	8TH HIGHEST VALUE IS	0.00342 AT (342400.00, 3180600.00, 0.00, 0.00)	DC	NA
	9TH HIGHEST VALUE IS	0.00333 AT (336500.00, 3183400.00, 0.00, 0.00)	DC	NA
	10TH HIGHEST VALUE IS	0.00331 AT (339000.00, 3183400.00, 0.00, 0.00)	DC	NA

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00 *** 03/08
*** NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING *** 23:39:

**MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF GEN IN (MICROGRAMS/CUBIC-METER) **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWOR GRID-I
COOL HIGH 1ST HIGH VALUE IS	0.00469c	ON 87022724: AT (343700.00, 3178300.00, 0.00, 0.00)		DC	NA
ALL HIGH 1ST HIGH VALUE IS	0.09672c	ON 87022724: AT (343700.00, 3178300.00, 0.00, 0.00)		DC	NA

*** RECEPTOR TYPES: GC = GRIDCART

GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** ISCST3 - VERSION 99155 *** *** 1987 OSPREY ENERGY CENTER 2 CTS/COMBINED CYCLE-CLASS I 3/8/00 *** 03/08
*** NATURAL GAS, PM10, BASED ON 100% LOAD 95 DEG.F- /W DUCT FIRING *** 23:39:
MODELOPTs: PAGE
CONC RURAL FLAT DFAULT NOCMPL

*** Message Summary : ISCST3 Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 0 Warning Message(s)
A Total of 531 Informational Message(s)

A Total of 531 Calm Hours Identified

******** FATAL ERROR MESSAGES ********
*** NONE ***

******** WARNING MESSAGES ********
*** NONE ***

****
*** ISCST3 Finishes Successfully ***
****

COMPUTER PRINTOUTS FOR CALPUFF MODEL FOR SIGNIFICANT IMPACT AND REGIONAL HAZE ANALYSES

CALPUFF Version: 5.0 Level: 990228

****

lock time: 11:33:10
Date: 03/09/00

Run Title:
REFINED SIGNIFICANT IMPACT ANALYSIS, CALPUFF, CALPINE OSPREY 3/9/00
RECEPTORS AT CHASSAHOWITZKA NWA, PROJECT ONLY
FDEP CHASSAHOWITZKA CALMET DOMAIN WITH PRECIPITATION

INPUT GROUP: 1 -- General run control parameters

Option to run all periods found
in the met. file(s) (METRUN) Default: 0 ! METRUN = 0 !

METRUN = 0 - Run period explicitly defined below
METRUN = 1 - Run all periods in met. file(s)

Starting date: Year (IBYR) -- No default ! IBYR = 90 !
(used only if Month (IBMO) -- No default ! IBMO = 1 !
METRUN = 0) Day (IBDY) -- No default ! IBDY = 6 !
Hour (IBHR) -- No default ! IBHR = 0 !

Length of run (hours) (IRLG) -- No default ! IRLG = 8616 !

Number of chemical species (NSPEC)
Default: 5 ! NSPEC = 6 !

Number of chemical species
to be emitted (NSE) Default: 3 ! NSE = 3 !

Flag to stop run after
SETUP phase (ITEST) Default: 2 ! ITEST = 2 !
(Used to allow checking
of the model inputs, files, etc.)
ITEST = 1 - STOPS program after SETUP phase
ITEST = 2 - Continues with execution of program
after SETUP

Restart Configuration:

Control flag (MRESTART) Default: 0 ! MRESTART = 0 !

0 = Do not read or write a restart file
1 = Read a restart file at the beginning of
the run
2 = Write a restart file during run
3 = Read a restart file at beginning of run
and write a restart file during run

Number of periods in Restart
output cycle (NRESPD) Default: 0 ! NRESPD = 0 !

0 = File written only at last period
>0 = File updated every NRESPD periods

Meteorological Data Format (METFM)
Default: 1 ! METFM = 1 !

METFM = 1 - CALMET binary file (CALMET.MET)
METFM = 2 - ISC ASCII file (ISCMET.MET)
METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
surface parameters file (SURFACE.DAT)

Averaging Time (minutes) (AVET)
Default: 60.0 ! AVET = 60. !
PG sigma-y is adjusted by the equation
(AVET/60.0)**0.2

!END!

INPUT GROUP: 2 -- Technical options

Vertical distribution used in the
near field (MGAUSS) Default: 1 ! MGAUSS = 1 !
0 = uniform
1 = Gaussian

Terrain adjustment method
(MCTADJ) Default: 3 ! MCTADJ = 3 !
0 = no adjustment
1 = ISC-type of terrain adjustment
2 = simple, CALPUFF-type of terrain
adjustment
3 = partial plume path adjustment

Subgrid-scale complex terrain
flag (MCTSG) Default: 0 ! MCTSG = 0 !
0 = not modeled
1 = modeled

Near-field puffs modeled as
elongated 0 (MSLUG) Default: 0 ! MSLUG = 0 !
0 = no
1 = yes (slug model used)

Transitional plume rise modeled ?
(MTRANS) Default: 1 ! MTRANS = 1 !
0 = no (i.e., final rise only)
1 = yes (i.e., transitional rise computed)

Stack tip downwash? (MTIP) Default: 1 ! MTIP = 1 !
0 = no (i.e., no stack tip downwash)
1 = yes (i.e., use stack tip downwash)

Vertical wind shear modeled above
stack top? (MSHEAR) Default: 0 ! MSHEAR = 1 !
0 = no (i.e., vertical wind shear not modeled)
1 = yes (i.e., vertical wind shear modeled)

Puff splitting allowed? (MSPLIT) Default: 0 ! MSPLIT = 0 !
0 = no (i.e., puffs not split)
1 = yes (i.e., puffs are split)

Chemical mechanism flag (MCHEM) Default: 1 ! MCHEM = 1 !
0 = chemical transformation not
modeled
1 = transformation rates computed
internally (MESOPUFF II scheme)
2 = user-specified transformation
rates used
3 = transformation rates computed
internally (RIVAD/ARM3 scheme)

Wet removal modeled ? (MWET) Default: 1 ! MWET = 1 !
0 = no
1 = yes

Dry deposition modeled ? (MDRY) Default: 1 ! MDRY = 1 !
0 = no
1 = yes
(dry deposition method specified
for each species in Input Group 3)

Method used to compute dispersion
coefficients (MDISP) Default: 3 ! MDISP = 4 !

1 = dispersion coefficients computed from measured values
of turbulence, sigma v, sigma w
2 = dispersion coefficients from internally calculated

```
        sigma v, sigma w using micrometeorological variables
        (u*, w*, L, etc.)
     3 = PG dispersion coefficients for RURAL areas (computed using
        the ISCST multi-segment approximation) and MP coefficients in
        urban areas
     4 = same as 3 except PG coefficients computed using
        the MESOPUFF II eqns.
     5 = CTDM sigmas used for stable and neutral conditions.
        For unstable conditions, sigmas are computed as in
        MDISP = 3, described above.  MDISP = 5 assumes that
        measured values are read

  Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
  (Used only if MDISP = 1 or 5)          Default: 3     ! MTURBVW =  0  !
     1 = use sigma-v or sigma-theta measurements
        from PROFILE.DAT to compute sigma-y
        (valid for METFM = 1, 2, 3, 4)
     2 = use sigma-w measurements
        from PROFILE.DAT to compute sigma-z
        (valid for METFM = 1, 2, 3, 4)
     3 = use both sigma-(v/theta) and sigma-w
        from PROFILE.DAT to compute sigma-y and sigma-z
        (valid for METFM = 1, 2, 3, 4)
     4 = use sigma-theta measurements
        from PLMMET.DAT to compute sigma-y
        (valid only if METFM = 3)

  Back-up method used to compute dispersion
  when measured turbulence data are
  missing (MDISP2)                       Default: 3     ! MDISP2 =  4  !
  (used only if MDISP = 1 or 5)
     2 = dispersion coefficients from internally calculated
        sigma v, sigma w using micrometeorological variables
        (u*, w*, L, etc.)
     3 = PG dispersion coefficients for RURAL areas (computed using
        the ISCST multi-segment approximation) and MP coefficients in
        urban areas
     4 = same as 3 except PG coefficients computed using
        the MESOPUFF II eqns.

  PG sigma-y,z adj. for roughness?       Default: 0     ! MROUGH =  0  !
  (MROUGH)
     0 = no
     1 = yes

  Partial plume penetration of           Default: 1     ! MPARTL =  1  !
  elevated inversion?
  (MPARTL)
     0 = no
     1 = yes

  Strength of temperature inversion      Default: 0     ! MTINV =  0  !
  provided in PROFILE.DAT extended records?
  (MTINV)
     0 = no (computed from measured/default gradients)
     1 = yes

  PDF used for dispersion under convective conditions?
                                         Default: 0     ! MPDF =  0  !
  (MPDF)
     0 = no
     1 = yes

  Sub-Grid TIBL module used for shore line?
                                         Default: 0     ! MSGTIBL = 0  !
  (MSGTIBL)
     0 = no
     1 = yes

  Test options specified to see if
  they conform to regulatory
  values? (MREG)                         Default: 1     ! MREG =  0  !

     0 = NO checks are made
     1 = Technical options must conform to USEPA values
                 METFM     1
                 AVET      60. (s)
```

```
                    MGAUSS   1
                    MCTADJ   3
                    MTRANS   1
                    MTIP     1
                    MCHEM    1 (if modeling SOx, NOx)
                    MWET     1
                    MDRY     1
                    MDISP    3
                    MROUGH   0
                    MPARTL   1
                    SYTDEP   550. (m)
                    MHFTSZ   0

!END!

--------------------------------------------------------------------------------

INPUT GROUP: 3a, 3b -- Species list
-----------------

------------
Subgroup (3a)
------------

  The following species are modeled:

! CSPEC =          SO2 !          !END!
! CSPEC =          SO4 !          !END!
! CSPEC =          NOX !          !END!
! CSPEC =         HNO3 !          !END!
! CSPEC =          NO3 !          !END!
! CSPEC =         PM10 !          !END!

    SPECIES          MODELED          EMITTED          Dry DEPOSITED          OUTPUT GROUP NUMBER
     NAME         (0=NO, 1=YES)    (0=NO, 1=YES)     (0=NO,                  (0=NONE,
   (Limit: 12                                         1=COMPUTED-GAS          1=1st CGRUP,
    Characters                                        2=COMPUTED-PARTICLE     2=2nd CGRUP,
    in length)                                        3=USER-SPECIFIED)       3= etc.)

!          SO2  =          1,               1,          1,                    0   !
!          SO4  =          1,               0,          2,                    0   !
!          NOX  =          1,               1,          1,                    0   !
!         HNO3  =          1,               0,          1,                    0   !
!          NO3  =          1,               0,          2,                    0   !
!         PM10  =          1,               1,          2,                    0   !

!END!

-------------
Subgroup (3b)
-------------
  The following names are used for Species-Groups in which results
  for certain species are combined (added) prior to output.  The
  CGRUP name will be used as the species name in output files.
  Use this feature to model specific particle-size distributions
  by treating each size-range as a separate species.
  Order must be consistent with 3(a) above.


--------------------------------------------------------------------------------

INPUT GROUP: 4 -- Grid control parameters
--------------

METEOROLOGICAL grid:

            No. X grid cells (NX)      No default     ! NX =  25  !
            No. Y grid cells (NY)      No default     ! NY =  20  !
          No. vertical layers (NZ)     No default     ! NZ =  9   !

            Grid spacing (DGRIDKM)     No default     ! DGRIDKM = 10. !
```

Units: km

Cell face heights (ZFACE(nz+1)) No defaults
Units: m
! ZFACE = 0., 20., 50., 100., 200., 500.,1000., 1500., 2500.,3500. !

Reference Coordinates of SOUTHWEST corner of grid cell(1, 1):

X coordinate (XORIGKM) No default ! XORIGKM = 250.000 !
Y coordinate (YORIGKM) No default ! YORIGKM = 2990.00 !
Units: km

UTM zone (IUTMZN) No default ! IUTMZN = 17 !

Reference coordinates of CENTER of the domain (used in the calculation of solar elevation angles)

Latitude (deg.) (XLAT) No default ! XLAT = 28.25 !
Longitude (deg.) (XLONG) No default ! XLONG = 82.25 !
Time zone (XTZ) No default ! XTZ = 5.0 !
(PST=8, MST=7, CST=6, EST=5)

Computational grid:

The computational grid is identical to or a subset of the MET. grid.
The lower left (LL) corner of the computational grid is at grid point (IBCOMP, JBCOMP) of the MET. grid. The upper right (UR) corner of the computational grid is at grid point (IECOMP, JECOMP) of the MET. grid.
The grid spacing of the computational grid is the same as the MET. grid.

X index of LL corner (IBCOMP) No default ! IBCOMP = 1 !
(1 <= IBCOMP <= NX)

Y index of LL corner (JBCOMP) No default ! JBCOMP = 1 !
(1 <= JBCOMP <= NY)

X index of UR corner (IECOMP) No default ! IECOMP = 25 !
(1 <= IECOMP <= NX)

Y index of UR corner (JECOMP) No default ! JECOMP = 28 !
(1 <= JECOMP <= NY)

SAMPLING GRID (GRIDDED RECEPTORS):

The lower left (LL) corner of the sampling grid is at grid point (IBSAMP, JBSAMP) of the MET. grid. The upper right (UR) corner of the sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
The sampling grid must be identical to or a subset of the computational grid. It may be a nested grid inside the computational grid.
The grid spacing of the sampling grid is DGRIDKM/MESHDN.

Logical flag indicating if gridded receptors are used (LSAMP) Default: T ! LSAMP = F !
(T=yes, F=no)

X index of LL corner (IBSAMP) No default ! IBSAMP = 0 !
(IBCOMP <= IBSAMP <= IECOMP)

Y index of LL corner (JBSAMP) No default ! JBSAMP = 0 !
(JBCOMP <= JBSAMP <= JECOMP)

X index of UR corner (IESAMP) No default ! IESAMP = 0 !
(IBCOMP <= IESAMP <= IECOMP)

Y index of UR corner (JESAMP) No default ! JESAMP = 0 !
(JBCOMP <= JESAMP <= JECOMP)

```
      Nesting factor of the sampling
       grid (MESHDN)                    Default: 1     ! MESHDN =  1 !
       (MESHDN is an integer >= 1)

!END!

------------------------------------------------------------------------------

INPUT GROUP: 5 -- Output Options
--------------
                                        *                       *
     FILE                          DEFAULT VALUE          VALUE THIS RUN
     ----                          -------------          --------------

   Concentrations (ICON)                 1                ! ICON =  1   !
   Dry Fluxes (IDRY)                     1                ! IDRY =  0   !
   Wet Fluxes (IWET)                     1                ! IWET =  0   !
   Relative Humidity (IVIS)              1                ! IVIS =  0   !
    (relative humidity file is
     required for visibility
     analysis)
   Use data compression option in output file?
   (LCOMPRS)                          Default: T          ! LCOMPRS = F !

   *
    0 = Do not create file, 1 = create file


    LINE PRINTER OUTPUT OPTIONS:

       Print concentrations (ICPRT)    Default: 0         ! ICPRT =  0   !
       Print dry fluxes (IDPRT)        Default: 0         ! IDPRT =  0   !
       Print wet fluxes (IWPRT)        Default: 0         ! IWPRT =  0   !
       (0 = Do not print, 1 = Print)

       Concentration print interval
       (ICFRQ) in hours                Default: 1         ! ICFRQ =  24  !
       Dry flux print interval
       (IDFRQ) in hours                Default: 1         ! IDFRQ =  1   !
       Wet flux print interval
       (IWFRQ) in hours                Default: 1         ! IWFRQ =  1   !

       Units for Line Printer Output
       (IPRTU)                         Default: 1         ! IPRTU =  3   !
                       for                for
                  Concentration       Deposition
            1 =       g/m**3            g/m**2/s
            2 =      mg/m**3           mg/m**2/s
            3 =      ug/m**3           ug/m**2/s
            4 =      ng/m**3           ng/m**2/s
            5 =    Odour Units

       Messages tracking progress of   Default: 1         ! IMESG =  1   !
       run written to the screen ?
       (IMESG) -- 0=no, 1=yes


     SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

                 -------- CONCENTRATIONS ---------   ----------- DRY FLUXES -----------   --------- WET FLUXES ----------
     SPECIES
     /GROUP        PRINTED ?       SAVED ON DISK ?     PRINTED ?       SAVED ON DISK ?     PRINTED ?     SAVED ON DISK ?
     -------     ---------------------------------   ---------------------------------   ------------------------------
!          SO2 =        0,                1,              0,              0,              0,              0   !
!          SO4 =        0,                1,              0,              0,              0,              0   !
!          NOX =        0,                1,              0,              0,              0,              0   !
!         HNO3 =        0,                1,              0,              0,              0,              0   !
!          NO3 =        0,                1,              0,              0,              0,              0   !
!         PM10 =        0,                1,              0,              0,              0,              0   !

     OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

       Logical for debug output
```

```
      (LDEBUG)                              Default: F     ! LDEBUG = F !

      Number of puffs to track
      (NPFDEB)                              Default: 1     ! NPFDEB =  1  !

      Met. period to start output
      (NN1)                                 Default: 1     ! NN1 =  1   !

      Met. period to end output
      (NN2)                                 Default: 10    ! NN2 =  10  !

!END!

-------------------------------------------------------------------------------

INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
-------------------------

--------------
Subgroup (6a)
--------------
      Number of terrain features (NHILL)    Default: 0     ! NHILL =  0   !

      Number of special complex terrain
      receptors  (NCTREC)                   Default: 0     ! NCTREC =  0   !

      Terrain and CTSG Receptor data for
      CTSG hills input in CTDM format ?
      (MHILL)                               No Default     ! MHILL =  0   !
      1 = Hill and Receptor data created
          by CTDM processors & read from
          HILL.DAT and HILLRCT.DAT files
      2 = Hill data created by OPTHILL &
          input below in Subgroup (6b);
          Receptor data in Subgroup (6c)

      Factor to convert horizontal dimensions  Default: 1.0  ! XHILL2M = 1. !
      to meters (MHILL=1)

      Factor to convert vertical dimensions    Default: 1.0  ! ZHILL2M = 1. !
      to meters (MHILL=1)

      X-origin of CTDM system relative to      No Default    ! XCTDMKM = 0.0E00 !
      CALPUFF coordinate system, in Kilometers (MHILL=1)

      Y-origin of CTDM system relative to      No Default    ! YCTDMKM = 0.0E00 !
      CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

--------------
Subgroup (6b)
--------------

                    1 **
    HILL information

HILL        XC       YC     THETAH  ZGRID  RELIEF   EXPO 1   EXPO 2  SCALE 1  SCALE 2   AMAX1    AMAX2
 NO.       (km)     (km)    (deg.)   (m)     (m)      (m)      (m)      (m)      (m)      (m)      (m)
----       ----     ----    ------  -----  ------   ------   ------  --------  --------  -----    -----

--------------
Subgroup (6c)
--------------

    COMPLEX TERRAIN RECEPTOR INFORMATION

                  XRCT       YRCT       ZRCT        XHH
                  (km)       (km)        (m)
                 ------     -----      ------       ----

------------------
1
```

```
     Description of Complex Terrain Variables:
          XC, YC  = Coordinates of center of hill
          THETAH  = Orientation of major axis of hill (clockwise from
                    North)
          ZGRID   = Height of the  0  of the grid above mean sea
                    level
          RELIEF  = Height of the crest of the hill above the grid elevation
          EXPO 1  = Hill-shape exponent for the major axis
          EXPO 2  = Hill-shape exponent for the major axis
          SCALE 1 = Horizontal length scale along the major axis
          SCALE 2 = Horizontal length scale along the minor axis
          AMAX    = Maximum allowed axis length for the major axis
          BMAX    = Maximum allowed axis length for the major axis

          XRCT, YRCT = Coordinates of the complex terrain receptors
          ZRCT    = Height of the ground (MSL) at the complex terrain
                    Receptor
          XHH     = Hill number associated with each complex terrain receptor
                    (NOTE: MUST BE ENTERED AS A REAL NUMBER)

    **
      NOTE: DATA for each hill and CTSG receptor are treated as a separate
            input subgroup and therefore must end with an input group terminator.

------------------------------------------------------------------------------

INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases
--------------

      SPECIES     DIFFUSIVITY     ALPHA STAR      REACTIVITY    MESOPHYLL RESISTANCE     HENRY'S LAW COEFFICIENT
       NAME        (cm**2/s)                                          (s/cm)               (dimensionless)
      -------     -----------     ----------      ----------    --------------------     ----------------------

!         SO2 =      0.1509,         1000.,           8.,              0.,                    0.04 !
!         NOX =      0.1656,            1.,           8.,              5.,                     3.5 !
!        HNO3 =      0.1628,            1.,          18.,              0.,              0.00000008 !

!END!

------------------------------------------------------------------------------

INPUT GROUP: 8 -- Size parameters for dry deposition of particles
--------------

     For SINGLE SPECIES, the mean and standard deviation are used to
     compute a deposition velocity for NINT (see group 9) size-ranges,
     and these are then averaged to obtain a mean deposition velocity.

     For GROUPED SPECIES, the size distribution should be explicitly
     specified (by the 'species' in the group), and the standard deviation
     for each should be entered as 0.  The model will then use the
     deposition velocity for the stated mean diameter.

      SPECIES      GEOMETRIC MASS MEAN      GEOMETRIC STANDARD
       NAME             DIAMETER                DEVIATION
                        (microns)               (microns)
      -------      ------------------       ------------------
!         SO4 =          0.48,                    2.   !
!         NO3 =          0.48,                    2.   !
!        PM10 =          0.48,                    2.   !

!END!

------------------------------------------------------------------------------

INPUT GROUP: 9 -- Miscellaneous dry deposition parameters
--------------

     Reference cuticle resistance (s/cm)
     (RCUTR)                          Default: 30    !  RCUTR = 30. !
     Reference ground resistance  (s/cm)
     (RGR)                            Default: 10    !    RGR = 10. !
```

```
     Reference pollutant reactivity
     (REACTR)                        Default: 8     ! REACTR = 8. !

     Number of particle-size intervals used to
     evaluate effective particle deposition velocity
     (NINT)                          Default: 9     !   NINT = 9  !

     Vegetation state in unirrigated areas
     (IVEG)                          Default: 1     !   IVEG = 1  !
        IVEG=1 for active and unstressed vegetation
        IVEG=2 for active and stressed vegetation
        IVEG=3 for inactive vegetation

!END!

--------------------------------------------------------------------------------

INPUT GROUP: 10 -- Wet Deposition Parameters
---------------

                    Scavenging Coefficient -- Units: (sec)**(-1)

       Pollutant      Liquid Precip.      Frozen Precip.
       ---------      --------------      --------------
!          SO2 =        3.0E-05,            0.0E00 !
!          SO4 =        1.0E-04,           3.0E-05 !
!         HNO3 =        6.0E-05,            0.0E00 !
!          NO3 =        1.0E-04,           3.0E-05 !
!         PM10 =        1.0E-04,           3.0E-05 !

!END!

--------------------------------------------------------------------------------

INPUT GROUP: 11 -- Chemistry Parameters
---------------

     Ozone data input option (MOZ)     Default: 1          ! MOZ =  0   !
     (Used only if MCHEM = 1 or 3)
        0 = use a constant background ozone value
        1 = read hourly ozone concentrations from
            the OZONE.DAT data file

     Background ozone concentration
     (BCKO3) in ppb                    Default: 80.        ! BCKO3 = 80. !
     (Used only if MCHEM = 1 or 3 and
      MOZ = 0 or (MOZ = 1 and all hourly
      O3 data missing)

     Background ammonia concentration
     (BCKNH3) in ppb                   Default: 10.        ! BCKNH3 = 10 !

     Nighttime SO2 loss rate (RNITE1)
     in percent/hour                   Default: 0.2        ! RNITE1 = 0.2 !

     Nighttime NOx loss rate (RNITE2)
     in percent/hour                   Default: 2.0        ! RNITE2 = 2. !

     Nighttime HNO3 formation rate (RNITE3)
     in percent/hour                   Default: 2.0        ! RNITE3 = 2. !

!END!

--------------------------------------------------------------------------------

INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
---------------

     Horizontal size of puff (m) beyond which
     time-dependent dispersion equations (Heffter)
```

```
are used to determine sigma-y and
sigma-z (SYTDEP)                          Default: 550.   ! SYTDEP = 5.5E02 !

Switch for using Heffter equation for sigma z
as above (0 = Not use Heffter; 1 = use Heffter
(MHFTSZ)                                  Default: 0      ! MHFTSZ =  0   !

Stability class used to determine plume
growth rates for puffs above the boundary
layer (JSUP)                              Default: 5      ! JSUP =  5   !

Vertical dispersion constant for stable
conditions (k1 in Eqn. 2.7-3)  (CONK1)    Default: 0.01   ! CONK1 = 0.01 !

Vertical dispersion constant for neutral/
unstable conditions (k2 in Eqn. 2.7-4)
(CONK2)                                   Default: 0.1    ! CONK2 = 0.1 !

Factor for determining Transition-point from
Schulman-Scire to Huber-Snyder Building Downwash
scheme (SS used for Hs < Hb + TBD * HL)
(TBD)                                     Default: 0.5    ! TBD = 0.5 !
   TBD < 0   ==> always use Huber-Snyder
   TBD = 1.5 ==> always use Schulman-Scire
   TBD = 0.5 ==> ISC Transition-point

Range of land use categories for which
urban dispersion is assumed
(IURB1, IURB2)                            Default: 10     ! IURB1 =  10  !
                                                   19     ! IURB2 =  19  !

Site characterization parameters for single-point Met data files ---------
(needed for METFM = 2,3,4)

   Land use category for modeling domain
   (ILANDUIN)                             Default: 20     ! ILANDUIN =  20  !

   Roughness length (m) for modeling domain
   (ZOIN)                                 Default: 0.25   ! ZOIN = 0.25 !

   Leaf area index for modeling domain
   (XLAIIN)                               Default: 3.0    ! XLAIIN = 3. !

   Elevation above sea level (m)
   (ELEVIN)                               Default: 0.0    ! ELEVIN = 0. !

   Latitude (degrees) for met location
   (XLATIN)                               Default: -999.  ! XLATIN = -999. !

   Longitude (degrees) for met location
   (XLONIN)                               Default: -999.  ! XLONIN = -999. !

 Specialized information for interpreting single-point Met data files -----

   Anemometer height (m) (Used only if METFM = 2,3)
   (ANEMHT)                               Default: 10.    ! ANEMHT = 6.7 !

   Form of lateral turbulance data in PROFILE.DAT file
   (Used only if METFM = 4 or MTURBVW = 1 or 3)
   (ISIGMAV)                              Default: 1      ! ISIGMAV =  2  !
       0 = read sigma-theta
       1 = read sigma-v

   Choice of mixing heights (Used only if METFM = 4)
   (IMIXCTDM)                             Default: 0      ! IMIXCTDM =  0  !
       0 = read PREDICTED mixing heights
       1 = read OBSERVED mixing heights

 Maximum length of a slug (met. grid units)
 (XMXLEN)                                 Default: 1.0    ! XMXLEN = 1. !

 Maximum travel distance of a puff/slug (in
 grid units) during one sampling step
 (XSAMLEN)                                Default: 1.0    ! XSAMLEN = 1. !

 Maximum Number of slugs/puffs release from
 one source during one time step
```

```
(MXNEW)                                  Default: 99     ! MXNEW =  99   !

Maximum Number of sampling steps for
one puff/slug during one time step
(MXSAM)                                  Default: 99     ! MXSAM =  99   !

Number of iterations used when computing
the transport wind for a sampling step
that includes gradual rise (for CALMET
and PROFILE winds)
(NCOUNT)                                 Default: 2      ! NCOUNT =  2   !

Minimum sigma y for a new puff/slug (m)
(SYMIN)                                  Default: 1.0    ! SYMIN = 1.  !

Minimum sigma z for a new puff/slug (m)
(SZMIN)                                  Default: 1.0    ! SZMIN = 1.  !

Default minimum turbulence velocities
sigma-v and sigma-w for each
stability class (m/s)
(SVMIN(6) and SWMIN(6))      Default SVMIN : .50,  .50,  .50,  .50,  .50,  .50
                             Default SWMIN : .20,  .12,  .08,  .06,  .03,  .016

                           Stability Class :  A     B     C     D     E     F
                                             ---   ---   ---   ---   ---   ---
                                  ! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500!
                                  ! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016!

Divergence criterion for dw/dz across puff
used to initiate adjustment for horizontal
convergence (1/s)
Partial adjustment starts at CDIV(1), and
full adjustment is reached at CDIV(2)
(CDIV(2))                                Default: 0.0,0.0  ! CDIV = 0., 0. !

Minimum wind speed (m/s) allowed for
non-calm conditions. Also used as minimum
speed returned when using power-law
extrapolation toward surface
(WSCALM)                                 Default: 0.5    ! WSCALM = 0.5 !

Maximum mixing height (m)
(XMAXZI)                                 Default: 3000.  ! XMAXZI = 3000. !

Minimum mixing height (m)
(XMINZI)                                 Default: 50.    ! XMINZI = 50. !

Default wind speed classes --
5 upper bounds (m/s) are entered;
the 6th class has no upper limit
(WSCAT(5))                       Default   :
                                 ISC RURAL : 1.54, 3.09, 5.14, 8.23, 10,8 (10.8+)

                             Wind Speed Class :  1     2     3     4     5     6
                                                ---   ---   ---   ---   ---   ---
                                    ! WSCAT = 1.54, 3.09, 5.14, 8.23, 10.80 !

Default wind speed profile power-law
exponents for stabilities 1-6
(PLXO(6))                        Default   : ISC RURAL values
                                 ISC RURAL : .07, .07, .10, .15, .35, .55
                                 ISC URBAN : .15, .15, .20, .25, .30, .30

                              Stability Class :  A     B     C     D     E     F
                                                ---   ---   ---   ---   ---   ---
                                    ! PLXO = 0.07, 0.07, 0.10, 0.15, 0.35, 0.55 !

Default potential temperature gradient
for stable classes E, F (degK/m)
(PTGO(2))                        Default: 0.020, 0.035
                                   ! PTGO = 0.020,   0.035 !

Default plume path coefficients for
each stability class (used when option
for partial plume height terrain adjustment
is selected -- MCTADJ=3)
```

```
    (PPC(6))                  Stability Class :  A     B     C     D     E     F
                                 Default  PPC : .50,  .50,  .50,  .50,  .35,  .35
                                                ---   ---   ---   ---   ---   ---
                                       !  PPC = 0.50, 0.50, 0.50, 0.50, 0.35, 0.35 !

    Slug-to-puff transition criterion factor
    equal to sigma-y/length of slug
    (SL2PF)                              Default: 10.       ! SL2PF = 10. !

    Puff-splitting control variables -----------------------

      Number of puffs that result every time a puff
      is split - nsplit=2 means that 1 puff splits
      into 2
      (NSPLIT)                           Default:  3        ! NSPLIT =  3  !

      Time(s) of a day when split puffs are eligible to
      be split once again; this is typically set once
      per day, around sunset before nocturnal shear develops.
      24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
      0=do not re-split    1=eligible for re-split
      (IRESPLIT(24))                     Default:  Hour 17 = 1
      !  IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0,0 !

      Split is allowed only if last hour's mixing
      height (m) exceeds a minimum value
      (ZISPLIT)                          Default: 100.      ! ZISPLIT = 100. !

      Split is allowed only if ratio of last hour's
      mixing ht to the maximum mixing ht experienced
      by the puff is less than a maximum value (this
      postpones a split until a nocturnal layer develops)
      (ROLDMAX)                          Default: 0.25      ! ROLDMAX = 0.25 !

    Integration control variables ------------------------

      Fractional convergence criterion for numerical SLUG
      sampling integration
      (EPSSLUG)                          Default:  1.0e-04  ! EPSSLUG = 1.0E-04 !

      Fractional convergence criterion for numerical AREA
      source integration
      (EPSAREA)                          Default:  1.0e-06  ! EPSAREA = 1.0E-06 !
!END!

--------------------------------------------------------------------------------

INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters
---------------------------------

---------------
Subgroup (13a)
---------------

    Number of point sources with
    parameters provided below     (NPT1)  No default  !  NPT1 = 3 !

    Units used for point source
    emissions below               (IPTU)  Default: 1  !  IPTU =  1  !
          1 =        g/s
          2 =       kg/hr
          3 =       lb/hr
          4 =     tons/yr
          5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
          6 =     Odour Unit * m**3/min

    Number of source-species
    combinations with variable
    emissions scaling factors
    provided below in (13d)       (NSPT1) Default: 0  !  NSPT1 =  0  !

    Number of point sources with
    variable emission parameters
    provided in external file     (NPT2)  No default  !  NPT2 =  0  !
```

(If NPT2 > 0, these point
source emissions are read from
the file: PTEMARB.DAT)

!END!

Subgroup (13b)

POINT SOURCE: CONSTANT DATA [a]

Source No.	X UTM Coordinate (km)	Y UTM Coordinate (km)	Stack Height (m)	Base Elevation (m)	Stack Diameter (m)	Exit Vel. (m/s)	Exit Temp. (deg. K) [b]	Bldg. Dwash [c]	Emission Rates
1	! SRCNAM = BSPD95A !								
1	! X =	421.0000,	3103.2000,	41.10,	0.00,	5.79,	18.30,	366.0,	1.0, 1.49, 0.0, 3.96, 0.0, 0.0, 2.83
2	! SRCNAM = BSPD95B !								
1	! X =	421.0000,	3103.2000,	41.10,	0.00,	5.79,	18.30,	366.0,	1.0, 1.49, 0.0, 3.96, 0.0, 0.0, 2.83
3	! SRCNAM = COOLTOW !								
3	! X =	421.0000,	3103.2000,	16.80,	0.00,	8.54,	9.88,	300.0,	1.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.12

---

[a] Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

[b] 0. = No building downwash modeled, 1. = downwash modeled
NOTE: must be entered as a REAL number (i.e., with decimal point)

[c] An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by IPTU (e.g. 1 for g/s).

Subgroup (13c)

BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH

Source No. — Effective building width and height (in meters) every 10 degrees [a]

```
      1  ! SRCNAM = BSPD95A    !
      1  !  HEIGHT =  24.38,  29.26,  29.26,  29.26,  29.26,  29.26,
                      29.26,  29.26,  29.26,  29.26,  29.26,  29.26,
                      29.26,  24.38,  24.38,  24.38,  24.38,  24.38,
                      24.38,  29.26,  29.26,  29.26,  29.26,  29.26,
                      29.26,  29.26,  29.26,  29.26,  29.26,  29.26,
                      29.26,  24.38,  24.38,  24.38,  24.38,  24.38 !
      1  !  WIDTH =   32.66,  80.49,  94.46, 105.56, 113.44, 117.89,
                     118.75, 116.00, 109.73, 116.00, 118.75, 117.89,
                     113.44,  33.15,  34.02,  33.85,  32.66,  30.48,
                      32.66,  80.49,  94.46, 105.56, 113.44, 117.89,
                     118.75, 116.00, 109.73, 116.00, 118.75, 117.89,
                     113.44,  33.15,  34.02,  33.85,  32.66,  30.48 !

!END!
      2  ! SRCNAM = BSPD95B    !
      2  !  HEIGHT =  24.38,  29.26,  29.26,  29.26,  29.26,  29.26,
                      29.26,  29.26,  29.26,  29.26,  29.26,  29.26,
                      29.26,  24.38,  24.38,  24.38,  24.38,  24.38,
                      24.38,  29.26,  29.26,  29.26,  29.26,  29.26,
                      29.26,  29.26,  29.26,  29.26,  29.26,  29.26,
                      29.26,  24.38,  24.38,  24.38,  24.38,  24.38 !
      2  !  WIDTH =   32.66,  80.49,  94.46, 105.56, 113.44, 117.89,
                     118.75, 116.00, 109.73, 116.00, 118.75, 117.89,
                     113.44,  33.15,  34.02,  33.85,  32.66,  30.48,
                      32.66,  80.49,  94.46, 105.56, 113.44, 117.89,
                     118.75, 116.00, 109.73, 116.00, 118.75, 117.89,
                     113.44,  33.15,  34.02,  33.85,  32.66,  30.48 !
```

```
!END!
      3  ! SRCNAM = COOLTOW    !
      3  !  HEIGHT =  29.26,  29.26,  24.38,  13.72,  13.72,  13.72,
                13.72,  13.72,  13.72,  13.72,  13.72,  13.72,
                13.72,  13.72,  13.72,  13.72,  13.72,  13.72,
                13.72,  13.72,  13.72,  13.72,  13.72,  13.72,
                13.72,  13.72,  13.72,  13.72,  13.72,  13.72,
                13.72,  13.72,  13.72,  13.72,  29.26,  29.26,!
      3  !  WIDTH =   64.08,  80.49, 106.68,  79.50,  72.51,  63.32,
                52.21,  39.50,  25.60,  39.50,  52.21,  63.32,
                72.51,  79.50,  84.07,  86.09,  85.49,  82.30,
                85.49,  86.09,  84.07,  79.50,  72.51,  63.32,
                52.21,  39.50,  25.60,  39.50,  52.21,  63.32,
                72.51,  79.50,  84.07,  86.09,  64.08,  45.72,!

!END!
```

---

[a] Each pair of width and height values is treated as a separate input subgroup and therefore must end with an input group terminator.

Subgroup (13d)

---

[a]

POINT SOURCE: VARIABLE EMISSIONS DATA

Use this subgroup to describe temporal variations in the emission rates given in 13b. Factors entered multiply the rates in 13b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

IVARY determines the type of variation, and is source-specific:

(IVARY) Default: 0

- 0 = Constant
- 1 = Diurnal cycle (24 scaling factors: hours 1-24)
- 2 = Monthly cycle (12 scaling factors: months 1-12)
- 3 = Hour & Season (4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
- 4 = Speed & Stab. (6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12
- 5 = Temperature (12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

---

[a] Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters

Subgroup (14a)

Number of polygon area sources with parameters specified below (NAR1) No default ! NAR1 = 0 !

Units used for area source emissions below (IARU) Default: 1 ! IARU = 1 !

- 1 = g/m**2/s
- 2 = kg/m**2/hr
- 3 = lb/m**2/hr

```
          4 =     tons/m**2/yr
          5 =     Odour Unit * m/s  (vol. flux/m**2 of odour compound)
          6 =     Odour Unit * m/min

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (14d)        (NSAR1) Default: 0  !  NSAR1 =  0  !

     Number of buoyant polygon area sources
     with variable location and emission
     parameters (NAR2)                      No default  !  NAR2 =  0  !
     (If NAR2 > 0, ALL parameter data for
     these sources are read from the file: BAEMARB.DAT)

!END!

---------------
Subgroup (14b)
---------------
                                   a
          AREA SOURCE: CONSTANT DATA
          --------------------------
                                                                  b
Source           Effect.    Base       Initial     Emission
 No.             Height   Elevation    Sigma z      Rates
                   (m)       (m)         (m)
-------          ------    ------     --------    ---------


--------
     a
      Data for each source are treated as a separate input subgroup
      and therefore must end with an input group terminator.
     b
      An emission rate must be entered for every pollutant modeled.
      Enter emission rate of zero for secondary pollutants that are
      modeled, but not emitted.  Units are specified by IARU
      (e.g. 1 for g/m**2/s).

---------------
Subgroup (14c)
---------------

          COORDINATES (UTM-km) FOR EACH VERTEX(4) OF EACH POLYGON
          -------------------------------------------------------
Source                                                             a
 No.      Ordered list of X followed by list of Y, grouped by source
------    ------------------------------------------------------------


--------
     a
      Data for each source are treated as a separate input subgroup
      and therefore must end with an input group terminator.


---------------
Subgroup (14d)
---------------
                                          a
          AREA SOURCE: VARIABLE EMISSIONS DATA
          ------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 14b.  Factors entered multiply the rates in 14b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
          0 =      Constant
          1 =      Diurnal cycle (24 scaling factors: hours 1-24)
          2 =      Monthly cycle (12 scaling factors: months 1-12)
          3 =      Hour & Season (4 groups of 24 hourly scaling factors,
                                  where first group is DEC-JAN-FEB)
          4 =      Speed & Stab. (6 groups of 6 scaling factors, where
```

first group is Stability Class A,
and the speed classes have upper
bounds (m/s) defined in Group 12
5 = Temperature (12 scaling factors, where temperature
classes have upper bounds (C) of:
0, 5, 10, 15, 20, 25, 30, 35, 40,
45, 50, 50+)

---

a
Data for each species are treated as a separate input subgroup
and therefore must end with an input group terminator.

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters

Subgroup (15a)

Number of buoyant line sources
with variable location and emission
parameters (NLN2) No default ! NLN2 = 0 !

(If NLN2 > 0, ALL parameter data for
these sources are read from the file: LNEMARB.DAT)

Number of buoyant line sources (NLINES) No default ! NLINES = 0 !

Units used for line source
emissions below (ILNU) Default: 1 ! ILNU = 1 !
1 = g/s
2 = kg/hr
3 = lb/hr
4 = tons/yr
5 = Odour Unit * m**3/s (vol. flux of odour compound)
6 = Odour Unit * m**3/min

Number of source-species
combinations with variable
emissions scaling factors
provided below in (15c) (NSLN1) Default: 0 ! NSLN1 = 0 !

Maximum number of segments used to model
each line (MXNSEG) Default: 7 ! MXNSEG = 7 !

The following variables are required only if NLINES > 0. They are
used in the buoyant line source plume rise calculations.

Number of distances at which Default: 6 ! NLRISE = 6 !
transitional rise is computed

Average line source length (XL) No default ! XL = 0. !
(in meters)

Average height of line source height (HBL) No default ! HBL = 0. !
(in meters)

Average building width (WBL) No default ! WBL = 0. !
(in meters)

Average line source width (WML) No default ! WML = 0. !
(in meters)

Average separation between buildings (DXL) No default ! DXL = 0. !
(in meters)

Average buoyancy parameter (FPRIMEL) No default ! FPRIMEL = 0. !
(in m**4/s**3)

!END!

Subgroup (15b)

BUOYANT LINE SOURCE: CONSTANT DATA
---

[a]

Source No.	Beg. X Coordinate (km)	Beg. Y Coordinate (km)	End. X Coordinate (km)	End. Y Coordinate (km)	Release Height (m)	Base Elevation (m)	Emission Rates
------	----------	----------	---------	----------	-------	---------	---------

---

[a] Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

[b] An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by ILNTU (e.g. 1 for g/s).

Subgroup (15c)

BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA [a]

Use this subgroup to describe temporal variations in the emission rates given in 15b. Factors entered multiply the rates in 15b. Skip sources here that have constant emissions.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

- 0 = Constant
- 1 = Diurnal cycle (24 scaling factors: hours 1-24)
- 2 = Monthly cycle (12 scaling factors: months 1-12)
- 3 = Hour & Season (4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
- 4 = Speed & Stab. (6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12
- 5 = Temperature (12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

---

[a] Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters

Subgroup (16a)

Number of volume sources with parameters provided in 16b,c (NVL1) No default ! NVL1 = 0 !

Units used for volume source emissions below in 16b (IVLU) Default: 1 ! IVLU = 1 !

- 1 = g/s
- 2 = kg/hr
- 3 = lb/hr

```
          4 =     tons/yr
          5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
          6 =     Odour Unit * m**3/min

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (16c)      (NSVL1)    Default: 0  !  NSVL1 =  0  !

     Gridded volume source data
     used ? (IGRDVL)                         No default  ! IGRDVL =  0  !
        0 = no
        1 = yes (gridded volume source
            emissions read from the file:
            VOLEM.DAT)

     The following parameters apply to the data in the
     gridded volume source emissions file (VOLEM.DAT)

       -  Effective height of emissions
          (VEFFHT) in meters             No default  ! VEFFHT =  0. !

       -  Initial sigma y (VSIGYI) in
          meters                         No default  ! VSIGYI =  0. !

       -  Initial sigma z (VSIGZI) in
          meters                         No default  ! VSIGZI =  0. !

!END!

---------------
Subgroup (16b)
---------------
                                    a
          VOLUME SOURCE: CONSTANT DATA
          ----------------------------
                                                                      b
       X UTM      Y UTM      Effect.    Base     Initial    Initial    Emission
     Coordinate  Coordinate  Height   Elevation  Sigma y    Sigma z     Rates
        (km)       (km)        (m)       (m)       (m)        (m)
     ----------  ----------  ------   ---------  --------   --------   --------


--------
     a
      Data for each source are treated as a separate input subgroup
      and therefore must end with an input group terminator.

     b
      An emission rate must be entered for every pollutant modeled.
      Enter emission rate of zero for secondary pollutants that are
      modeled, but not emitted.  Units are specified by IVLU
      (e.g. 1 for g/s).

---------------
Subgroup (16c)
---------------
                                         a
          VOLUME SOURCE: VARIABLE EMISSIONS DATA
          --------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 16b.  Factors entered multiply the rates in 16b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use VOLEM.DAT and IGRDVL = 1.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                 Default: 0
          0 =      Constant
          1 =      Diurnal cycle (24 scaling factors: hours 1-24)
          2 =      Monthly cycle (12 scaling factors: months 1-12)
          3 =      Hour & Season (4 groups of 24 hourly scaling factors,
                                  where first group is DEC-JAN-FEB)
          4 =      Speed & Stab. (6 groups of 6 scaling factors, where
                                  first group is Stability Class A,
                                  and the speed classes have upper
                                  bounds (m/s) defined in Group 12
```

5 = Temperature (12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

---

[a] Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUPS: 17a & 17b -- Non-gridded (discrete) receptor information

---

Subgroup (17a)

Number of non-gridded receptors (NREC) No default ! NREC = 13 !

!END!

Subgroup (17b)

NON-GRIDDED (DISCRETE) RECEPTOR DATA [a]

Receptor No.	X UTM Coordinate (km)	Y UTM Coordinate (km)	Ground Elevation (m)	
1 ! X =	340.300,	3165.700,	0.000!	!END!
2 ! X =	340.300,	3167.700,	0.000!	!END!
3 ! X =	340.300,	3169.800,	0.000!	!END!
4 ! X =	340.700,	3171.900,	0.000!	!END!
5 ! X =	342.000,	3174.000,	0.000!	!END!
6 ! X =	343.000,	3176.200,	0.000!	!END!
7 ! X =	343.700,	3178.300,	0.000!	!END!
8 ! X =	342.400,	3180.600,	0.000!	!END!
9 ! X =	341.100,	3183.400,	0.000!	!END!
10 ! X =	339.000,	3183.400,	0.000!	!END!
11 ! X =	336.500,	3183.400,	0.000!	!END!
12 ! X =	334.000,	3183.400,	0.000!	!END!
13 ! X =	331.500,	3183.400,	0.000!	!END!

INPUT FILES

Default Name	Unit No.	File Name and Path
CALPUFF.INP	1	calpuff.inp
CALMET.DAT	7	c:\calmet\chass\calmet.dat

OUTPUT FILES

Default Name	Unit No.	File Name and Path
CALPUFF.LST	2	calpuff.lst
CONC.DAT	8	calpuff.con

Data read from header records of MET output file

CALMET for Chassahowitzka Class I Area
25 x 28 x 10, 10 km meteorological grid -- wind & met model
Met. stations used: 6 surface, 3 upper air, 14 precip, 1 sea

CALMET Version: 5.0 Level: 990228

```
IBYR    =          90
IBMO    =           1
IBDY    =           6
IBHR    =           0
IBTZ    =           5
IRLG    =        8616
IRTYPE  =           1
LCALGRD = T
NXM     =          25
NYM     =          28
NZM     =           9
XGRIDM  =     10000.0
XORIGM  =     250000.
YORIGM  =    0.299000E+07
IUTMZNM =          17
IWFCOD  =           1
NSSTA   =           6
NUSTA   =           3
NPSTA   =          14
NOWSTA  =           1
NLU     =           9
IWAT1   =          55
XLATOM  =     27.0110
XLONOM  =     83.5200
LLCONFM = F
CONECM  =    0.715568
XLAT1M  =     30.0000
XLAT2M  =     60.0000
RLATOM  =     40.0000
RLONOM  =     74.0000
ZFACEM  =      0.000,    20.000,    50.000,   100.000,   200.000,   500.000,  1000.000,  1500.000,  2500.000,  3500.000,

XSSTA   =     99202.0       245138.       218957.       127395.
    307515.       163652.
YSSTA   =     104208.       238052.       156884.       294122.
    68358.9      -49623.0
XUSTA   =     99202.0       337866.      -140000.
YUSTA   =     104283.      -38575.9       306000.
XPSTA   =     108029.       245138.       220780.       92631.0
    159871.       173594.       159255.       218990.       116986.
    126483.       89036.0       99168.0       107593.       216756.
YPSTA   =     159545.       238089.       219660.       221652.
    109178.       203256.       240295.       156884.       64394.0
    145086.       82214.1       104246.       8177.98       6086.91
```

Surface roughness lengths (m) ZO

Multiply all values by 10 ** -3

```
28 I   1   2   2  302  302  933  407  407  436  436  355  355  355  354  354  355  355  355  871  871
   I   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +
27 I   1   2   2  302  302  302  574  574  660  660  467  467  467  305  305  501  501  501  355  355
   I   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +
26 I   1   1   1    7    7    7  851  851  660  660  407  407  407  379  379  660  660  501  355  355
   I   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +
25 I   1   1   1    7    7    7  851  851  660  660  407  407  407  379  379  660  660  660   89   89
   I   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +
24 I   1   1   1    1    1    1    2    2  660  660  467  467  467  379  379  204  204  204  501  501
   I   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +
23 I   1   1   1    1    1    1    2    2  660  660  467  467  467  379  379  204  204  204  501  501
   I   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +
22 I   1   1   1    1    1    1    1    1  193  193  555  555  555  461  461  177  177  177  204  204
   I   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +
21 I   1   1   1    1    1    1    1    1  193  193  555  555  555  461  461  177  177  177  204  204
   I   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +
20 I   1   1   1    1    1    1    1    1  260  260  536  536  536  501  501  102  102  102  204  204
   I   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +
19 I   1   1   1    1    1    1    1    1  260  260  536  536  536  501  501  102  102  102  204  20
   I   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +
18 I   1   1   1    1    1    1    1    1  100  100  501  501  501  354  354  109  109  109   45   45
   I   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +   +
```

17	1	1	1	1	1	1	1	1	100	100	501	501	501	354	354	109	109	109	45	45
16	1	1	1	1	1	1	1	1	174	174	305	305	305	616	616	209	209	209	105	105
15	1	1	1	1	1	1	1	1	609	174	305	305	305	616	616	209	209	209	105	105
14	1	1	1	1	1	1	1	1	609	609	301	301	301	301	301	167	167	167	536	536
13	1	1	1	1	1	1	1	1	275	275	467	467	467	308	308	24	24	24	204	204
12	1	1	1	1	1	1	1	1	275	275	467	467	467	308	308	24	24	24	204	204
11	1	1	1	1	1	16	16	16	32	32	151	151	151	436	436	308	308	308	288	288
10	1	1	1	1	1	16	16	16	32	32	151	151	151	436	436	308	308	308	288	288
9	1	1	1	1	1	2	2	2	11	11	87	87	87	103	103	149	149	149	149	149
8	1	1	1	1	1	2	2	2	11	11	87	87	87	103	103	149	149	149	149	149
7	1	1	1	1	1	1	1	1	6	6	141	141	141	103	103	149	149	149	149	149
6	1	1	1	1	1	1	1	1	6	6	141	141	141	103	103	149	149	149	149	149
5	1	1	1	1	1	1	1	1	24	24	186	186	186	103	103	149	149	149	149	149
4	1	1	1	1	1	1	1	1	24	24	186	186	186	103	103	149	149	149	149	149
3	1	1	1	1	1	1	1	1	2	2	101	101	101	103	103	149	149	149	149	149
2	1	1	1	1	1	1	1	1	1	1	44	44	44	76	76	149	149	149	149	149
1	1	1	1	1	1	1	1	1	1	1	44	44	44	76	76	149	149	149	149	149
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Surface roughness lengths (m)

ZO

Multiply all values by 10 ** -3

28	1000	1000	1000	6	6
27	436	436	436	71	71
26	436	436	436	71	71
25	708	708	708	501	501
24	282	282	282	871	871
23	282	282	282	871	871
22	380	380	380	436	436
21	380	380	380	436	436
20	468	468	468	124	124
19	468	468	468	124	124
18	251	251	251	295	295
17	251	251	251	295	295
16	186	186	186	214	214
15	186	186	186	214	214
14	126	126	126	177	177
13	82	82	82	112	112
12	82	82	82	112	112
11	72	72	72	81	81

10	72	72	72	81	81
9	263	263	263	147	147
8	263	263	263	147	147
7	226	226	226	147	147
6	226	226	226	147	147
5	50	50	50	147	147
4	50	50	50	147	147
3	87	87	87	147	147
2	87	87	87	147	147
1	89	89	89	89	89
	21	22	23	24	25

Land use categories ILANDU

Multiply all values by 10 ** -2

28	5500	5500	5500	4300	4300	4300	4200	4200	4200	4200	4200	4200	4200	4300	4300	4200	4200	4200	4200	4200
27	5500	5500	5500	4300	4300	4300	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200
26	5500	5500	5500	5500	5500	5500	4300	4300	4200	4200	4200	4200	4200	2000	2000	4200	4200	4200	4200	4200
25	5500	5500	5500	5500	5500	5500	4300	4300	4200	4200	4200	4200	4200	2000	2000	4200	4200	4200	4200	4200
24	5500	5500	5500	5500	5500	5500	5500	5500	4200	4200	4200	4200	4200	2000	2000	4200	4200	4200	4200	4200
23	5500	5500	5500	5500	5500	5500	5500	5500	4200	4200	4200	4200	4200	2000	2000	4200	4200	4200	4200	4200
22	5500	5500	5500	5500	5500	5500	5500	5500	4200	4200	4200	4200	4200	2000	2000	2000	2000	2000	2000	2000
21	5500	5500	5500	5500	5500	5500	5500	5500	4200	4200	4200	4200	4200	2000	2000	2000	2000	2000	2000	2000
20	5500	5500	5500	5500	5500	5500	5500	5500	4300	4300	4200	4200	4200	4300	4300	2000	2000	2000	2000	2000
19	5500	5500	5500	5500	5500	5500	5500	5500	4300	4300	4200	4200	4200	4300	4300	2000	2000	2000	2000	2000
18	5500	5500	5500	5500	5500	5500	5500	5500	4200	4200	4200	4200	4200	2000	2000	2000	2000	2000	2000	2000
17	5500	5500	5500	5500	5500	5500	5500	5500	4200	4200	4200	4200	4200	2000	2000	2000	2000	2000	2000	2000
16	5500	5500	5500	5500	5500	5500	5500	5500	4300	4300	2000	2000	2000	4300	4300	4300	4300	4300	4300	4300
15	5500	5500	5500	5500	5500	5500	5500	5500	4300	4300	2000	2000	2000	4300	4300	4300	4300	4300	4300	4300
14	5500	5500	5500	5500	5500	5500	5500	5500	4300	4300	2000	2000	2000	2000	2000	2000	2000	2000	4300	4300
13	5500	5500	5500	5500	5500	5500	5500	5500	2000	2000	4300	4300	4300	2000	2000	2000	2000	2000	2000	2000
12	5500	5500	5500	5500	5500	5500	5500	5500	2000	2000	4300	4300	4300	2000	2000	2000	2000	2000	2000	2000
11	5500	5500	5500	5500	5500	5500	5500	5500	1000	1000	4300	4300	4300	4200	4200	4300	4300	4300	2000	2000
10	5500	5500	5500	5500	5500	5500	5500	5500	1000	1000	4300	4300	4300	4200	4200	4300	4300	4300	2000	2000
9	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
8	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
7	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	3000	3000	3000	2000	2000	2000	2000	2000	2000	2000
6	5500	5500	5500	5500	5500	5500	5500	5500	5500	5500	3000	3000	3000	2000	2000	2000	2000	2000	2000	2000
5	5500	5500	5500	5500	5500	5500	5500	5500	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
4	5500	5500	5500	5500	5500	5500	5500	5500	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000

```
 3 I 5500  5500  5500  5500  5500  5500  5500  5500  5500  5500  2000  2000  2000  2000  2000  2000  2000  2000  2000  2000
   I    +     +     +     +     +     +     +     +     +     +     +     +     +     +     +     +     +     +     +     +
 2 I 5500  5500  5500  5500  5500  5500  5500  5500  5500  5500  3000  3000  3000  3000  3000  2000  2000  2000  2000  2000
   I    +     +     +     +     +     +     +     +     +     +     +     +     +     +     +     +     +     +     +     +
 1 I 5500  5500  5500  5500  5500  5500  5500  5500  5500  5500  3000  3000  3000  3000  3000  2000  2000  2000  2000  2000
   I    +     +     +     +     +     +     +     +     +     +     +     +     +     +     +     +     +     +     +     +
   ---------------------------------------------------------------------------------------------------------------------
        1     2     3     4     5     6     7     8     9    10    11    12    13    14    15    16    17    18    19    20
```

Land use categories ILANDU

Multiply all values by 10 ** -2

```
28 I 4200  4200  4200  5500  5500
   I    +     +     +     +     +
27 I 4200  4200  4200  4200  4200
   I    +     +     +     +     +
26 I 4200  4200  4200  4200  4200
   I    +     +     +     +     +
25 I 4200  4200  4200  4200  4200
   I    +     +     +     +     +
24 I 4200  4200  4200  4200  4200
   I    +     +     +     +     +
23 I 4200  4200  4200  4200  4200
   I    +     +     +     +     +
22 I 4300  4300  4300  4300  4300
   I    +     +     +     +     +
21 I 4300  4300  4300  4300  4300
   I    +     +     +     +     +
20 I 4300  4300  4300  4200  4200
   I    +     +     +     +     +
19 I 4300  4300  4300  4200  4200
   I    +     +     +     +     +
18 I 4300  4300  4300  4200  4200
   I    +     +     +     +     +
17 I 4300  4300  4300  4200  4200
   I    +     +     +     +     +
16 I 4300  4300  4300  4300  4300
   I    +     +     +     +     +
15 I 4300  4300  4300  4300  4300
   I    +     +     +     +     +
14 I 4300  4300  4300  2000  2000
   I    +     +     +     +     +
13 I 3000  3000  3000  3000  3000
   I    +     +     +     +     +
12 I 3000  3000  3000  3000  3000
   I    +     +     +     +     +
11 I 3000  3000  3000  3000  3000
   I    +     +     +     +     +
10 I 3000  3000  3000  3000  3000
   I    +     +     +     +     +
 9 I 4200  4200  4200  2000  2000
   I    +     +     +     +     +
 8 I 4200  4200  4200  2000  2000
   I    +     +     +     +     +
 7 I 2000  2000  2000  2000  2000
   I    +     +     +     +     +
 6 I 2000  2000  2000  2000  2000
   I    +     +     +     +     +
 5 I 2000  2000  2000  2000  2000
   I    +     +     +     +     +
 4 I 2000  2000  2000  2000  2000
   I    +     +     +     +     +
 3 I 2000  2000  2000  2000  2000
   I    +     +     +     +     +
 2 I 2000  2000  2000  2000  2000
   I    +     +     +     +     +
 1 I 3000  3000  3000  3000  3000
   I    +     +     +     +     +
   ---------------------------
        21    22    23    24    25
```

Terrain heights (m) ELEV

Multiply all values by 10 ** -2

```
28 I    0     0     0     0     0     0     0     0     0     0     0     0     0   300   730   970   560  1000  1000  1530  1850
```

27	0	0	0	0	0	0	0	0	0	0	0	150	1000	1000	1000	970	1120	1620	1990	2000
26	0	0	0	0	0	0	0	0	0	40	580	820	790	1000	1390	1390	1380	1990	2030	2020
25	0	0	0	0	0	0	0	0	0	180	880	1020	1350	1120	1960	1980	1550	1810	2150	2550
24	0	0	0	0	0	0	0	0	10	570	550	1350	1910	1860	1990	2050	1590	1810	1950	2590
23	0	0	0	0	0	0	0	0	50	160	390	990	2240	2650	2850	2710	2720	2290	2040	2980
22	0	0	0	0	0	0	0	0	0	60	900	900	2480	3460	3920	3700	3050	2840	2790	3160
21	0	0	0	0	0	0	0	0	0	0	110	820	2080	2820	3640	3980	3680	3380	4030	3340
20	0	0	0	0	0	0	0	50	650	0	0	640	2450	3200	3660	3990	4100	4270	4080	4020
19	0	0	0	0	0	0	50	430	10	0	0	330	1480	2390	2890	4190	3840	3950	4110	3930
18	0	0	0	0	0	0	0	760	210	50	680	670	1620	2770	3430	4490	3130	3960	4000	3330
17	0	0	0	0	0	0	0	520	400	810	1010	1050	1310	2420	3420	4430	3770	4060	4090	2980
16	0	0	0	0	0	0	0	90	700	1060	1480	1300	1480	1790	2730	4100	4090	4020	4150	2700
15	0	0	0	0	0	0	0	10	710	1040	1870	2000	2670	2480	2130	2970	3740	4000	4140	2620
14	0	0	0	0	0	0	0	0	500	1070	1940	2140	3510	2740	2060	2270	3540	3930	3960	2290
13	0	0	0	0	0	0	0	0	120	990	1920	2810	4240	2290	2000	2330	3590	3660	3860	2540
12	0	0	0	0	0	0	0	0	0	630	2010	3450	3070	2100	2060	2280	3820	3790	3570	3430
11	0	0	0	0	0	0	0	0	0	200	2490	2910	2120	1840	2320	2230	3410	3690	2280	2820
10	0	0	0	0	0	0	0	0	0	100	1870	2690	1510	1370	2240	2640	3200	2540	2040	2450
9	0	0	0	0	0	0	0	0	0	0	1670	2550	1120	1030	1440	2320	2150	2060	2680	2770
8	0	0	0	0	0	0	0	0	0	80	2040	1960	1000	1250	1700	2400	2290	2080	2420	2200
7	0	0	0	0	0	0	0	0	10	690	2980	1370	1100	1750	2120	2160	2140	2110	2050	1820
6	0	0	0	0	0	0	0	0	160	1080	1830	1230	1870	2200	2130	1990	1890	2540	2390	1360
5	0	0	0	0	0	10	0	0	60	1320	2480	2120	2210	2410	2360	1380	2110	3520	1620	700
4	0	0	0	0	0	0	30	0	420	1580	2220	1810	2680	2070	1850	1560	2050	3120	960	10
3	0	0	0	0	0	30	800	920	930	2080	1940	2080	3600	2810	1900	2020	2030	1590	380	290
2	0	0	0	0	20	240	990	1000	1080	2040	1980	2340	3690	2070	1840	1670	3090	1510	580	1100
1	0	0	0	150	200	450	910	1490	1300	2270	2000	2040	2630	1690	1720	1680	1750	460	980	670
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Terrain heights (m) ELEV

Multiply all values by 10 ** -2

28	1920	2590	1020	1000	1000
27	2300	3950	1210	1000	1000
26	2940	2560	1050	1000	1000
25	2880	1930	1000	1000	1000
24	2950	1530	1240	1000	1040
23	3290	1710	1740	1000	1360
22	2890	1510	2230	1220	1400
21	2020	1950	2340	1270	1940

20	2130	2210	1630	1390	2000
19	2580	1480	1020	1590	1940
18	1780	1140	1370	2000	1930
17	1610	1080	1560	2000	1850
16	1770	1260	1230	1910	1940
15	1820	1180	1160	1810	1980
14	2070	1990	1780	2000	1970
13	2600	2010	2000	1890	1770
12	3040	2850	1990	1440	1450
11	3020	2320	1380	1280	830
10	1990	1740	690	800	200
9	1050	1310	610	360	170
8	1120	670	1100	1040	840
7	1080	730	1600	1050	1000
6	390	850	1320	1000	800
5	580	1010	1050	1000	590
4	920	1000	1000	860	350
3	770	330	750	910	20
2	130	860	1000	610	0
1	240	1000	940	120	0
	21	22	23	24	25

Leaf area index XLAI

Multiply all values by 10 ** -3

28	0	400	400	5350	5350	6800	5050	5050	5250	5250	3910	3910	3910	5300	5300	5950	5950	5950	6260	6260
27	0	400	400	5350	5350	5350	5400	5400	6450	6450	5450	5450	5450	4800	4800	6300	6300	6300	5950	5950
26	0	0	0	1500	1500	1500	6400	6400	6450	6450	5050	5050	5050	3860	3860	6450	6450	6300	5950	5950
25	0	0	0	1500	1500	1500	6400	6400	6450	6450	5050	5050	5050	3860	3860	6450	6450	6450	4550	4550
24	0	0	0	0	0	0	100	100	6450	6450	5450	5450	5450	4200	4200	5000	5000	5000	6300	6300
23	0	0	0	0	0	0	100	100	6450	6450	5450	5450	5450	4200	4200	5000	5000	5000	6300	6300
22	0	0	0	0	0	0	0	0	3850	3850	4760	4760	4760	4700	4700	3300	3300	3300	3360	3360
21	0	0	0	0	0	0	0	0	3850	3850	4760	4760	4760	4700	4700	3300	3300	3300	3360	3360
20	0	0	0	0	0	0	0	0	4850	4850	5510	5510	5510	5650	5650	3000	3000	3000	3700	3700
19	0	0	0	0	0	0	0	0	4850	4850	5510	5510	5510	5650	5650	3000	3000	3000	3700	3700
18	0	0	0	0	0	0	0	0	4100	4100	5310	5310	5310	4650	4650	2860	2860	2860	2550	2550
17	0	0	0	0	0	0	0	0	4100	4100	5310	5310	5310	4650	4650	2860	2860	2860	2550	2550
16	0	0	0	0	0	0	0	0	4240	4240	4320	4320	4320	5260	5260	4200	4200	4200	3500	3500
15	0	0	0	0	0	0	0	0	4480	4240	4320	4320	4320	5260	5260	4200	4200	4200	3500	3500
14	0	0	0	0	0	0	0	0	4480	4480	4060	4060	4060	4060	4060	3030	3030	3030	5850	5850

13	0	0	0	0	0	0	0	0	3330	3330	4090	4090	4090	3910	3910	1710	1710	1710	4010	4010
12	0	0	0	0	0	0	0	0	3330	3330	4090	4090	4090	3910	3910	1710	1710	1710	4010	4010
11	0	0	0	0	0	80	80	80	100	100	2990	2990	2990	5250	5250	4900	4900	4900	4360	4360
10	0	0	0	0	0	80	80	80	100	100	2990	2990	2990	5250	5250	4900	4900	4900	4360	4360
9	0	0	0	0	0	20	20	20	70	70	3060	3060	3060	2920	2920	2600	2600	2600	2600	2600
8	0	0	0	0	0	20	20	20	70	70	3060	3060	3060	2920	2920	2600	2600	2600	2600	2600
7	0	0	0	0	0	0	0	0	860	860	2850	2850	2850	2920	2920	2600	2600	2600	2600	2600
6	0	0	0	0	0	0	0	0	860	860	2850	2850	2850	2920	2920	2600	2600	2600	2600	2600
5	0	0	0	0	0	0	0	0	1680	1680	3310	3310	3310	2920	2920	2600	2600	2600	2600	2600
4	0	0	0	0	0	0	0	0	1680	1680	3310	3310	3310	2920	2920	2600	2600	2600	2600	2600
3	0	0	0	0	0	0	0	0	20	20	2090	2090	2090	2920	2920	2600	2600	2600	2600	2600
2	0	0	0	0	0	0	0	0	0	0	1370	1370	1370	2010	2010	2600	2600	2600	2600	2600
1	0	0	0	0	0	0	0	0	0	0	1370	1370	1370	2010	2010	2600	2600	2600	2600	2600
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Leaf area index XLAI

Multiply all values by 10 ** -3

28	7000	7000	7000	1750	1750
27	5900	5900	5900	3750	3750
26	5900	5900	5900	3750	3750
25	6650	6650	6650	4940	4940
24	4810	4810	4810	6600	6600
23	4810	4810	4810	6600	6600
22	5160	5160	5160	5900	5900
21	5160	5160	5160	5900	5900
20	5760	5760	5760	4150	4150
19	5760	5760	5760	4150	4150
18	3930	3930	3930	4550	4550
17	3930	3930	3930	4550	4550
16	4300	4300	4300	4050	4050
15	4300	4300	4300	4050	4050
14	3910	3910	3910	3950	3950
13	2480	2480	2480	2400	2400
12	2480	2480	2480	2400	2400
11	2650	2650	2650	2550	2550
10	2650	2650	2650	2550	2550
9	4650	4650	4650	2550	2550
8	4650	4650	4650	2550	2550
7	3680	3680	3680	2550	2550

6	3680	3680	3680	2550	2550
5	2450	2450	2450	2550	2550
4	2450	2450	2450	2550	2550
3	2100	2100	2100	2550	2550
2	2100	2100	2100	2550	2550
1	1770	1770	1770	1770	1770
	21	22	23	24	25

Nearest surface station no. to each grid point NEARS

Multiply all values by 10 ** -3

28	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	2000
27	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	2000
26	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	2000	2000
25	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	2000	2000
24	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	2000	2000	2000
23	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	2000	2000	2000
22	1000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	3000	3000	2000	2000
21	1000	1000	1000	1000	1000	1000	1000	4000	4000	4000	4000	4000	4000	4000	3000	3000	3000	3000	3000	3000
20	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	3000	3000	3000	3000	3000	3000	3000
19	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	3000	3000	3000	3000	3000	3000
18	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	3000	3000	3000	3000	3000	3000
17	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	3000	3000	3000	3000	3000	3000
16	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	3000	3000	3000	3000	3000
15	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	3000	3000	3000	3000	3000
14	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	3000	3000	3000	3000
13	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	3000	3000	3000	3000
12	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	3000	3000	3000
11	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	3000	3000	3000
10	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	3000	3000	3000
9	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	3000	3000
8	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	3000	3000
7	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	3000
6	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	3000
5	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	6000	6000	6000
4	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	6000	6000	6000	6000	6000
3	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	6000	6000	6000	6000	6000	6000
2	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
1	1000	1000	1000	1000	1000	1000	1000	1000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000

Nearest surface station no. to each grid point NEARS

Multiply all values by 10 ** -3

28	2000	2000	2000	2000	2000
27	2000	2000	2000	2000	2000
26	2000	2000	2000	2000	2000
25	2000	2000	2000	2000	2000
24	2000	2000	2000	2000	2000
23	2000	2000	2000	2000	2000
22	2000	2000	2000	2000	2000
21	3000	2000	2000	2000	2000
20	3000	3000	3000	3000	2000
19	3000	3000	3000	3000	3000
18	3000	3000	3000	3000	3000
17	3000	3000	3000	3000	3000
16	3000	3000	3000	3000	3000
15	3000	3000	3000	3000	3000
14	3000	3000	3000	3000	3000
13	3000	3000	3000	3000	3000
12	3000	3000	3000	3000	3000
11	3000	3000	3000	3000	3000
10	3000	3000	3000	3000	3000
9	3000	3000	3000	3000	5000
8	3000	3000	3000	5000	5000
7	3000	3000	5000	5000	5000
6	3000	5000	5000	5000	5000
5	6000	5000	5000	5000	5000
4	6000	5000	5000	5000	5000
3	6000	6000	5000	5000	5000
2	6000	6000	6000	5000	5000
1	6000	6000	6000	6000	5000

21 22 23 24 25

LAST DAY/HOUR PROCESSED:
Year: 90 Month: 12 Day: 30 Julian day: 364 Hour: 23

End of run -- Clock time: 11:40:00
Date: 03/09/00

Elapsed Clock Time: 410.0 (seconds)

CPU Time: 410.0 (seconds)

****

CALPOST Version 5.0 Level 990228

****

Run Title:
CALPINE OSPRAY CLASS I SINIFICANT IMPACT ANALYSIS, SO2 2/6/00
RECEPTORS AT CHASSAHOWITZKA NWA, 24,3-HOUR AND ANNUAL AVERAGING TIMES, CALPOST
2 SIMPLE-CYCLE NATURAL GAS FIRED CTs AT BASE LOAD, 32 DEGREES + COOLING TOWER

INPUT GROUP: 1 -- General run control parameters

Option to run all periods found
in the met. file(s) (METRUN) Default: 0 ! METRUN = 0 !

METRUN = 0 - Run period explicitly defined below
METRUN = 1 - Run all periods in CALPUFF data file(s)

Starting date: Year (ISYR) -- No default ! ISYR = 90 !
(used only if Month (ISMO) -- No default ! ISMO = 1 !
METRUN = 0) Day (ISDY) -- No default ! ISDY = 6 !
Hour (ISHR) -- No default ! ISHR = 0 !

Number of hours to process (NHRS) -- No default ! NHRS = 8616 !

Species to process (ASPEC) -- No default ! ASPEC = SO2 !
(ASPEC = VISIB for visibility processing)

Process every hour of data?(NREP) -- Default: 1 ! NREP = 1 !
(1 = every hour processed,
2 = every 2nd hour processed,
5 = every 5th hour processed, etc.)

Concentration and scaling factors

Layer/deposition code (ILAYER) -- Default: 1 ! ILAYER = 1 !
'1' for CALPUFF concentrations,
'-1' for dry deposition fluxes,
'-2' for wet deposition fluxes.

Scaling factors of the form: -- Defaults: ! A = 0.0 !
X(new) = X(old) * A + B A = 0.0 ! B = 0.0 !
(NOT applied if A = B = 0.0) B = 0.0

Add Hourly Background Concentrations?
(LBACK) -- Default: F ! LBACK = F !

Receptor information

Gridded receptors processed? (LG) -- Default: F ! LG = F !
Discrete receptors processed? (LD) -- Default: F ! LD = T !
CTSG Complex terrain receptors processed?
(LCT) -- Default: F ! LCT = F !

--Select range of DISCRETE receptors (only used when LD = T):

Select ALL DISCRETE receptors by setting NDRECP flag to -1;
OR
Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
0 = discrete receptor not processed
1 = discrete receptor processed
using repeated value notation to select blocks of receptors:
23*1, 15*0, 12*1
Flag for all receptors after the last one assigned is set to 0
(NDRECP) -- Default: -1
! NDRECP = -1 !

--Select range of GRIDDED receptors (only used when LG = T):

```
      X index of LL corner (IBGRID) -- Default: -1     ! IBGRID = -1  !
         (-1 OR 1 <= IBGRID <= NX)

      Y index of LL corner (JBGRID) -- Default: -1     ! JBGRID = -1  !
         (-1 OR 1 <= JBGRID <= NY)

      X index of UR corner (IEGRID) -- Default: -1     ! IEGRID = -1  !
         (-1 OR 1 <= IEGRID <= NX)

      Y index of UR corner (JEGRID) -- Default: -1     ! JEGRID = -1  !
         (-1 OR 1 <= JEGRID <= NY)

  Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1

!END!
----------------------------------------------------------------------------

INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)
--------------

    Maximum relative humidity (%) used in particle growth curve
                           (RHMAX) -- Default: 98   ! RHMAX  = 0.0 !

    Modeled species to be included in computing the light extinction
     Include SULFATE?          (LVSO4) -- Default: T   ! LVSO4  = T  !
     Include NITRATE?          (LVNO3) -- Default: T   ! LVNO3  = T  !
     Include ORGANIC CARBON?   (LVOC)  -- Default: T   ! LVOC   = T  !
     Include COARSE PARTICLES? (LVPMC) -- Default: T   ! LVPMC  = T  !
     Include FINE PARTICLES?   (LVPMF) -- Default: T   ! LVPMF  = T  !

    And, when ranking for TOP-N, TOP-50, and Exceedance tables,
     Include BACKGROUND?       (LVBK)  -- Default: T   ! LVBK   = T  !

    Species name used for particulates in MODEL.DAT file
                  COARSE    (SPECPMC) -- Default: PMC ! SPECPMC = PMC !
                  FINE      (SPECPMF) -- Default: PMF ! SPECPMF = PMF !

Extinction Efficiency (1/Mm per ug/m**3)
---------------------------------------
    MODELED particulate species:
              PM  COARSE      (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
              PM  FINE        (EEPMF) -- Default: 1.0 ! EEPMF  = 1.0 !
    BACKGROUND particulate species:
              PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
    Other species:
             AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
             AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
             ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
             SOIL             (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
             ELEMENTAL CARBON (EEEC)  -- Default: 10. ! EEEC   = 10.0 !

Background Extinction Computation
---------------------------------

    Method used for background light extinction
                           (MVISBK) -- Default: 2   ! MVISBK =  2  !

        1 =  Supply single light extinction and hygroscopic fraction
             - IWAQM (1993) RH adjustment applied to hygroscopic background
               and modeled sulfate and nitrate
        2 =  Compute extinction from speciated PM measurements (A)
             - PATH RH adjustment applied to observed and modeled sulfate
               and nitrate
             - RH factor is capped at RHMAX
        3 =  Compute extinction from speciated PM measurements (B)
             - PATH RH adjustment applied to observed and modeled sulfate
               and nitrate
             - Receptor-hour excluded if RH>RHMAX
             - Receptor-day excluded if fewer than 6 valid receptor-hours
        4 =  Read hourly transmissometer background extinction measurements
             - PATH RH adjustment applied to modeled sulfate and nitrate
             - Hour excluded if measurement invalid (missing, interference,
               or large RH)
             - Receptor-hour excluded if RH>RHMAX
             - Receptor-day excluded if fewer than 6 valid receptor-hours
        5 =  Read hourly nephelometer background extinction measurements
             - Rayleigh extinction value (BEXTRAY) added to measurement
```

```
            - PATH RH adjustment applied to modeled sulfate and nitrate
            - Hour excluded if measurement invalid (missing, interference,
              or large RH)
            - Receptor-hour excluded if RH>RHMAX
            - Receptor-day excluded if fewer than 6 valid receptor-hours

    Additional inputs used for MVISBK = 1:
    --------------------------------------
     Background light extinction (1/Mm)
                            (BEXTBK) -- No default   ! BEXTBK = 0.0 !
     Percentage of particles affected by relative humidity
                            (RHFRAC) -- No default   ! RHFRAC = 0.0 !

    Additional inputs used for MVISBK = 2,3:
    ----------------------------------------
     Background extinction coefficients are computed from monthly
     CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3),
     coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and
     elemental carbon (BKEC).  Month 1 is January.
     (ug/m**3)

     (BKSO4)  -- No default     ! BKSO4 = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKNO3)  -- No default     ! BKNO3 = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKPMC)  -- No default     ! BKPMC = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKOC)   -- No default     ! BKOC  = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKSOIL) -- No default     ! BKSOIL= 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKEC)   -- No default     ! BKEC  = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !

     Additional inputs used for MVISBK = 2,3,5:
     ------------------------------------------
      Extinction due to Rayleigh scattering is added (1/Mm)
                            (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 0.0 !

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 3 -- Processing options
-------------

Averaging time and TOP 50 Table control
---------------------------------------
    User-specified averaging time
                               (NAVG) -- Default: 0   !   NAVG =  0  !
    Top 50 table for  1-hr averages
                              (L1T50) -- Default: T   !  L1T50 = F  !
    Top 50 table for  3-hr averages
                              (L3T50) -- Default: T   !  L3T50 = F  !
    Top 50 table for 24-hr averages
                             (L24T50) -- Default: T   ! L24T50 = T  !
    Top 50 table for NAVG-hr averages
                              (LNT50) -- Default: F   !  LNT50 = F  !
    Top 50 table for length of run averages
                              (LRT50) -- Default: T   !  LRT50 = F  !

TOP 'n' Table control
---------------------

    Number of 'Top' values at each receptor
                               (NTOP) -- Default: 4   ! NTOP =  2   !
              (NTOP must be <= 4)

    Specific ranks of 'Top' values reported (NTOP values must be entered)
                       (ITOP(4) array) -- Default:     ! ITOP =  1 , 2   !
                                          1,2,3,4
```

```
    Top 'n' table for  1-hr averages
                          (L1TOPN) -- Default: F   ! L1TOPN = F  !
    Top 'n' table for  3-hr averages
                          (L3TOPN) -- Default: F   ! L3TOPN = T  !
    Top 'n' table for 24-hr averages
                          (L24TOPN) -- Default: F   ! L24TOPN = T  !
    Top 'n' table for NAVG-hr averages
                          (LNTOPN) -- Default: F   ! LNTOPN = F  !
    Top 'n' table for length of run averages
                          (LRAVG) -- Default: F   !  LRAVG = T  !


Output Units
------------
    Units for All Output       (IPRTU) -- Default: 1   ! IPRTU =  3   !
                     for            for
                Concentration   Deposition
       1 =          g/m**3        g/m**2/s
       2 =         mg/m**3       mg/m**2/s
       3 =         ug/m**3       ug/m**2/s
       4 =         ng/m**3       ng/m**2/s
       5 =       Odour Units

    Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Threshold Exceedance control
----------------------------          -- Default: -1.0

    Counts will be tabulated for each average that
    exceeds a specified non-negative threshold (output units).


    Threshold for  1-hr averages   (THRESH1)     !  THRESH1 = -1.0  !
    Threshold for  3-hr averages   (THRESH3)     !  THRESH3 = -1.0  !
    Threshold for 24-hr averages  (THRESH24)     ! THRESH24 = -1.0  !
    Threshold for NAVG-hr averages (THRESHN)     !  THRESHN = -1.0  !


Selected Day (Echo) Output Control
----------------------------------     -- Default: F
    Output 1-hr averages for selected days (LECH1)     ! LECH1   = F !
    Output 3-hr averages for selected days (LECH3)     ! LECH3   = F !
    Output 24-hr averages for selected days (LECH24)   ! LECH24  = F !
    Output NAVG-hr averages for selected days (LECHN)  ! LECHN   = F !
    Output selected information for debugging (LDEBUG) ! LDEBUG  = F !

    Days selected for output IECHO(366)-- Default: 366*0
! IECHO  = 366*0  !
     (366 values must be entered)

Plot Output Options
-------------------

     Plot files can be created for selected Top-n, Exceedance and Echo
     tables selected above.  Two formats for these files are available,
     DATA and GRID.  In the DATA format, results at all receptors are
     listed along with the receptor location [x,y,val1,val2,...].
     In the GRID format, results at only gridded receptors are written,
     using a compact representation.  The gridded values are written in
     rows (x varies), starting with the most southern row of the grid.
     The GRID format is given the .GRD extension, and includes headers
     compatible with the SURFER(R) plotting software.

     A plotting and analysis file is also created for the daily peak
     visibility summary output, in DATA format only.

     Generate Plot-File Output   (LPLT) -- Default: F   ! LPLT  = F !

     Write Top-n files in GRID format?
                               (LTGRD) -- Default: F   ! LTGRD = F !

     Write Exceedance files in GRID format?
                               (LXGRD) -- Default: F   ! LXGRD = F !
     Write Echo files in GRID format?
                               (LEGRD) -- Default: F   ! LEGRD = F !
```

!END!

CALPOST Control File Input Summary ----------

```
Replace run data with data in Puff file 1=Y:    0
                  Run starting date -- year:   90
                                      month:    1
                                        day:    6
                                  Julian day:    6
                            hour ending(0-23):    0
                           Run length (hours):  8616
                                      Species: SO2
```

Every hour of data processed -- NREP = 1

Concentration & scaling factors

```
                    Layer of processed data:    1
(>0 = concentrations, -1 = dry fluxes, -2 = wet fluxes)
              Multiplicative scaling factor: 0.0000E+00
                    Additive scaling factor: 0.0000E+00
       Hourly background concentrations used?: F
```

Receptor information

```
                Gridded receptors processed?: F
               Discrete receptors processed?: T
    CTSG Complex terrain receptors processed?: F
```

Discrete Receptors Processed

(All Discrete Receptors are Used)

Visibility Processing is NOT Selected

Averaging time & TOP 50 table control

```
   User-specified averaging time (NAVG hours):    0
             Top 50 table for  1-hr averages:    F
             Top 50 table for  3-hr averages:    F
             Top 50 table for 24-hr averages:    T
          Top 50 table for NAVG-hr averages:    F
      Top 50 table for length of run averages:    F
```

Top "n" table control

```
      Number of "top" values at each receptor:    2
      Specific ranks of "top" values reported:  1  2

            Top "n" table for  1-hr averages: F
            Top "n" table for  3-hr averages: T
            Top "n" table for 24-hr averages: T
         Top "n" table for NAVG-hr averages: F
     Top "n" table for length of run averages: T
```

Units requested for output: (ug/m**3)

Threshold Exceedance control

Exceedances of a specified value will be counted for --

Output options

```
                        Plot files created: F
    Output   1-hr averages for selected days: F
    Output   3-hr averages for selected days: F
    Output  24-hr averages for selected days: F
    Output NAVG-hr averages for selected days: F
    Output selected information for debugging: F
```

Days selected for output tables

```
0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000
0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000
```

0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000
0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 000000

IDENTIFICATION OF PROCESSED MODEL FILE ----------

CALPUFF 5.0 990228

REFINED SIGNIFICANT IMPACT ANALYSIS, CALPUFF, CALPINE OSPREY 3/9/00
RECEPTORS AT CHASSAHOWITZKA NWA, PROJECT ONLY
FDEP CHASSAHOWITZKA CALMET DOMAIN WITH PRECIPITATION

Chemical species names for each layer in model:
SO2 1
SO4 1
NOX 1
HNO3 1
NO3 1
PM10 1

********** NOTICE **********
NDRECP array reset to full range: all 1s

INPUT FILES

Default Name	Unit No.	File Name and Path
CALPOST.INP	5	calpost.inp
MODEL.DAT	4	calpuff.con

OUTPUT FILES

Default Name	Unit No.	File Name and Path
CALPOST.LST	7	calpost.lst

****
CALPOST Version 5.0 Level 990228
****

8616-HOUR AVERAGE CONCENTRATION AT EACH RECEPTOR FOR THE PERIOD ENDING YEAR: 90 DAY: 364 HOUR(0-23):

DISCRETE RECEPTORS: SO2 1

RECEPTOR	COORDINATES (km)	CONCENTRATION	RECEPTOR	COORDINATES (km)	CONCENTRATION
1	340.300 3165.700	1.3456E-03	7	343.700 3178.300	1.0436E-03
2	340.300 3167.700	1.2947E-03	8	342.400 3180.600	1.0013E-03
3	340.300 3169.800	1.2409E-03	9	341.100 3183.400	9.5538E-04
4	340.700 3171.900	1.1857E-03	10	339.000 3183.400	9.5106E-04
5	342.000 3174.000	1.1310E-03	11	336.500 3183.400	9.4996E-04
6	343.000 3176.200	1.0823E-03	12	334.000 3183.400	9.5235E-04
			13	331.500 3183.400	9.5879E-04

****
CALPOST Version 5.0 Level 990228
****

SO2 1

TOP-50 24-HOUR AVERAGE CONCENTRATION VALUES (ug/m**3)

YEAR DAY HOUR(0-23) RECEPTOR TYPE CONCENTRATION COORDINATES (km)

90	356	23	(0, 2)	D	2.3764E-02	340.300	3167.700
90	356	23	(0, 3)	D	2.3330E-02	340.300	3169.800
90	356	23	(0, 1)	D	2.2998E-02	340.300	3165.700
90	45	23	(0, 1)	D	2.2311E-02	340.300	3165.700
90	356	23	(0, 4)	D	2.1678E-02	340.700	3171.900
90	45	23	(0, 2)	D	2.0698E-02	340.300	3167.700
90	356	23	(0, 5)	D	1.8472E-02	342.000	3174.000
90	45	23	(0, 3)	D	1.8387E-02	340.300	3169.800
90	180	23	(0, 1)	D	1.8073E-02	340.300	3165.700
90	117	23	(0, 1)	D	1.6860E-02	340.300	3165.700
90	180	23	(0, 2)	D	1.6616E-02	340.300	3167.700
90	356	23	(0, 13)	D	1.5626E-02	331.500	3183.400
90	45	23	(0, 4)	D	1.5607E-02	340.700	3171.900
90	180	23	(0, 3)	D	1.5126E-02	340.300	3169.800
90	117	23	(0, 2)	D	1.4944E-02	340.300	3167.700
90	356	23	(0, 6)	D	1.4925E-02	343.000	3176.200
90	136	23	(0, 5)	D	1.4031E-02	342.000	3174.000
90	202	23	(0, 2)	D	1.3960E-02	340.300	3167.700
90	202	23	(0, 1)	D	1.3876E-02	340.300	3165.700
90	202	23	(0, 3)	D	1.3871E-02	340.300	3169.800
90	356	23	(0, 12)	D	1.3850E-02	334.000	3183.400
90	191	23	(0, 1)	D	1.3849E-02	340.300	3165.700
90	136	23	(0, 6)	D	1.3768E-02	343.000	3176.200
90	136	23	(0, 4)	D	1.3760E-02	340.700	3171.900
90	202	23	(0, 4)	D	1.3744E-02	340.700	3171.900
90	88	23	(0, 5)	D	1.3743E-02	342.000	3174.000
90	88	23	(0, 4)	D	1.3732E-02	340.700	3171.900
90	238	23	(0, 7)	D	1.3732E-02	343.700	3178.300
90	202	23	(0, 5)	D	1.3669E-02	342.000	3174.000
90	88	23	(0, 3)	D	1.3528E-02	340.300	3169.800
90	238	23	(0, 8)	D	1.3526E-02	342.400	3180.600
90	238	23	(0, 6)	D	1.3434E-02	343.000	3176.200
90	180	23	(0, 4)	D	1.3328E-02	340.700	3171.900
90	202	23	(0, 6)	D	1.3307E-02	343.000	3176.200
90	136	23	(0, 3)	D	1.3289E-02	340.300	3169.800
90	238	23	(0, 9)	D	1.3267E-02	341.100	3183.400
90	238	23	(0, 10)	D	1.3249E-02	339.000	3183.400
90	88	23	(0, 6)	D	1.3236E-02	343.000	3176.200
90	136	23	(0, 7)	D	1.3170E-02	343.700	3178.300
90	88	23	(0, 2)	D	1.3170E-02	340.300	3167.700
90	238	23	(0, 11)	D	1.3100E-02	336.500	3183.400
90	117	23	(0, 3)	D	1.2891E-02	340.300	3169.800
90	202	23	(0, 7)	D	1.2770E-02	343.700	3178.300
90	147	23	(0, 1)	D	1.2739E-02	340.300	3165.700
90	226	23	(0, 7)	D	1.2729E-02	343.700	3178.300
90	238	23	(0, 5)	D	1.2706E-02	342.000	3174.000
90	238	23	(0, 12)	D	1.2650E-02	334.000	3183.400
90	136	23	(0, 2)	D	1.2640E-02	340.300	3167.700
90	124	23	(0, 1)	D	1.2623E-02	340.300	3165.700
90	88	23	(0, 1)	D	1.2615E-02	340.300	3165.700

****

CALPOST Version 5.0 Level 990228

****

SO2 1

2 RANKED 3-HOUR AVERAGE CONCENTRATION VALUES AT EACH DISCRETE RECEPTOR (YEAR,DAY,ENDING HOUR) (ug/m**3)

RECEPTOR	COORDINATES (km)		1 RANK	2 RANK
1	340.300	3165.700	6.5047E-02 (90, 88, 8)	6.2344E-02 (90, 45, 8)
2	340.300	3167.700	6.9102E-02 (90, 88, 8)	5.6484E-02 (90, 45, 8)
3	340.300	3169.800	7.1483E-02 (90, 88, 8)	5.2796E-02 (90,136, 8)
4	340.700	3171.900	7.1851E-02 (90, 88, 8)	5.4603E-02 (90,136, 8)
5	342.000	3174.000	6.9416E-02 (90, 88, 8)	5.3007E-02 (90,136, 8)
6	343.000	3176.200	6.3803E-02 (90, 88, 8)	4.8202E-02 (90,136, 8)
7	343.700	3178.300	5.6693E-02 (90, 88, 8)	4.2062E-02 (90,136, 8)
8	342.400	3180.600	5.1900E-02 (90, 88, 8)	4.1077E-02 (90,332, 2)
9	341.100	3183.400	4.5632E-02 (90, 88, 8)	4.1928E-02 (90,332, 2)
10	339.000	3183.400	4.9147E-02 (90, 88, 8)	3.9899E-02 (90,185, 8)
11	336.500	3183.400	5.2440E-02 (90, 88, 8)	4.3571E-02 (90,136, 8)
12	334.000	3183.400	5.5742E-02 (90, 88, 8)	4.6771E-02 (90,136, 8)
13	331.500	3183.400	5.7314E-02 (90, 88, 8)	5.0282E-02 (90,136, 8)

****

CALPOST Version 5.0 Level 990228

SO2 1

2 RANKED 24-HOUR AVERAGE CONCENTRATION VALUES AT EACH DISCRETE RECEPTOR (YEAR,DAY,ENDING HOUR) (ug/m**3)

RECEPTOR	COORDINATES (km)		1 RANK	2 RANK
1	340.300	3165.700	2.2998E-02 (90,356,23)	2.2311E-02 (90, 45,23)
2	340.300	3167.700	2.3764E-02 (90,356,23)	2.0698E-02 (90, 45,23)
3	340.300	3169.800	2.3330E-02 (90,356,23)	1.8387E-02 (90, 45,23)
4	340.700	3171.900	2.1678E-02 (90,356,23)	1.5607E-02 (90, 45,23)
5	342.000	3174.000	1.8472E-02 (90,356,23)	1.4031E-02 (90,136,23)
6	343.000	3176.200	1.4925E-02 (90,356,23)	1.3768E-02 (90,136,23)
7	343.700	3178.300	1.3732E-02 (90,238,23)	1.3170E-02 (90,136,23)
8	342.400	3180.600	1.3526E-02 (90,238,23)	1.2608E-02 (90,136,23)
9	341.100	3183.400	1.3267E-02 (90,238,23)	1.2249E-02 (90,185,23)
10	339.000	3183.400	1.3249E-02 (90,238,23)	1.2222E-02 (90,136,23)
11	336.500	3183.400	1.3100E-02 (90,238,23)	1.2482E-02 (90,136,23)
12	334.000	3183.400	1.3850E-02 (90,356,23)	1.2650E-02 (90,238,23)
13	331.500	3183.400	1.5626E-02 (90,356,23)	1.2502E-02 (90, 88,23)

CALPOST Version 5.0 Level 990228

SUMMARY SECTION

SO2 1

(ug/m**3)

RECEPTOR	COORDINATES (km)		TYPE	PEAK (YEAR,DAY,ENDING HOUR)	FOR RANK	FOR AVERAGE PERIOD
4	340.700	3171.900	DISCRETE	7.1851E-02 (90, 88, 8)	RANK 1	3-HOUR
1	340.300	3165.700	DISCRETE	6.2344E-02 (90, 45, 8)	RANK 2	3-HOUR
2	340.300	3167.700	DISCRETE	2.3764E-02 (90,356,23)	RANK 1	24-HOUR
1	340.300	3165.700	DISCRETE	2.2311E-02 (90, 45,23)	RANK 2	24-HOUR
1	340.300	3165.700	DISCRETE	1.3456E-03	RANK 1	8616-HOUR

```
**********************************************************************************************************************
                                        CALPOST  Version 5.0          Level 990228
**********************************************************************************************************************

 Run Title:
    CALPINE OSPRAY CLASS I SINIFICANT IMPACT ANALYSIS, NOX     2/6/00
    RECEPTORS AT CHASSAHOWITZKA NWA, ANNUAL AVERAGING TIMES, CALPOST
    2 SIMPLE-CYCLE NATURAL GAS FIRED CTs AT BASE LOAD, 32 DEGREES + COOLING TOWER

 ------------------------------------------------------------------------------

 INPUT GROUP: 1 -- General run control parameters
 --------------

      Option to run all periods found
      in the met. file(s)  (METRUN)        Default: 0   ! METRUN =   0  !

          METRUN = 0 - Run period explicitly defined below
          METRUN = 1 - Run all periods in CALPUFF data file(s)

      Starting date:    Year  (ISYR) --    No default   ! ISYR  =  90   !
      (used only if     Month (ISMO) --    No default   ! ISMO  =  1   !
       METRUN = 0)      Day   (ISDY) --    No default   ! ISDY  =  6   !
                        Hour  (ISHR) --    No default   ! ISHR  =  0   !

      Number of hours to process (NHRS) -- No default   ! NHRS  =  8616  !

            Species to process (ASPEC) -- No default   ! ASPEC = NOX  !
            (ASPEC = VISIB for visibility processing)

      Process every hour of data?(NREP) -- Default: 1   ! NREP  =  1  !
       (1 = every hour processed,
        2 = every 2nd hour processed,
        5 = every 5th hour processed, etc.)

 Concentration and scaling factors
 ---------------------------------

       Layer/deposition code (ILAYER)   -- Default: 1   ! ILAYER =  1  !
         '1'  for CALPUFF concentrations,
         '-1' for dry deposition fluxes,
         '-2' for wet deposition fluxes.

       Scaling factors of the form:     -- Defaults:    ! A =  0.0    !
            X(new) = X(old) * A + B          A = 0.0    ! B =  0.0    !
         (NOT applied if A = B = 0.0)        B = 0.0

       Add Hourly Background Concentrations?
                              (LBACK)  -- Default: F   ! LBACK =  F !

 Receptor information
 --------------------

   Gridded receptors processed?    (LG) -- Default: F   ! LG  = F  !
   Discrete receptors processed?   (LD) -- Default: F   ! LD  = T  !
   CTSG Complex terrain receptors processed?
                                 (LCT) -- Default: F   ! LCT = F  !

 --Select range of DISCRETE receptors (only used when LD = T):

   Select ALL DISCRETE receptors by setting NDRECP flag to -1;
                           OR
   Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
      0 = discrete receptor not processed
      1 = discrete receptor processed
   using repeated value notation to select blocks of receptors:
      23*1, 15*0, 12*1
   Flag for all receptors after the last one assigned is set to 0
   (NDRECP) -- Default: -1
                                          ! NDRECP =  -1  !

 --Select range of GRIDDED receptors (only used when LG = T):

                                                    Page: 1
```

```
      X index of LL corner (IBGRID) -- Default: -1     ! IBGRID = -1  !
         (-1 OR 1 <= IBGRID <= NX)

      Y index of LL corner (JBGRID) -- Default: -1     ! JBGRID = -1  !
         (-1 OR 1 <= JBGRID <= NY)

      X index of UR corner (IEGRID) -- Default: -1     ! IEGRID = -1  !
         (-1 OR 1 <= IEGRID <= NX)

      Y index of UR corner (JEGRID) -- Default: -1     ! JEGRID = -1  !
         (-1 OR 1 <= JEGRID <= NY)

  Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)
--------------

    Maximum relative humidity (%) used in particle growth curve
                           (RHMAX) -- Default: 98   ! RHMAX  = 0.0 !

    Modeled species to be included in computing the light extinction
     Include SULFATE?          (LVSO4) -- Default: T   ! LVSO4  = T  !
     Include NITRATE?          (LVNO3) -- Default: T   ! LVNO3  = T  !
     Include ORGANIC CARBON?   (LVOC)  -- Default: T   ! LVOC   = T  !
     Include COARSE PARTICLES? (LVPMC) -- Default: T   ! LVPMC  = T  !
     Include FINE PARTICLES?   (LVPMF) -- Default: T   ! LVPMF  = T  !

    And, when ranking for TOP-N, TOP-50, and Exceedance tables,
     Include BACKGROUND?       (LVBK)  -- Default: T   ! LVBK   = T  !

    Species name used for particulates in MODEL.DAT file
                  COARSE    (SPECPMC) -- Default: PMC ! SPECPMC = PMC !
                  FINE      (SPECPMF) -- Default: PMF ! SPECPMF = PMF !

Extinction Efficiency (1/Mm per ug/m**3)
---------------------------------------
    MODELED particulate species:
              PM  COARSE      (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
              PM  FINE        (EEPMF) -- Default: 1.0 ! EEPMF  = 1.0 !
    BACKGROUND particulate species:
              PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
    Other species:
             AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
             AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
             ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
             SOIL             (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
             ELEMENTAL CARBON (EEEC)  -- Default: 10. ! EEEC   = 10.0 !

Background Extinction Computation
---------------------------------

    Method used for background light extinction
                           (MVISBK) -- Default: 2   ! MVISBK =  2  !

        1 =  Supply single light extinction and hygroscopic fraction
             - IWAQM (1993) RH adjustment applied to hygroscopic background
               and modeled sulfate and nitrate
        2 =  Compute extinction from speciated PM measurements (A)
             - PATH RH adjustment applied to observed and modeled sulfate
               and nitrate
             - RH factor is capped at RHMAX
        3 =  Compute extinction from speciated PM measurements (B)
             - PATH RH adjustment applied to observed and modeled sulfate
               and nitrate
             - Receptor-hour excluded if RH>RHMAX
             - Receptor-day excluded if fewer than 6 valid receptor-hours
        4 =  Read hourly transmissometer background extinction measurements
             - PATH RH adjustment applied to modeled sulfate and nitrate
             - Hour excluded if measurement invalid (missing, interference,
               or large RH)
             - Receptor-hour excluded if RH>RHMAX
             - Receptor-day excluded if fewer than 6 valid receptor-hours
        5 =  Read hourly nephelometer background extinction measurements
             - Rayleigh extinction value (BEXTRAY) added to measurement
```

```
            - PATH RH adjustment applied to modeled sulfate and nitrate
            - Hour excluded if measurement invalid (missing, interference,
              or large RH)
            - Receptor-hour excluded if RH>RHMAX
            - Receptor-day excluded if fewer than 6 valid receptor-hours

    Additional inputs used for MVISBK = 1:
    --------------------------------------
     Background light extinction (1/Mm)
                           (BEXTBK) -- No default   ! BEXTBK = 0.0 !
     Percentage of particles affected by relative humidity
                           (RHFRAC) -- No default   ! RHFRAC = 0.0 !

    Additional inputs used for MVISBK = 2,3:
    ----------------------------------------
     Background extinction coefficients are computed from monthly
     CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3),
     coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and
     elemental carbon (BKEC).  Month 1 is January.
     (ug/m**3)

     (BKSO4)  -- No default     ! BKSO4 = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKNO3)  -- No default     ! BKNO3 = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKPMC)  -- No default     ! BKPMC = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKOC)   -- No default     ! BKOC  = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKSOIL) -- No default     ! BKSOIL= 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKEC)   -- No default     ! BKEC  = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !

    Additional inputs used for MVISBK = 2,3,5:
    ------------------------------------------
     Extinction due to Rayleigh scattering is added (1/Mm)
                           (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 0.0 !

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 3 -- Processing options
--------------

Averaging time and TOP 50 Table control
---------------------------------------
    User-specified averaging time
                             (NAVG) -- Default: 0   !   NAVG =  0  !
    Top 50 table for  1-hr averages
                            (L1T50) -- Default: T   !  L1T50 = F  !
    Top 50 table for  3-hr averages
                            (L3T50) -- Default: T   !  L3T50 = F  !
    Top 50 table for 24-hr averages
                           (L24T50) -- Default: T   ! L24T50 = T  !
    Top 50 table for NAVG-hr averages
                            (LNT50) -- Default: F   !  LNT50 = F  !
    Top 50 table for length of run averages
                            (LRT50) -- Default: T   !  LRT50 = F  !

TOP 'n' Table control
---------------------

    Number of 'Top' values at each receptor
                             (NTOP) -- Default: 4   ! NTOP =  2   !
            (NTOP must be <= 4)

    Specific ranks of 'Top' values reported (NTOP values must be entered)
                    (ITOP(4) array) -- Default:     ! ITOP =  1 , 2   !
                                       1,2,3,4
```

```
    Top 'n' table for  1-hr averages
                          (L1TOPN) -- Default: F   !  L1TOPN = F  !
    Top 'n' table for  3-hr averages
                          (L3TOPN) -- Default: F   !  L3TOPN = F  !
    Top 'n' table for 24-hr averages
                         (L24TOPN) -- Default: F   ! L24TOPN = F  !
    Top 'n' table for NAVG-hr averages
                          (LNTOPN) -- Default: F   !  LNTOPN = F  !
    Top 'n' table for length of run averages
                           (LRAVG) -- Default: F   !   LRAVG = T  !


Output Units
------------
    Units for All Output       (IPRTU) -- Default: 1   ! IPRTU =  3   !
                    for              for
                Concentration    Deposition
       1 =          g/m**3         g/m**2/s
       2 =         mg/m**3        mg/m**2/s
       3 =         ug/m**3        ug/m**2/s
       4 =         ng/m**3        ng/m**2/s
       5 =       Odour Units

    Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Threshold Exceedance control
----------------------------          -- Default: -1.0

    Counts will be tabulated for each average that
    exceeds a specified non-negative threshold (output units).


    Threshold for  1-hr averages   (THRESH1)     !  THRESH1 = -1.0  !
    Threshold for  3-hr averages   (THRESH3)     !  THRESH3 = -1.0  !
    Threshold for 24-hr averages  (THRESH24)     ! THRESH24 = -1.0  !
    Threshold for NAVG-hr averages (THRESHN)     !  THRESHN = -1.0  !


Selected Day (Echo) Output Control
----------------------------------     -- Default: F
    Output 1-hr averages for selected days (LECH1)     ! LECH1   = F !
    Output 3-hr averages for selected days (LECH3)     ! LECH3   = F !
    Output 24-hr averages for selected days (LECH24)   ! LECH24  = F !
    Output NAVG-hr averages for selected days (LECHN)  ! LECHN   = F !
    Output selected information for debugging (LDEBUG) ! LDEBUG  = F !

    Days selected for output IECHO(366)-- Default: 366*0
! IECHO  = 366*0  !
     (366 values must be entered)

Plot Output Options
-------------------

      Plot files can be created for selected Top-n, Exceedance and Echo
      tables selected above.  Two formats for these files are available,
      DATA and GRID.  In the DATA format, results at all receptors are
      listed along with the receptor location [x,y,val1,val2,...].
      In the GRID format, results at only gridded receptors are written,
      using a compact representation.  The gridded values are written in
      rows (x varies), starting with the most southern row of the grid.
      The GRID format is given the .GRD extension, and includes headers
      compatible with the SURFER(R) plotting software.

      A plotting and analysis file is also created for the daily peak
      visibility summary output, in DATA format only.

      Generate Plot-File Output   (LPLT) -- Default: F   ! LPLT  = F !

      Write Top-n files in GRID format?
                                  (LTGRD) -- Default: F   ! LTGRD = F !

      Write Exceedance files in GRID format?
                                  (LXGRD) -- Default: F   ! LXGRD = F !
      Write Echo files in GRID format?
                                  (LEGRD) -- Default: F   ! LEGRD = F !
```

```
 !END!

  CALPOST Control File Input Summary ------------------------

     Replace run data with data in Puff file 1=Y:    0
                       Run starting date -- year:   90
                                           month:    1
                                             day:    6
                                     Julian day:     6
                                hour ending(0-23):   0
                               Run length (hours):   8616
                                         Species: NOX

  Every hour of data processed -- NREP = 1


  Concentration & scaling factors
                          Layer of processed data:    1
       (>0 = concentrations, -1 = dry fluxes, -2 = wet fluxes)
                    Multiplicative scaling factor: 0.0000E+00
                          Additive scaling factor: 0.0000E+00
          Hourly background concentrations used?: F


  Receptor information
                     Gridded receptors processed?: F
                    Discrete receptors processed?: T
       CTSG Complex terrain receptors processed?: F

  Discrete Receptors Processed

  (All Discrete Receptors are Used)


  Visibility Processing is NOT Selected


  Averaging time & TOP 50 table control
      User-specified averaging time (NAVG hours):     0
                 Top 50 table for  1-hr averages:     F
                 Top 50 table for  3-hr averages:     F
                 Top 50 table for 24-hr averages:     T
               Top 50 table for NAVG-hr averages:     F
          Top 50 table for length of run averages:     F


  Top "n" table control
         Number of "top" values at each receptor:     2
         Specific ranks of "top" values reported:   1   2

               Top "n" table for  1-hr averages: F
               Top "n" table for  3-hr averages: F
               Top "n" table for 24-hr averages: F
             Top "n" table for NAVG-hr averages: F
        Top "n" table for length of run averages: T


  Units requested for output:   (ug/m**3)


  Threshold Exceedance control
       Exceedances of a specified value will be counted for --


  Output options
                              Plot files created: F
       Output    1-hr averages for selected days: F
       Output    3-hr averages for selected days: F
       Output   24-hr averages for selected days: F
       Output NAVG-hr averages for selected days: F
       Output selected information for debugging: F


  Days selected for output tables
       0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000
       0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000
```

0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000
0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 000000

IDENTIFICATION OF PROCESSED MODEL FILE ----------

CALPUFF 5.0 990228

REFINED SIGNIFICANT IMPACT ANALYSIS, CALPUFF, CALPINE OSPREY 3/9/00
RECEPTORS AT CHASSAHOWITZKA NWA, PROJECT ONLY
FDEP CHASSAHOWITZKA CALMET DOMAIN WITH PRECIPITATION

Chemical species names for each layer in model:
SO2 1
SO4 1
NOX 1
HNO3 1
NO3 1
PM10 1

********** NOTICE **********
NDRECP array reset to full range: all 1s

INPUT FILES

Default Name	Unit No.	File Name and Path
CALPOST.INP	5	calpost.inp
MODEL.DAT	4	calpuff.con

OUTPUT FILES

Default Name	Unit No.	File Name and Path
CALPOST.LST	7	calpost.lst

****
CALPOST Version 5.0 Level 990228
****

8616-HOUR AVERAGE CONCENTRATION AT EACH RECEPTOR FOR THE PERIOD ENDING YEAR: 90 DAY: 364 HOUR(0-23):

DISCRETE RECEPTORS: NOX 1

RECEPTOR	COORDINATES (km)	CONCENTRATION	RECEPTOR	COORDINATES (km)	CONCENTRATION
1	340.300 3165.700	1.4151E-03	7	343.700 3178.300	9.3991E-04
2	340.300 3167.700	1.3398E-03	8	342.400 3180.600	8.8022E-04
3	340.300 3169.800	1.2555E-03	9	341.100 3183.400	8.1726E-04
4	340.700 3171.900	1.1673E-03	10	339.000 3183.400	8.0881E-04
5	342.000 3174.000	1.0775E-03	11	336.500 3183.400	8.0465E-04
6	343.000 3176.200	9.9937E-04	12	334.000 3183.400	8.0782E-04
			13	331.500 3183.400	8.1603E-04

****
CALPOST Version 5.0 Level 990228
****

NOX 1

TOP-50 24-HOUR AVERAGE CONCENTRATION VALUES (ug/m**3)

YEAR DAY HOUR(0-23) RECEPTOR TYPE CONCENTRATION COORDINATES (km)

90	356	23	(0,	2)	D	4.8821E-02	340.300	3167.700
90	356	23	(0,	1)	D	4.8275E-02	340.300	3165.700
90	356	23	(0,	3)	D	4.6524E-02	340.300	3169.800
90	356	23	(0,	4)	D	4.1333E-02	340.700	3171.900
90	45	23	(0,	1)	D	3.6514E-02	340.300	3165.700
90	356	23	(0,	5)	D	3.2319E-02	342.000	3174.000
90	45	23	(0,	2)	D	3.1825E-02	340.300	3167.700
90	117	23	(0,	1)	D	3.0221E-02	340.300	3165.700
90	356	23	(0,	13)	D	2.6341E-02	331.500	3183.400
90	45	23	(0,	3)	D	2.6149E-02	340.300	3169.800
90	117	23	(0,	2)	D	2.5854E-02	340.300	3167.700
90	88	23	(0,	2)	D	2.4821E-02	340.300	3167.700
90	88	23	(0,	1)	D	2.4593E-02	340.300	3165.700
90	88	23	(0,	3)	D	2.4574E-02	340.300	3169.800
90	88	23	(0,	4)	D	2.3895E-02	340.700	3171.900
90	180	23	(0,	1)	D	2.3412E-02	340.300	3165.700
90	356	23	(0,	6)	D	2.2931E-02	343.000	3176.200
90	88	23	(0,	5)	D	2.2633E-02	342.000	3174.000
90	180	23	(0,	2)	D	2.1679E-02	340.300	3167.700
90	356	23	(0,	12)	D	2.1569E-02	334.000	3183.400
90	117	23	(0,	3)	D	2.1064E-02	340.300	3169.800
90	124	23	(0,	1)	D	2.1054E-02	340.300	3165.700
90	88	23	(0,	6)	D	2.0482E-02	343.000	3176.200
90	45	23	(0,	4)	D	1.9850E-02	340.700	3171.900
90	180	23	(0,	3)	D	1.9698E-02	340.300	3169.800
90	124	23	(0,	2)	D	1.9228E-02	340.300	3167.700
90	332	23	(0,	9)	D	1.9054E-02	341.100	3183.400
90	136	23	(0,	1)	D	1.8552E-02	340.300	3165.700
90	46	23	(0,	7)	D	1.8526E-02	343.700	3178.300
90	88	23	(0,	7)	D	1.8137E-02	343.700	3178.300
90	46	23	(0,	6)	D	1.8100E-02	343.000	3176.200
90	136	23	(0,	2)	D	1.7879E-02	340.300	3167.700
90	46	23	(0,	8)	D	1.7735E-02	342.400	3180.600
90	180	23	(0,	4)	D	1.7408E-02	340.700	3171.900
90	332	23	(0,	8)	D	1.7212E-02	342.400	3180.600
90	136	23	(0,	3)	D	1.7108E-02	340.300	3169.800
90	46	23	(0,	5)	D	1.7103E-02	342.000	3174.000
90	356	23	(0,	11)	D	1.6915E-02	336.500	3183.400
90	124	23	(0,	3)	D	1.6898E-02	340.300	3169.800
90	46	23	(0,	9)	D	1.6832E-02	341.100	3183.400
90	20	23	(0,	9)	D	1.6809E-02	341.100	3183.400
90	147	23	(0,	1)	D	1.6757E-02	340.300	3165.700
90	238	23	(0,	6)	D	1.6613E-02	343.000	3176.200
90	238	23	(0,	7)	D	1.6469E-02	343.700	3178.300
90	88	23	(0,	8)	D	1.6389E-02	342.400	3180.600
90	20	23	(0,	8)	D	1.6331E-02	342.400	3180.600
90	46	23	(0,	10)	D	1.6245E-02	339.000	3183.400
90	88	23	(0,	13)	D	1.6163E-02	331.500	3183.400
90	238	23	(0,	5)	D	1.6100E-02	342.000	3174.000
90	332	23	(0,	7)	D	1.6081E-02	343.700	3178.300

****

CALPOST Version 5.0 Level 990228

****

SUMMARY SECTION

NOX 1

(ug/m**3)

RECEPTOR	COORDINATES (km)		TYPE	PEAK (YEAR,DAY,ENDING HOUR)	FOR RANK	FOR AVERAGE PERIOD
1	340.300	3165.700	DISCRETE	1.4151E-03	RANK 1	8616-HOUR

```
**********************************************************************************************************************
                                        CALPOST  Version 5.0          Level 990228
**********************************************************************************************************************


 Run Title:
    CALPINE OSPRAY CLASS I SINIFICANT IMPACT ANALYSIS, PM10     2/6/00
    RECEPTORS AT CHASSAHOWITZKA NWA, 24-HOUR AND ANNUAL AVERAGING TIMES, CALPOST
    2 SIMPLE-CYCLE NATURAL GAS FIRED CTs AT BASE LOAD, 32 DEGREES + COOLING TOWER

-------------------------------------------------------------------------------

 INPUT GROUP: 1 -- General run control parameters
 -------------

      Option to run all periods found
      in the met. file(s)  (METRUN)        Default: 0   ! METRUN =   0  !

          METRUN = 0 - Run period explicitly defined below
          METRUN = 1 - Run all periods in CALPUFF data file(s)

      Starting date:    Year  (ISYR) --    No default   ! ISYR  =  90   !
      (used only if     Month (ISMO) --    No default   ! ISMO  =  1   !
       METRUN = 0)      Day   (ISDY) --    No default   ! ISDY  =  6   !
                        Hour  (ISHR) --    No default   ! ISHR  =  0   !

      Number of hours to process (NHRS) -- No default   ! NHRS  =  8616  !

            Species to process (ASPEC) -- No default   ! ASPEC = PM10  !
            (ASPEC = VISIB for visibility processing)

      Process every hour of data?(NREP) -- Default: 1   ! NREP  =  1  !
       (1 = every hour processed,
        2 = every 2nd hour processed,
        5 = every 5th hour processed, etc.)

 Concentration and scaling factors
 ---------------------------------

       Layer/deposition code (ILAYER)   -- Default: 1   ! ILAYER =  1  !
         '1'  for CALPUFF concentrations,
         '-1' for dry deposition fluxes,
         '-2' for wet deposition fluxes.

       Scaling factors of the form:     -- Defaults:    ! A =  0.0    !
            X(new) = X(old) * A + B          A = 0.0    ! B =  0.0    !
         (NOT applied if A = B = 0.0)        B = 0.0

       Add Hourly Background Concentrations?
                               (LBACK)  -- Default: F   ! LBACK =  F !

 Receptor information
 --------------------

   Gridded receptors processed?    (LG) -- Default: F   ! LG  = F  !
   Discrete receptors processed?   (LD) -- Default: F   ! LD  = T  !
   CTSG Complex terrain receptors processed?
                                  (LCT) -- Default: F   ! LCT = F  !

 --Select range of DISCRETE receptors (only used when LD = T):

   Select ALL DISCRETE receptors by setting NDRECP flag to -1;
                             OR
   Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
      0 = discrete receptor not processed
      1 = discrete receptor processed
   using repeated value notation to select blocks of receptors:
      23*1, 15*0, 12*1
   Flag for all receptors after the last one assigned is set to 0
   (NDRECP) -- Default: -1
                                            ! NDRECP =  -1  !


 --Select range of GRIDDED receptors (only used when LG = T):
```

```
      X index of LL corner (IBGRID) -- Default: -1     ! IBGRID = -1  !
          (-1 OR 1 <= IBGRID <= NX)

      Y index of LL corner (JBGRID) -- Default: -1     ! JBGRID = -1  !
          (-1 OR 1 <= JBGRID <= NY)

      X index of UR corner (IEGRID) -- Default: -1     ! IEGRID = -1  !
          (-1 OR 1 <= IEGRID <= NX)

      Y index of UR corner (JEGRID) -- Default: -1     ! JEGRID = -1  !
          (-1 OR 1 <= JEGRID <= NY)

   Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)
--------------

    Maximum relative humidity (%) used in particle growth curve
                           (RHMAX) -- Default: 98   ! RHMAX  = 0.0 !

    Modeled species to be included in computing the light extinction
     Include SULFATE?          (LVSO4) -- Default: T   ! LVSO4  = T  !
     Include NITRATE?          (LVNO3) -- Default: T   ! LVNO3  = T  !
     Include ORGANIC CARBON?   (LVOC)  -- Default: T   ! LVOC   = T  !
     Include COARSE PARTICLES? (LVPMC) -- Default: T   ! LVPMC  = T  !
     Include FINE PARTICLES?   (LVPMF) -- Default: T   ! LVPMF  = T  !

    And, when ranking for TOP-N, TOP-50, and Exceedance tables,
     Include BACKGROUND?       (LVBK)  -- Default: T   ! LVBK   = T  !

    Species name used for particulates in MODEL.DAT file
                  COARSE    (SPECPMC) -- Default: PMC ! SPECPMC = PMC !
                  FINE      (SPECPMF) -- Default: PMF ! SPECPMF = PMF !

Extinction Efficiency (1/Mm per ug/m**3)
---------------------------------------
    MODELED particulate species:
              PM  COARSE      (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
              PM  FINE        (EEPMF) -- Default: 1.0 ! EEPMF  = 1.0 !
    BACKGROUND particulate species:
              PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
    Other species:
             AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
             AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
             ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
             SOIL             (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
             ELEMENTAL CARBON (EEEC)  -- Default: 10. ! EEEC   = 10.0 !

Background Extinction Computation
---------------------------------

    Method used for background light extinction
                           (MVISBK) -- Default: 2   ! MVISBK =  2  !

        1 =  Supply single light extinction and hygroscopic fraction
             - IWAQM (1993) RH adjustment applied to hygroscopic background
               and modeled sulfate and nitrate
        2 =  Compute extinction from speciated PM measurements (A)
             - PATH RH adjustment applied to observed and modeled sulfate
               and nitrate
             - RH factor is capped at RHMAX
        3 =  Compute extinction from speciated PM measurements (B)
             - PATH RH adjustment applied to observed and modeled sulfate
               and nitrate
             - Receptor-hour excluded if RH>RHMAX
             - Receptor-day excluded if fewer than 6 valid receptor-hours
        4 =  Read hourly transmissometer background extinction measurements
             - PATH RH adjustment applied to modeled sulfate and nitrate
             - Hour excluded if measurement invalid (missing, interference,
               or large RH)
             - Receptor-hour excluded if RH>RHMAX
             - Receptor-day excluded if fewer than 6 valid receptor-hours
        5 =  Read hourly nephelometer background extinction measurements
             - Rayleigh extinction value (BEXTRAY) added to measurement
```

```
            - PATH RH adjustment applied to modeled sulfate and nitrate
            - Hour excluded if measurement invalid (missing, interference,
              or large RH)
            - Receptor-hour excluded if RH>RHMAX
            - Receptor-day excluded if fewer than 6 valid receptor-hours

   Additional inputs used for MVISBK = 1:
   --------------------------------------
    Background light extinction (1/Mm)
                          (BEXTBK) -- No default   ! BEXTBK = 0.0 !
    Percentage of particles affected by relative humidity
                          (RHFRAC) -- No default   ! RHFRAC = 0.0 !

   Additional inputs used for MVISBK = 2,3:
   ----------------------------------------
    Background extinction coefficients are computed from monthly
    CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3),
    coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and
    elemental carbon (BKEC).  Month 1 is January.
    (ug/m**3)

    (BKSO4)  -- No default     ! BKSO4 = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKNO3)  -- No default     ! BKNO3 = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKPMC)  -- No default     ! BKPMC = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKOC)   -- No default     ! BKOC  = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKSOIL) -- No default     ! BKSOIL= 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKEC)   -- No default     ! BKEC  = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !

   Additional inputs used for MVISBK = 2,3,5:
   ------------------------------------------
    Extinction due to Rayleigh scattering is added (1/Mm)
                         (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 0.0 !

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 3 -- Processing options
-------------

Averaging time and TOP 50 Table control
---------------------------------------
   User-specified averaging time
                            (NAVG) -- Default: 0   !   NAVG =  0  !
   Top 50 table for  1-hr averages
                           (L1T50) -- Default: T   !  L1T50 = F  !
   Top 50 table for  3-hr averages
                           (L3T50) -- Default: T   !  L3T50 = F  !
   Top 50 table for 24-hr averages
                          (L24T50) -- Default: T   ! L24T50 = T  !
   Top 50 table for NAVG-hr averages
                           (LNT50) -- Default: F   !  LNT50 = F  !
   Top 50 table for length of run averages
                           (LRT50) -- Default: T   !  LRT50 = F  !

TOP 'n' Table control
---------------------

   Number of 'Top' values at each receptor
                            (NTOP) -- Default: 4   ! NTOP =  2   !
             (NTOP must be <= 4)

   Specific ranks of 'Top' values reported (NTOP values must be entered)
                    (ITOP(4) array) -- Default:     ! ITOP =  1 , 2   !
                                       1,2,3,4
```

```
    Top 'n' table for  1-hr averages
                            (L1TOPN) -- Default: F   !  L1TOPN = F  !
    Top 'n' table for  3-hr averages
                            (L3TOPN) -- Default: F   !  L3TOPN = F  !
    Top 'n' table for 24-hr averages
                           (L24TOPN) -- Default: F   ! L24TOPN = T  !
    Top 'n' table for NAVG-hr averages
                            (LNTOPN) -- Default: F   !  LNTOPN = F  !
    Top 'n' table for length of run averages
                             (LRAVG) -- Default: F   !   LRAVG = T  !


Output Units
------------
    Units for All Output       (IPRTU) -- Default: 1   ! IPRTU =  3   !
                    for              for
                Concentration    Deposition
       1 =          g/m**3         g/m**2/s
       2 =         mg/m**3        mg/m**2/s
       3 =         ug/m**3        ug/m**2/s
       4 =         ng/m**3        ng/m**2/s
       5 =      Odour Units

    Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Threshold Exceedance control
----------------------------          -- Default: -1.0

    Counts will be tabulated for each average that
    exceeds a specified non-negative threshold (output units).


    Threshold for  1-hr averages   (THRESH1)     !  THRESH1 = -1.0  !
    Threshold for  3-hr averages   (THRESH3)     !  THRESH3 = -1.0  !
    Threshold for 24-hr averages  (THRESH24)     ! THRESH24 = -1.0  !
    Threshold for NAVG-hr averages (THRESHN)     !  THRESHN = -1.0  !


elected Day (Echo) Output Control
---------------------------------     -- Default: F
    Output 1-hr averages for selected days (LECH1)     ! LECH1   = F !
    Output 3-hr averages for selected days (LECH3)     ! LECH3   = F !
    Output 24-hr averages for selected days (LECH24)   ! LECH24  = F !
    Output NAVG-hr averages for selected days (LECHN)  ! LECHN   = F !
    Output selected information for debugging (LDEBUG) ! LDEBUG  = F !

    Days selected for output IECHO(366)-- Default: 366*0
! IECHO  = 366*0  !
     (366 values must be entered)

Plot Output Options
-------------------

      Plot files can be created for selected Top-n, Exceedance and Echo
      tables selected above.  Two formats for these files are available,
      DATA and GRID.  In the DATA format, results at all receptors are
      listed along with the receptor location [x,y,val1,val2,...].
      In the GRID format, results at only gridded receptors are written,
      using a compact representation.  The gridded values are written in
      rows (x varies), starting with the most southern row of the grid.
      The GRID format is given the .GRD extension, and includes headers
      compatible with the SURFER(R) plotting software.

      A plotting and analysis file is also created for the daily peak
      visibility summary output, in DATA format only.

      Generate Plot-File Output   (LPLT) -- Default: F   ! LPLT  = F !

      Write Top-n files in GRID format?
                              (LTGRD) -- Default: F   ! LTGRD = F !

      Write Exceedance files in GRID format?
                              (LXGRD) -- Default: F   ! LXGRD = F !
      Write Echo files in GRID format?
                              (LEGRD) -- Default: F   ! LEGRD = F !
```

```
 !END!


 CALPOST Control File Input Summary ------------------------

    Replace run data with data in Puff file 1=Y:    0
                     Run starting date -- year:   90
                                        month:    1
                                          day:    6
                                  Julian day:     6
                               hour ending(0-23):    0
                              Run length (hours):    8616
                                       Species: PM10

 Every hour of data processed -- NREP = 1


 Concentration & scaling factors
                        Layer of processed data:    1
      (>0 = concentrations, -1 = dry fluxes, -2 = wet fluxes)
                  Multiplicative scaling factor: 0.0000E+00
                        Additive scaling factor: 0.0000E+00
          Hourly background concentrations used?: F


 Receptor information
                   Gridded receptors processed?: F
                  Discrete receptors processed?: T
      CTSG Complex terrain receptors processed?: F

 Discrete Receptors Processed

 (All Discrete Receptors are Used)


 Visibility Processing is NOT Selected


 Averaging time & TOP 50 table control
     User-specified averaging time (NAVG hours):     0
                Top 50 table for  1-hr averages:     F
                Top 50 table for  3-hr averages:     F
                Top 50 table for 24-hr averages:     T
              Top 50 table for NAVG-hr averages:     F
         Top 50 table for length of run averages:     F


 Top "n" table control
        Number of "top" values at each receptor:     2
        Specific ranks of "top" values reported:   1   2

              Top "n" table for  1-hr averages: F
              Top "n" table for  3-hr averages: F
              Top "n" table for 24-hr averages: T
            Top "n" table for NAVG-hr averages: F
       Top "n" table for length of run averages: T


 Units requested for output:   (ug/m**3)


 Threshold Exceedance control
      Exceedances of a specified value will be counted for --


 Output options
                           Plot files created: F
      Output    1-hr averages for selected days: F
      Output    3-hr averages for selected days: F
      Output   24-hr averages for selected days: F
      Output NAVG-hr averages for selected days: F
      Output selected information for debugging: F


 Days selected for output tables
    0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000
    0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000
```

0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000
0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 000000

[redacted]NTIFICATION OF PROCESSED MODEL FILE ----------

CALPUFF 5.0 990228

REFINED SIGNIFICANT IMPACT ANALYSIS, CALPUFF, CALPINE OSPREY 3/9/00
RECEPTORS AT CHASSAHOWITZKA NWA, PROJECT ONLY
FDEP CHASSAHOWITZKA CALMET DOMAIN WITH PRECIPITATION

Chemical species names for each layer in model:
SO2 1
SO4 1
NOX 1
HNO3 1
NO3 1
PM10 1

********** NOTICE **********
NDRECP array reset to full range: all 1s

INPUT FILES

Default Name	Unit No.	File Name and Path
CALPOST.INP	5	calpost.inp
MODEL.DAT	4	calpuff.con

OUTPUT FILES

[redacted]efault Name	Unit No.	File Name and Path
CALPOST.LST	7	calpost.lst

****
CALPOST Version 5.0 Level 990228
****

8616-HOUR AVERAGE CONCENTRATION AT EACH RECEPTOR FOR THE PERIOD ENDING YEAR: 90 DAY: 364 HOUR(0-23):

DISCRETE RECEPTORS: PM10 1

RECEPTOR	COORDINATES (km)	CONCENTRATION	RECEPTOR	COORDINATES (km)	CONCENTRATION
1	340.300 3165.700	3.3532E-03	7	343.700 3178.300	2.6881E-03
2	340.300 3167.700	3.2407E-03	8	342.400 3180.600	2.5933E-03
3	340.300 3169.800	3.1230E-03	9	341.100 3183.400	2.4894E-03
4	340.700 3171.900	3.0019E-03	10	339.000 3183.400	2.4818E-03
5	342.000 3174.000	2.8818E-03	11	336.500 3183.400	2.4819E-03
6	343.000 3176.200	2.7743E-03	12	334.000 3183.400	2.4907E-03
			13	331.500 3183.400	2.5093E-03

****
CALPOST Version 5.0 Level 990228
****

[redacted] PM10 1

TOP-50 24-HOUR AVERAGE CONCENTRATION VALUES (ug/m**3)

YEAR DAY HOUR(0-23) RECEPTOR TYPE CONCENTRATION COORDINATES (km)

90	356	23	(0, 2)	D	5.1918E-02	340.300	3167.700
90	356	23	(0, 3)	D	5.1147E-02	340.300	3169.800
90	356	23	(0, 1)	D	5.0217E-02	340.300	3165.700
90	356	23	(0, 4)	D	4.7861E-02	340.700	3171.900
90	45	23	(0, 1)	D	4.7033E-02	340.300	3165.700
90	45	23	(0, 2)	D	4.3966E-02	340.300	3167.700
90	356	23	(0, 5)	D	4.1384E-02	342.000	3174.000
90	180	23	(0, 1)	D	4.0410E-02	340.300	3165.700
90	45	23	(0, 3)	D	3.9435E-02	340.300	3169.800
90	202	23	(0, 2)	D	3.7721E-02	340.300	3167.700
90	202	23	(0, 3)	D	3.7702E-02	340.300	3169.800
90	202	23	(0, 4)	D	3.7507E-02	340.700	3171.900
90	202	23	(0, 1)	D	3.7319E-02	340.300	3165.700
90	202	23	(0, 5)	D	3.7254E-02	342.000	3174.000
90	180	23	(0, 2)	D	3.7136E-02	340.300	3167.700
90	202	23	(0, 6)	D	3.6312E-02	343.000	3176.200
90	356	23	(0, 13)	D	3.6076E-02	331.500	3183.400
90	117	23	(0, 1)	D	3.5483E-02	340.300	3165.700
90	202	23	(0, 7)	D	3.4938E-02	343.700	3178.300
90	228	23	(0, 5)	D	3.4377E-02	342.000	3174.000
90	228	23	(0, 4)	D	3.4305E-02	340.700	3171.900
90	356	23	(0, 6)	D	3.4237E-02	343.000	3176.200
90	228	23	(0, 3)	D	3.4197E-02	340.300	3169.800
90	228	23	(0, 6)	D	3.4186E-02	343.000	3176.200
90	191	23	(0, 1)	D	3.3948E-02	340.300	3165.700
90	45	23	(0, 4)	D	3.3874E-02	340.700	3171.900
90	228	23	(0, 7)	D	3.3782E-02	343.700	3178.300
90	180	23	(0, 3)	D	3.3780E-02	340.300	3169.800
90	228	23	(0, 2)	D	3.3554E-02	340.300	3167.700
90	228	23	(0, 1)	D	3.3152E-02	340.300	3165.700
90	228	23	(0, 8)	D	3.3100E-02	342.400	3180.600
90	136	23	(0, 5)	D	3.2714E-02	342.000	3174.000
90	136	23	(0, 6)	D	3.2706E-02	343.000	3176.200
90	202	23	(0, 8)	D	3.2696E-02	342.400	3180.600
90	356	23	(0, 12)	D	3.2358E-02	334.000	3183.400
90	185	23	(0, 9)	D	3.2297E-02	341.100	3183.400
90	185	23	(0, 8)	D	3.2067E-02	342.400	3180.600
90	185	23	(0, 7)	D	3.1858E-02	343.700	3178.300
90	136	23	(0, 7)	D	3.1857E-02	343.700	3178.300
90	228	23	(0, 9)	D	3.1749E-02	341.100	3183.400
90	117	23	(0, 2)	D	3.1672E-02	340.300	3167.700
90	136	23	(0, 4)	D	3.1537E-02	340.700	3171.900
90	228	23	(0, 10)	D	3.1267E-02	339.000	3183.400
90	185	23	(0, 10)	D	3.1232E-02	339.000	3183.400
90	238	23	(0, 7)	D	3.1095E-02	343.700	3178.300
90	136	23	(0, 8)	D	3.0862E-02	342.400	3180.600
90	238	23	(0, 8)	D	3.0760E-02	342.400	3180.600
90	228	23	(0, 11)	D	3.0546E-02	336.500	3183.400
90	238	23	(0, 6)	D	3.0392E-02	343.000	3176.200
90	202	23	(0, 10)	D	3.0391E-02	339.000	3183.400

****

CALPOST Version 5.0 Level 990228

****

PM10 1

2 RANKED 24-HOUR AVERAGE CONCENTRATION VALUES AT EACH DISCRETE RECEPTOR (YEAR,DAY,ENDING HOUR) (ug/m**3)

RECEPTOR	COORDINATES (km)		1 RANK	2 RANK
1	340.300	3165.700	5.0217E-02 (90,356,23)	4.7033E-02 (90, 45,23)
2	340.300	3167.700	5.1918E-02 (90,356,23)	4.3966E-02 (90, 45,23)
3	340.300	3169.800	5.1147E-02 (90,356,23)	3.9435E-02 (90, 45,23)
4	340.700	3171.900	4.7861E-02 (90,356,23)	3.7507E-02 (90,202,23)
5	342.000	3174.000	4.1384E-02 (90,356,23)	3.7254E-02 (90,202,23)
6	343.000	3176.200	3.6312E-02 (90,202,23)	3.4237E-02 (90,356,23)
7	343.700	3178.300	3.4938E-02 (90,202,23)	3.3782E-02 (90,228,23)
8	342.400	3180.600	3.3100E-02 (90,228,23)	3.2696E-02 (90,202,23)
9	341.100	3183.400	3.2297E-02 (90,185,23)	3.1749E-02 (90,228,23)
10	339.000	3183.400	3.1267E-02 (90,228,23)	3.1232E-02 (90,185,23)
11	336.500	3183.400	3.0546E-02 (90,228,23)	3.0387E-02 (90,136,23)
12	334.000	3183.400	3.2358E-02 (90,356,23)	2.9990E-02 (90,136,23)
13	331.500	3183.400	3.6076E-02 (90,356,23)	2.9574E-02 (90,136,23)

****

CALPOST Version 5.0 Level 990228

****

SUMMARY SECTION

PM10 .1

(ug/m**3)

RECEPTOR	COORDINATES (km)		TYPE	PEAK (YEAR,DAY,ENDING HOUR)	FOR RANK	FOR AVERAGE PERIOD
2	340.300	3167.700	DISCRETE	5.1918E-02 (90,356,23)	RANK 1	24-HOUR
1	340.300	3165.700	DISCRETE	4.7033E-02 (90, 45,23)	RANK 2	24-HOUR
1	340.300	3165.700	DISCRETE	3.3532E-03	RANK 1	8616-HOUR

```
**********************************************************************************************************************
                                        CALPOST  Version 5.0          Level 990228
**********************************************************************************************************************

 Run Title:
    CALPINE OSPRAY REGIONAL HAZE ANALYSIS, SO4                    2/6/00
    RECEPTORS AT CHASSAHOWITZKA NWA, 24-HOUR AVERAGING TIME, CALPOST
    2 SIMPLE-CYCLE NATURAL GAS FIRED CTs AT BASE LOAD, 32 DEGREES + COOLING TOWER

 ------------------------------------------------------------------------------

 INPUT GROUP: 1 -- General run control parameters
 --------------

      Option to run all periods found
      in the met. file(s)  (METRUN)        Default: 0   ! METRUN =   0  !

         METRUN = 0 - Run period explicitly defined below
         METRUN = 1 - Run all periods in CALPUFF data file(s)

      Starting date:    Year  (ISYR) --    No default   ! ISYR  =  90   !
      (used only if     Month (ISMO) --    No default   ! ISMO  =  1   !
       METRUN = 0)      Day   (ISDY) --    No default   ! ISDY  =  6   !
                        Hour  (ISHR) --    No default   ! ISHR  =  0   !

      Number of hours to process (NHRS) -- No default   ! NHRS  =  8616  !

            Species to process (ASPEC) -- No default   ! ASPEC = SO4  !
            (ASPEC = VISIB for visibility processing)

      Process every hour of data?(NREP) -- Default: 1   ! NREP  =  1  !
       (1 = every hour processed,
        2 = every 2nd hour processed,
        5 = every 5th hour processed, etc.)

 Concentration and scaling factors
 ---------------------------------

       Layer/deposition code (ILAYER)   -- Default: 1   ! ILAYER =  1  !
         '1'  for CALPUFF concentrations,
         '-1' for dry deposition fluxes,
         '-2' for wet deposition fluxes.

       Scaling factors of the form:     -- Defaults:    ! A =  0.0    !
            X(new) = X(old) * A + B          A = 0.0    ! B =  0.0    !
         (NOT applied if A = B = 0.0)        B = 0.0

       Add Hourly Background Concentrations?
                              (LBACK)  -- Default: F   ! LBACK =  F !

 Receptor information
 --------------------

   Gridded receptors processed?    (LG) -- Default: F   ! LG  = F  !
   Discrete receptors processed?   (LD) -- Default: F   ! LD  = T  !
   CTSG Complex terrain receptors processed?
                                  (LCT) -- Default: F   ! LCT = F  !

 --Select range of DISCRETE receptors (only used when LD = T):

   Select ALL DISCRETE receptors by setting NDRECP flag to -1;
                               OR
   Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
      0 = discrete receptor not processed
      1 = discrete receptor processed
   using repeated value notation to select blocks of receptors:
      23*1, 15*0, 12*1
   Flag for all receptors after the last one assigned is set to 0
   (NDRECP) -- Default: -1
                                             ! NDRECP =  -1  !


 --Select range of GRIDDED receptors (only used when LG = T):
```

```
       X index of LL corner (IBGRID) -- Default: -1     ! IBGRID = -1  !
          (-1 OR 1 <= IBGRID <= NX)

       Y index of LL corner (JBGRID) -- Default: -1     ! JBGRID = -1  !
          (-1 OR 1 <= JBGRID <= NY)

       X index of UR corner (IEGRID) -- Default: -1     ! IEGRID = -1  !
          (-1 OR 1 <= IEGRID <= NX)

       Y index of UR corner (JEGRID) -- Default: -1     ! JEGRID = -1  !
          (-1 OR 1 <= JEGRID <= NY)

    Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1

  !END!
  ------------------------------------------------------------------------------

  INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)
  -------------

      Maximum relative humidity (%) used in particle growth curve
                              (RHMAX) -- Default: 98   ! RHMAX  = 0.0 !

      Modeled species to be included in computing the light extinction
       Include SULFATE?          (LVSO4) -- Default: T   ! LVSO4  = T  !
       Include NITRATE?          (LVNO3) -- Default: T   ! LVNO3  = T  !
       Include ORGANIC CARBON?   (LVOC)  -- Default: T   ! LVOC   = T  !
       Include COARSE PARTICLES? (LVPMC) -- Default: T   ! LVPMC  = T  !
       Include FINE PARTICLES?   (LVPMF) -- Default: T   ! LVPMF  = T  !

      And, when ranking for TOP-N, TOP-50, and Exceedance tables,
       Include BACKGROUND?       (LVBK)  -- Default: T   ! LVBK   = T  !

      Species name used for particulates in MODEL.DAT file
                    COARSE    (SPECPMC) -- Default: PMC ! SPECPMC = PMC !
                    FINE      (SPECPMF) -- Default: PMF ! SPECPMF = PMF !

  Extinction Efficiency (1/Mm per ug/m**3)
  ----------------------------------------
      MODELED particulate species:
                PM  COARSE      (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
                PM  FINE        (EEPMF) -- Default: 1.0 ! EEPMF  = 1.0 !
      BACKGROUND particulate species:
                PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
      Other species:
               AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
               AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
               ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
               SOIL             (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
               ELEMENTAL CARBON (EEEC)  -- Default: 10. ! EEEC   = 10.0 !

  Background Extinction Computation
  ---------------------------------

      Method used for background light extinction
                              (MVISBK) -- Default: 2   ! MVISBK =  2  !

          1 =  Supply single light extinction and hygroscopic fraction
               - IWAQM (1993) RH adjustment applied to hygroscopic background
                 and modeled sulfate and nitrate
          2 =  Compute extinction from speciated PM measurements (A)
               - PATH RH adjustment applied to observed and modeled sulfate
                 and nitrate
               - RH factor is capped at RHMAX
          3 =  Compute extinction from speciated PM measurements (B)
               - PATH RH adjustment applied to observed and modeled sulfate
                 and nitrate
               - Receptor-hour excluded if RH>RHMAX
               - Receptor-day excluded if fewer than 6 valid receptor-hours
          4 =  Read hourly transmissometer background extinction measurements
               - PATH RH adjustment applied to modeled sulfate and nitrate
               - Hour excluded if measurement invalid (missing, interference,
                 or large RH)
               - Receptor-hour excluded if RH>RHMAX
               - Receptor-day excluded if fewer than 6 valid receptor-hours
          5 =  Read hourly nephelometer background extinction measurements
               - Rayleigh extinction value (BEXTRAY) added to measurement
```

```
            - PATH RH adjustment applied to modeled sulfate and nitrate
            - Hour excluded if measurement invalid (missing, interference,
              or large RH)
            - Receptor-hour excluded if RH>RHMAX
            - Receptor-day excluded if fewer than 6 valid receptor-hours

    Additional inputs used for MVISBK = 1:
    --------------------------------------
     Background light extinction (1/Mm)
                          (BEXTBK) -- No default   ! BEXTBK = 0.0 !
     Percentage of particles affected by relative humidity
                          (RHFRAC) -- No default   ! RHFRAC = 0.0 !

    Additional inputs used for MVISBK = 2,3:
    ----------------------------------------
     Background extinction coefficients are computed from monthly
     CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3),
     coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and
     elemental carbon (BKEC).  Month 1 is January.
     (ug/m**3)

     (BKSO4)  -- No default     ! BKSO4 = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKNO3)  -- No default     ! BKNO3 = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKPMC)  -- No default     ! BKPMC = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKOC)   -- No default     ! BKOC  = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKSOIL) -- No default     ! BKSOIL= 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKEC)   -- No default     ! BKEC  = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !

    Additional inputs used for MVISBK = 2,3,5:
    ------------------------------------------
     Extinction due to Rayleigh scattering is added (1/Mm)
                         (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 0.0 !

!END!
--------------------------------------------------------------------------------

INPUT GROUP: 3 -- Processing options
-------------

Averaging time and TOP 50 Table control
---------------------------------------
    User-specified averaging time
                            (NAVG) -- Default: 0   !   NAVG =  0  !
    Top 50 table for  1-hr averages
                           (L1T50) -- Default: T   !  L1T50 = F  !
    Top 50 table for  3-hr averages
                           (L3T50) -- Default: T   !  L3T50 = F  !
    Top 50 table for 24-hr averages
                          (L24T50) -- Default: T   ! L24T50 = T  !
    Top 50 table for NAVG-hr averages
                           (LNT50) -- Default: F   !  LNT50 = F  !
    Top 50 table for length of run averages
                           (LRT50) -- Default: T   !  LRT50 = F  !

TOP 'n' Table control
---------------------

    Number of 'Top' values at each receptor
                            (NTOP) -- Default: 4   ! NTOP =  2   !
              (NTOP must be <= 4)

    Specific ranks of 'Top' values reported (NTOP values must be entered)
                    (ITOP(4) array) -- Default:     ! ITOP =  1 , 2   !
                                       1,2,3,4
```

```
    Top 'n' table for  1-hr averages
                          (L1TOPN) -- Default: F   !  L1TOPN = F  !
    Top 'n' table for  3-hr averages
                          (L3TOPN) -- Default: F   !  L3TOPN = F  !
    Top 'n' table for 24-hr averages
                         (L24TOPN) -- Default: F   ! L24TOPN = T  !
    Top 'n' table for NAVG-hr averages
                          (LNTOPN) -- Default: F   !  LNTOPN = F  !
    Top 'n' table for length of run averages
                           (LRAVG) -- Default: F   !   LRAVG = F  !


Output Units
------------
    Units for All Output       (IPRTU) -- Default: 1   ! IPRTU =  3   !
                    for            for
               Concentration    Deposition
       1 =        g/m**3          g/m**2/s
       2 =       mg/m**3         mg/m**2/s
       3 =       ug/m**3         ug/m**2/s
       4 =       ng/m**3         ng/m**2/s
       5 =     Odour Units

    Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Threshold Exceedance control
----------------------------          -- Default: -1.0

    Counts will be tabulated for each average that
    exceeds a specified non-negative threshold (output units).


    Threshold for  1-hr averages   (THRESH1)     !  THRESH1 = -1.0  !
    Threshold for  3-hr averages   (THRESH3)     !  THRESH3 = -1.0  !
    Threshold for 24-hr averages  (THRESH24)     ! THRESH24 = -1.0  !
    Threshold for NAVG-hr averages (THRESHN)     !  THRESHN = -1.0  !


Selected Day (Echo) Output Control
----------------------------------     -- Default: F
    Output 1-hr averages for selected days (LECH1)     ! LECH1   = F !
    Output 3-hr averages for selected days (LECH3)     ! LECH3   = F !
    Output 24-hr averages for selected days (LECH24)   ! LECH24  = F !
    Output NAVG-hr averages for selected days (LECHN)  ! LECHN   = F !
    Output selected information for debugging (LDEBUG) ! LDEBUG  = F !

    Days selected for output IECHO(366)-- Default: 366*0
! IECHO  = 366*0  !
     (366 values must be entered)

Plot Output Options
-------------------

      Plot files can be created for selected Top-n, Exceedance and Echo
      tables selected above.  Two formats for these files are available,
      DATA and GRID.  In the DATA format, results at all receptors are
      listed along with the receptor location [x,y,val1,val2,...].
      In the GRID format, results at only gridded receptors are written,
      using a compact representation.  The gridded values are written in
      rows (x varies), starting with the most southern row of the grid.
      The GRID format is given the .GRD extension, and includes headers
      compatible with the SURFER(R) plotting software.

      A plotting and analysis file is also created for the daily peak
      visibility summary output, in DATA format only.

      Generate Plot-File Output   (LPLT) -- Default: F   ! LPLT  = F !

      Write Top-n files in GRID format?
                               (LTGRD) -- Default: F   ! LTGRD = F !

      Write Exceedance files in GRID format?
                               (LXGRD) -- Default: F   ! LXGRD = F !
      Write Echo files in GRID format?
                               (LEGRD) -- Default: F   ! LEGRD = F !
```

```
 !END!


 CALPOST Control File Input Summary ------------------------

    Replace run data with data in Puff file 1=Y:    0
                     Run starting date -- year:   90
                                         month:    1
                                           day:    6
                                     Julian day:    6
                               hour ending(0-23):    0
                              Run length (hours):   8616
                                         Species: SO4

 Every hour of data processed -- NREP = 1


 Concentration & scaling factors
                         Layer of processed data:    1
      (>0 = concentrations, -1 = dry fluxes, -2 = wet fluxes)
                  Multiplicative scaling factor: 0.0000E+00
                        Additive scaling factor: 0.0000E+00
         Hourly background concentrations used?: F


 Receptor information
                    Gridded receptors processed?: F
                   Discrete receptors processed?: T
      CTSG Complex terrain receptors processed?: F

 Discrete Receptors Processed

 (All Discrete Receptors are Used)


 Visibility Processing is NOT Selected


 Averaging time & TOP 50 table control
     User-specified averaging time (NAVG hours):     0
                Top 50 table for  1-hr averages:     F
                Top 50 table for  3-hr averages:     F
                Top 50 table for 24-hr averages:     T
              Top 50 table for NAVG-hr averages:     F
        Top 50 table for length of run averages:     F


 Top "n" table control
        Number of "top" values at each receptor:     2
        Specific ranks of "top" values reported:   1   2

              Top "n" table for  1-hr averages: F
              Top "n" table for  3-hr averages: F
              Top "n" table for 24-hr averages: T
            Top "n" table for NAVG-hr averages: F
       Top "n" table for length of run averages: F


 Units requested for output:   (ug/m**3)


 Threshold Exceedance control
      Exceedances of a specified value will be counted for --


 Output options
                             Plot files created: F
      Output    1-hr averages for selected days: F
      Output    3-hr averages for selected days: F
      Output   24-hr averages for selected days: F
      Output NAVG-hr averages for selected days: F
      Output selected information for debugging: F


 Days selected for output tables
    0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  000000000
    0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  000000000
```

0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 000000000
0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 000000

IDENTIFICATION OF PROCESSED MODEL FILE ----------

CALPUFF 5.0 990228

REFINED SIGNIFICANT IMPACT ANALYSIS, CALPUFF, CALPINE OSPREY 3/9/00
RECEPTORS AT CHASSAHOWITZKA NWA, PROJECT ONLY
FDEP CHASSAHOWITZKA CALMET DOMAIN WITH PRECIPITATION

Chemical species names for each layer in model:
SO2 1
SO4 1
NOX 1
HNO3 1
NO3 1
PM10 1

********** NOTICE **********
NDRECP array reset to full range: all 1s

INPUT FILES

Default Name	Unit No.	File Name and Path
CALPOST.INP	5	calpost.inp
MODEL.DAT	4	calpuff.con

OUTPUT FILES

Default Name	Unit No.	File Name and Path
CALPOST.LST	7	calpost.lst

****

CALPOST Version 5.0 Level 990228

****

SO4 1

TOP-50 24-HOUR AVERAGE CONCENTRATION VALUES (ug/m**3)

YEAR	DAY	HOUR(0-23)	RECEPTOR	TYPE	CONCENTRATION	COORDINATES (km)	
90	228	23	(0, 8)	D	3.8588E-03	342.400	3180.600
90	228	23	(0, 9)	D	3.8561E-03	341.100	3183.400
90	228	23	(0, 10)	D	3.8097E-03	339.000	3183.400
90	228	23	(0, 7)	D	3.8015E-03	343.700	3178.300
90	228	23	(0, 11)	D	3.7385E-03	336.500	3183.400
90	228	23	(0, 6)	D	3.7194E-03	343.000	3176.200
90	228	23	(0, 12)	D	3.6484E-03	334.000	3183.400
90	228	23	(0, 5)	D	3.6061E-03	342.000	3174.000
90	228	23	(0, 13)	D	3.5483E-03	331.500	3183.400
90	228	23	(0, 4)	D	3.4733E-03	340.700	3171.900
90	228	23	(0, 3)	D	3.3233E-03	340.300	3169.800
90	228	23	(0, 2)	D	3.1205E-03	340.300	3167.700
90	228	23	(0, 1)	D	2.9431E-03	340.300	3165.700
90	151	23	(0, 1)	D	2.6874E-03	340.300	3165.700
90	151	23	(0, 2)	D	2.6351E-03	340.300	3167.700
90	351	23	(0, 1)	D	2.5971E-03	340.300	3165.700
90	224	23	(0, 7)	D	2.5756E-03	343.700	3178.300
90	151	23	(0, 3)	D	2.5702E-03	340.300	3169.800
90	224	23	(0, 8)	D	2.5448E-03	342.400	3180.600
90	224	23	(0, 6)	D	2.5399E-03	343.000	3176.200
90	351	23	(0, 2)	D	2.5348E-03	340.300	3167.700
90	202	23	(0, 13)	D	2.5151E-03	331.500	3183.400

90	224	23	(0, 9)	D	2.5102E-03	341.100	3183.400
90	151	23	(0, 4)	D	2.5063E-03	340.700	3171.900
90	202	23	(0, 12)	D	2.4960E-03	334.000	3183.400
90	202	23	(0, 7)	D	2.4892E-03	343.700	3178.300
90	202	23	(0, 6)	D	2.4866E-03	343.000	3176.200
90	224	23	(0, 5)	D	2.4864E-03	342.000	3174.000
90	202	23	(0, 11)	D	2.4710E-03	336.500	3183.400
90	351	23	(0, 3)	D	2.4700E-03	340.300	3169.800
90	202	23	(0, 8)	D	2.4665E-03	342.400	3180.600
90	202	23	(0, 5)	D	2.4565E-03	342.000	3174.000
90	151	23	(0, 5)	D	2.4560E-03	342.000	3174.000
90	224	23	(0, 10)	D	2.4536E-03	339.000	3183.400
90	202	23	(0, 10)	D	2.4528E-03	339.000	3183.400
90	179	23	(0, 9)	D	2.4327E-03	341.100	3183.400
90	202	23	(0, 9)	D	2.4291E-03	341.100	3183.400
90	224	23	(0, 4)	D	2.4161E-03	340.700	3171.900
90	179	23	(0, 10)	D	2.4048E-03	339.000	3183.400
90	351	23	(0, 4)	D	2.4023E-03	340.700	3171.900
90	202	23	(0, 4)	D	2.4018E-03	340.700	3171.900
90	179	23	(0, 8)	D	2.3873E-03	342.400	3180.600
90	224	23	(0, 11)	D	2.3833E-03	336.500	3183.400
90	151	23	(0, 6)	D	2.3743E-03	343.000	3176.200
90	224	23	(0, 3)	D	2.3669E-03	340.300	3169.800
90	179	23	(0, 7)	D	2.3612E-03	343.700	3178.300
90	191	23	(0, 1)	D	2.3586E-03	340.300	3165.700
90	179	23	(0, 11)	D	2.3545E-03	336.500	3183.400
90	224	23	(0, 2)	D	2.3260E-03	340.300	3167.700
90	351	23	(0, 5)	D	2.3223E-03	342.000	3174.000

****

CALPOST Version 5.0 Level 990228

****

SO4 1

2 RANKED 24-HOUR AVERAGE CONCENTRATION VALUES AT EACH DISCRETE RECEPTOR (YEAR,DAY,ENDING HOUR) (ug/m**3)

RECEPTOR	COORDINATES (km)		1 RANK	2 RANK
1	340.300	3165.700	2.9431E-03 (90,228,23)	2.6874E-03 (90,151,23)
2	340.300	3167.700	3.1205E-03 (90,228,23)	2.6351E-03 (90,151,23)
3	340.300	3169.800	3.3233E-03 (90,228,23)	2.5702E-03 (90,151,23)
4	340.700	3171.900	3.4733E-03 (90,228,23)	2.5063E-03 (90,151,23)
5	342.000	3174.000	3.6061E-03 (90,228,23)	2.4864E-03 (90,224,23)
6	343.000	3176.200	3.7194E-03 (90,228,23)	2.5399E-03 (90,224,23)
7	343.700	3178.300	3.8015E-03 (90,228,23)	2.5756E-03 (90,224,23)
8	342.400	3180.600	3.8588E-03 (90,228,23)	2.5448E-03 (90,224,23)
9	341.100	3183.400	3.8561E-03 (90,228,23)	2.5102E-03 (90,224,23)
10	339.000	3183.400	3.8097E-03 (90,228,23)	2.4536E-03 (90,224,23)
11	336.500	3183.400	3.7385E-03 (90,228,23)	2.4710E-03 (90,202,23)
12	334.000	3183.400	3.6484E-03 (90,228,23)	2.4960E-03 (90,202,23)
13	331.500	3183.400	3.5483E-03 (90,228,23)	2.5151E-03 (90,202,23)

****

CALPOST Version 5.0 Level 990228

****

SUMMARY SECTION

SO4 1

(ug/m**3)

RECEPTOR	COORDINATES (km)		TYPE	PEAK (YEAR,DAY,ENDING HOUR)	FOR RANK	FOR AVERAGE PERIOD
8	342.400	3180.600	DISCRETE	3.8588E-03 (90,228,23)	RANK 1	24-HOUR
1	340.300	3165.700	DISCRETE	2.6874E-03 (90,151,23)	RANK 2	24-HOUR

```
**********************************************************************************************************************
                                    CALPOST  Version 5.0          Level 990228
**********************************************************************************************************************

 Run Title:
    CALPINE OSPRAY REGIONAL HAZE ANALYSIS, NO3                    2/6/00
    RECEPTORS AT CHASSAHOWITZKA NWA, 24-HOUR AVERAGING TIME, CALPOST
    2 SIMPLE-CYCLE NATURAL GAS FIRED CTs AT BASE LOAD, 32 DEGREES + COOLING TOWER

 ----------------------------------------------------------------------------

 INPUT GROUP: 1 -- General run control parameters
 --------------

      Option to run all periods found
      in the met. file(s)  (METRUN)        Default: 0   ! METRUN =   0  !

         METRUN = 0 - Run period explicitly defined below
         METRUN = 1 - Run all periods in CALPUFF data file(s)

      Starting date:    Year  (ISYR) --    No default   ! ISYR  =  90   !
      (used only if     Month (ISMO) --    No default   ! ISMO  =  1   !
       METRUN = 0)      Day   (ISDY) --    No default   ! ISDY  =  6   !
                        Hour  (ISHR) --    No default   ! ISHR  =  0   !

      Number of hours to process (NHRS) -- No default   ! NHRS  =  8616  !

            Species to process (ASPEC) -- No default   ! ASPEC = NO3  !
            (ASPEC = VISIB for visibility processing)

      Process every hour of data?(NREP) -- Default: 1   ! NREP  =  1  !
       (1 = every hour processed,
        2 = every 2nd hour processed,
        5 = every 5th hour processed, etc.)

 Concentration and scaling factors
 ---------------------------------

       Layer/deposition code (ILAYER)   -- Default: 1   ! ILAYER =  1  !
         '1'  for CALPUFF concentrations,
         '-1' for dry deposition fluxes,
         '-2' for wet deposition fluxes.

       Scaling factors of the form:     -- Defaults:    ! A =  0.0    !
            X(new) = X(old) * A + B          A = 0.0    ! B =  0.0    !
         (NOT applied if A = B = 0.0)        B = 0.0

       Add Hourly Background Concentrations?
                              (LBACK)  -- Default: F   ! LBACK =  F !

 Receptor information
 --------------------

   Gridded receptors processed?    (LG) -- Default: F   ! LG  = F  !
   Discrete receptors processed?   (LD) -- Default: F   ! LD  = T  !
   CTSG Complex terrain receptors processed?
                                  (LCT) -- Default: F   ! LCT = F  !

 --Select range of DISCRETE receptors (only used when LD = T):

   Select ALL DISCRETE receptors by setting NDRECP flag to -1;
                               OR
   Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
      0 = discrete receptor not processed
      1 = discrete receptor processed
   using repeated value notation to select blocks of receptors:
      23*1, 15*0, 12*1
   Flag for all receptors after the last one assigned is set to 0
   (NDRECP) -- Default: -1
                                            ! NDRECP =  -1  !

 --Select range of GRIDDED receptors (only used when LG = T):

                                                      Page: 1
```

```
       X index of LL corner (IBGRID) -- Default: -1     ! IBGRID = -1  !
           (-1 OR 1 <= IBGRID <= NX)

       Y index of LL corner (JBGRID) -- Default: -1     ! JBGRID = -1  !
           (-1 OR 1 <= JBGRID <= NY)

       X index of UR corner (IEGRID) -- Default: -1     ! IEGRID = -1  !
           (-1 OR 1 <= IEGRID <= NX)

       Y index of UR corner (JEGRID) -- Default: -1     ! JEGRID = -1  !
           (-1 OR 1 <= JEGRID <= NY)

  Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1

!END!
--------------------------------------------------------------------------------

INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)
--------------

    Maximum relative humidity (%) used in particle growth curve
                             (RHMAX) -- Default: 98   ! RHMAX  = 0.0 !

    Modeled species to be included in computing the light extinction
     Include SULFATE?          (LVSO4) -- Default: T   ! LVSO4  = T  !
     Include NITRATE?          (LVNO3) -- Default: T   ! LVNO3  = T  !
     Include ORGANIC CARBON?   (LVOC)  -- Default: T   ! LVOC   = T  !
     Include COARSE PARTICLES? (LVPMC) -- Default: T   ! LVPMC  = T  !
     Include FINE PARTICLES?   (LVPMF) -- Default: T   ! LVPMF  = T  !

    And, when ranking for TOP-N, TOP-50, and Exceedance tables,
     Include BACKGROUND?       (LVBK)  -- Default: T   ! LVBK   = T  !

    Species name used for particulates in MODEL.DAT file
                  COARSE    (SPECPMC) -- Default: PMC ! SPECPMC = PMC !
                  FINE      (SPECPMF) -- Default: PMF ! SPECPMF = PMF !

Extinction Efficiency (1/Mm per ug/m**3)
----------------------------------------
    MODELED particulate species:
              PM  COARSE      (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
              PM  FINE        (EEPMF) -- Default: 1.0 ! EEPMF  = 1.0 !
    BACKGROUND particulate species:
              PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
    Other species:
             AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
             AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
             ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
             SOIL             (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
             ELEMENTAL CARBON (EEEC)  -- Default: 10. ! EEEC   = 10.0 !

Background Extinction Computation
---------------------------------

    Method used for background light extinction
                             (MVISBK) -- Default: 2   ! MVISBK =  2  !

         1 =  Supply single light extinction and hygroscopic fraction
              - IWAQM (1993) RH adjustment applied to hygroscopic background
                and modeled sulfate and nitrate
         2 =  Compute extinction from speciated PM measurements (A)
              - PATH RH adjustment applied to observed and modeled sulfate
                and nitrate
              - RH factor is capped at RHMAX
         3 =  Compute extinction from speciated PM measurements (B)
              - PATH RH adjustment applied to observed and modeled sulfate
                and nitrate
              - Receptor-hour excluded if RH>RHMAX
              - Receptor-day excluded if fewer than 6 valid receptor-hours
         4 =  Read hourly transmissometer background extinction measurements
              - PATH RH adjustment applied to modeled sulfate and nitrate
              - Hour excluded if measurement invalid (missing, interference,
                or large RH)
              - Receptor-hour excluded if RH>RHMAX
              - Receptor-day excluded if fewer than 6 valid receptor-hours
         5 =  Read hourly nephelometer background extinction measurements
              - Rayleigh extinction value (BEXTRAY) added to measurement
```

```
            - PATH RH adjustment applied to modeled sulfate and nitrate
            - Hour excluded if measurement invalid (missing, interference,
              or large RH)
            - Receptor-hour excluded if RH>RHMAX
            - Receptor-day excluded if fewer than 6 valid receptor-hours

    Additional inputs used for MVISBK = 1:
    --------------------------------------
     Background light extinction (1/Mm)
                           (BEXTBK) -- No default   ! BEXTBK = 0.0 !
     Percentage of particles affected by relative humidity
                           (RHFRAC) -- No default   ! RHFRAC = 0.0 !

    Additional inputs used for MVISBK = 2,3:
    ----------------------------------------
     Background extinction coefficients are computed from monthly
     CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3),
     coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and
     elemental carbon (BKEC).  Month 1 is January.
     (ug/m**3)

     (BKSO4)  -- No default     ! BKSO4 = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKNO3)  -- No default     ! BKNO3 = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKPMC)  -- No default     ! BKPMC = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKOC)   -- No default     ! BKOC  = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKSOIL) -- No default     ! BKSOIL= 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKEC)   -- No default     ! BKEC  = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !

    Additional inputs used for MVISBK = 2,3,5:
    ------------------------------------------
     Extinction due to Rayleigh scattering is added (1/Mm)
                           (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 0.0 !

!END!
--------------------------------------------------------------------------------

INPUT GROUP: 3 -- Processing options
-------------

Averaging time and TOP 50 Table control
---------------------------------------
    User-specified averaging time
                              (NAVG) -- Default: 0   !   NAVG =  0  !
    Top 50 table for  1-hr averages
                             (L1T50) -- Default: T   !  L1T50 = F  !
    Top 50 table for  3-hr averages
                             (L3T50) -- Default: T   !  L3T50 = F  !
    Top 50 table for 24-hr averages
                            (L24T50) -- Default: T   ! L24T50 = T  !
    Top 50 table for NAVG-hr averages
                             (LNT50) -- Default: F   !  LNT50 = F  !
    Top 50 table for length of run averages
                             (LRT50) -- Default: T   !  LRT50 = F  !

TOP 'n' Table control
---------------------

    Number of 'Top' values at each receptor
                              (NTOP) -- Default: 4   ! NTOP =  2   !
              (NTOP must be <= 4)

    Specific ranks of 'Top' values reported (NTOP values must be entered)
                         (ITOP(4) array) -- Default:     ! ITOP =  1 , 2   !
                                             1,2,3,4
```

```
    Top 'n' table for  1-hr averages
                          (L1TOPN) -- Default: F   ! L1TOPN = F  !
    Top 'n' table for  3-hr averages
                          (L3TOPN) -- Default: F   ! L3TOPN = F  !
    Top 'n' table for 24-hr averages
                         (L24TOPN) -- Default: F   ! L24TOPN = T  !
    Top 'n' table for NAVG-hr averages
                          (LNTOPN) -- Default: F   ! LNTOPN = F  !
    Top 'n' table for length of run averages
                           (LRAVG) -- Default: F   !  LRAVG = F  !


Output Units
------------
    Units for All Output       (IPRTU) -- Default: 1   ! IPRTU =  3   !
                      for            for
                Concentration    Deposition
       1 =          g/m**3         g/m**2/s
       2 =         mg/m**3        mg/m**2/s
       3 =         ug/m**3        ug/m**2/s
       4 =         ng/m**3        ng/m**2/s
       5 =       Odour Units

    Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Threshold Exceedance control
----------------------------          -- Default: -1.0

    Counts will be tabulated for each average that
    exceeds a specified non-negative threshold (output units).


    Threshold for  1-hr averages   (THRESH1)     !  THRESH1 = -1.0  !
    Threshold for  3-hr averages   (THRESH3)     !  THRESH3 = -1.0  !
    Threshold for 24-hr averages  (THRESH24)     ! THRESH24 = -1.0  !
    Threshold for NAVG-hr averages (THRESHN)     !  THRESHN = -1.0  !


Selected Day (Echo) Output Control
----------------------------------     -- Default: F
    Output 1-hr averages for selected days (LECH1)     ! LECH1   = F !
    Output 3-hr averages for selected days (LECH3)     ! LECH3   = F !
    Output 24-hr averages for selected days (LECH24)   ! LECH24  = F !
    Output NAVG-hr averages for selected days (LECHN)  ! LECHN   = F !
    Output selected information for debugging (LDEBUG) ! LDEBUG  = F !

    Days selected for output IECHO(366)-- Default: 366*0
! IECHO  = 366*0  !
    (366 values must be entered)

Plot Output Options
-------------------

     Plot files can be created for selected Top-n, Exceedance and Echo
     tables selected above.  Two formats for these files are available,
     DATA and GRID.  In the DATA format, results at all receptors are
     listed along with the receptor location [x,y,val1,val2,...].
     In the GRID format, results at only gridded receptors are written,
     using a compact representation.  The gridded values are written in
     rows (x varies), starting with the most southern row of the grid.
     The GRID format is given the .GRD extension, and includes headers
     compatible with the SURFER(R) plotting software.

     A plotting and analysis file is also created for the daily peak
     visibility summary output, in DATA format only.

     Generate Plot-File Output   (LPLT) -- Default: F   ! LPLT  = F !

     Write Top-n files in GRID format?
                           (LTGRD) -- Default: F   ! LTGRD = F !

     Write Exceedance files in GRID format?
                           (LXGRD) -- Default: F   ! LXGRD = F !
     Write Echo files in GRID format?
                           (LEGRD) -- Default: F   ! LEGRD = F !
```

```
!END!

 CALPOST Control File Input Summary ------------------------

    Replace run data with data in Puff file 1=Y:    0
                      Run starting date -- year:   90
                                          month:    1
                                            day:    6
                                    Julian day:     6
                               hour ending(0-23):   0
                              Run length (hours):   8616
                                        Species: NO3

Every hour of data processed -- NREP = 1


 Concentration & scaling factors
                         Layer of processed data:    1
      (>0 = concentrations, -1 = dry fluxes, -2 = wet fluxes)
                  Multiplicative scaling factor: 0.0000E+00
                      Additive scaling factor: 0.0000E+00
         Hourly background concentrations used?: F


 Receptor information
                   Gridded receptors processed?: F
                  Discrete receptors processed?: T
      CTSG Complex terrain receptors processed?: F

 Discrete Receptors Processed

 (All Discrete Receptors are Used)


 Visibility Processing is NOT Selected


 Averaging time & TOP 50 table control
     User-specified averaging time (NAVG hours):     0
                 Top 50 table for  1-hr averages:    F
                 Top 50 table for  3-hr averages:    F
                 Top 50 table for 24-hr averages:    T
               Top 50 table for NAVG-hr averages:    F
        Top 50 table for length of run averages:    F


 Top "n" table control
        Number of "top" values at each receptor:    2
        Specific ranks of "top" values reported:   1   2

              Top "n" table for  1-hr averages: F
              Top "n" table for  3-hr averages: F
              Top "n" table for 24-hr averages: T
            Top "n" table for NAVG-hr averages: F
       Top "n" table for length of run averages: F


 Units requested for output:   (ug/m**3)


 Threshold Exceedance control
      Exceedances of a specified value will be counted for --


 Output options
                            Plot files created: F
      Output    1-hr averages for selected days: F
      Output    3-hr averages for selected days: F
      Output   24-hr averages for selected days: F
      Output NAVG-hr averages for selected days: F
      Output selected information for debugging: F


 Days selected for output tables
    0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  000000000
    0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  000000000
```

0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 000000000
0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 000000

IDENTIFICATION OF PROCESSED MODEL FILE ----------

CALPUFF 5.0 990228

REFINED SIGNIFICANT IMPACT ANALYSIS, CALPUFF, CALPINE OSPREY 3/9/00
RECEPTORS AT CHASSAHOWITZKA NWA, PROJECT ONLY
FDEP CHASSAHOWITZKA CALMET DOMAIN WITH PRECIPITATION

Chemical species names for each layer in model:
SO2 1
SO4 1
NOX 1
HNO3 1
NO3 1
PM10 1

********** NOTICE **********
NDRECP array reset to full range: all 1s

INPUT FILES

Default Name	Unit No.	File Name and Path
CALPOST.INP	5	calpost.inp
MODEL.DAT	4	calpuff.con

OUTPUT FILES

Default Name	Unit No.	File Name and Path
CALPOST.LST	7	calpost.lst

****

CALPOST Version 5.0 Level 990228

****

NO3 1

TOP-50 24-HOUR AVERAGE CONCENTRATION VALUES (ug/m**3)

YEAR	DAY	HOUR(0-23)	RECEPTOR	TYPE	CONCENTRATION	COORDINATES (km)	
90	185	23	(0, 9)	D	9.1405E-03	341.100	3183.400
90	185	23	(0, 10)	D	9.0527E-03	339.000	3183.400
90	185	23	(0, 8)	D	8.8673E-03	342.400	3180.600
90	185	23	(0, 11)	D	8.8438E-03	336.500	3183.400
90	333	23	(0, 1)	D	8.6451E-03	340.300	3165.700
90	185	23	(0, 7)	D	8.6405E-03	343.700	3178.300
90	185	23	(0, 12)	D	8.5623E-03	334.000	3183.400
90	351	23	(0, 1)	D	8.2370E-03	340.300	3165.700
90	185	23	(0, 13)	D	8.2315E-03	331.500	3183.400
90	185	23	(0, 6)	D	8.2197E-03	343.000	3176.200
90	333	23	(0, 2)	D	8.1839E-03	340.300	3167.700
90	351	23	(0, 2)	D	8.0133E-03	340.300	3167.700
90	351	23	(0, 3)	D	7.7901E-03	340.300	3169.800
90	185	23	(0, 5)	D	7.6398E-03	342.000	3174.000
90	351	23	(0, 4)	D	7.5656E-03	340.700	3171.900
90	333	23	(0, 3)	D	7.5355E-03	340.300	3169.800
90	351	23	(0, 5)	D	7.3182E-03	342.000	3174.000
90	351	23	(0, 6)	D	7.0770E-03	343.000	3176.200
90	333	23	(0, 4)	D	7.0197E-03	340.700	3171.900
90	185	23	(0, 4)	D	6.9724E-03	340.700	3171.900
90	45	23	(0, 1)	D	6.8941E-03	340.300	3165.700
90	351	23	(0, 7)	D	6.8698E-03	343.700	3178.300

90	351	23	(0, 8)	D	6.7079E-03	342.400	3180.600
90	351	23	(0, 13)	D	6.7075E-03	331.500	3183.400
90	351	23	(0, 12)	D	6.6616E-03	334.000	3183.400
90	351	23	(0, 11)	D	6.6085E-03	336.500	3183.400
90	333	23	(0, 5)	D	6.5888E-03	342.000	3174.000
90	45	23	(0, 2)	D	6.5809E-03	340.300	3167.700
90	202	23	(0, 5)	D	6.5722E-03	342.000	3174.000
90	202	23	(0, 6)	D	6.5626E-03	343.000	3176.200
90	351	23	(0, 10)	D	6.5576E-03	339.000	3183.400
90	351	23	(0, 9)	D	6.5065E-03	341.100	3183.400
90	202	23	(0, 4)	D	6.4746E-03	340.700	3171.900
90	202	23	(0, 7)	D	6.4743E-03	343.700	3178.300
90	88	23	(0, 13)	D	6.4360E-03	331.500	3183.400
90	202	23	(0, 3)	D	6.4240E-03	340.300	3169.800
90	185	23	(0, 3)	D	6.4160E-03	340.300	3169.800
90	202	23	(0, 2)	D	6.3762E-03	340.300	3167.700
90	356	23	(0, 2)	D	6.2885E-03	340.300	3167.700
90	202	23	(0, 1)	D	6.2739E-03	340.300	3165.700
90	356	23	(0, 3)	D	6.2590E-03	340.300	3169.800
90	202	23	(0, 8)	D	6.1715E-03	342.400	3180.600
90	88	23	(0, 12)	D	6.0210E-03	334.000	3183.400
90	356	23	(0, 1)	D	6.0052E-03	340.300	3165.700
90	45	23	(0, 3)	D	5.9574E-03	340.300	3169.800
90	88	23	(0, 4)	D	5.9309E-03	340.700	3171.900
90	185	23	(0, 2)	D	5.9097E-03	340.300	3167.700
90	88	23	(0, 3)	D	5.9004E-03	340.300	3169.800
90	333	23	(0, 6)	D	5.8993E-03	343.000	3176.200
90	356	23	(0, 4)	D	5.8823E-03	340.700	3171.900

****

CALPOST Version 5.0 Level 990228

****

NO3 1

2 RANKED 24-HOUR AVERAGE CONCENTRATION VALUES AT EACH DISCRETE RECEPTOR (YEAR,DAY,ENDING HOUR) (ug/m**3)

RECEPTOR	COORDINATES (km)		1 RANK	2 RANK
1	340.300	3165.700	8.6451E-03 (90,333,23)	8.2370E-03 (90,351,23)
2	340.300	3167.700	8.1839E-03 (90,333,23)	8.0133E-03 (90,351,23)
3	340.300	3169.800	7.7901E-03 (90,351,23)	7.5355E-03 (90,333,23)
4	340.700	3171.900	7.5656E-03 (90,351,23)	7.0197E-03 (90,333,23)
5	342.000	3174.000	7.6398E-03 (90,185,23)	7.3182E-03 (90,351,23)
6	343.000	3176.200	8.2197E-03 (90,185,23)	7.0770E-03 (90,351,23)
7	343.700	3178.300	8.6405E-03 (90,185,23)	6.8698E-03 (90,351,23)
8	342.400	3180.600	8.8673E-03 (90,185,23)	6.7079E-03 (90,351,23)
9	341.100	3183.400	9.1405E-03 (90,185,23)	6.5065E-03 (90,351,23)
10	339.000	3183.400	9.0527E-03 (90,185,23)	6.5576E-03 (90,351,23)
11	336.500	3183.400	8.8438E-03 (90,185,23)	6.6085E-03 (90,351,23)
12	334.000	3183.400	8.5623E-03 (90,185,23)	6.6616E-03 (90,351,23)
13	331.500	3183.400	8.2315E-03 (90,185,23)	6.7075E-03 (90,351,23)

****

CALPOST Version 5.0 Level 990228

****

SUMMARY SECTION

NO3 1

(ug/m**3)

RECEPTOR	COORDINATES (km)		TYPE	PEAK (YEAR,DAY,ENDING HOUR)	FOR RANK	FOR AVERAGE PERIOD
9	341.100	3183.400	DISCRETE	9.1405E-03 (90,185,23)	RANK 1	24-HOUR
1	340.300	3165.700	DISCRETE	8.2370E-03 (90,351,23)	RANK 2	24-HOUR

```
**********************************************************************************************************************
                                        CALPOST  Version 5.0          Level 990228
**********************************************************************************************************************

 Run Title:
    CALPINE OSPRAY CLASS I SINIFICANT IMPACT ANALYSIS, PM10     2/6/00
    RECEPTORS AT CHASSAHOWITZKA NWA, 24-HOUR AND ANNUAL AVERAGING TIMES, CALPOST
    2 SIMPLE-CYCLE NATURAL GAS FIRED CTs AT BASE LOAD, 32 DEGREES + COOLING TOWER

-------------------------------------------------------------------------------

 INPUT GROUP: 1 -- General run control parameters
 -------------

      Option to run all periods found
      in the met. file(s)  (METRUN)        Default: 0   ! METRUN =   0  !

          METRUN = 0 - Run period explicitly defined below
          METRUN = 1 - Run all periods in CALPUFF data file(s)

      Starting date:    Year  (ISYR) --    No default   ! ISYR  =  90   !
      (used only if     Month (ISMO) --    No default   ! ISMO  =  1   !
       METRUN = 0)      Day   (ISDY) --    No default   ! ISDY  =  6   !
                        Hour  (ISHR) --    No default   ! ISHR  =  0   !

      Number of hours to process (NHRS) -- No default   ! NHRS  =  8616  !

            Species to process (ASPEC) -- No default   ! ASPEC = PM10  !
            (ASPEC = VISIB for visibility processing)

      Process every hour of data?(NREP) -- Default: 1   ! NREP  =  1  !
       (1 = every hour processed,
        2 = every 2nd hour processed,
        5 = every 5th hour processed, etc.)

 Concentration and scaling factors
 ---------------------------------

       Layer/deposition code (ILAYER)   -- Default: 1   ! ILAYER =  1  !
         '1'  for CALPUFF concentrations,
         '-1' for dry deposition fluxes,
         '-2' for wet deposition fluxes.

       Scaling factors of the form:     -- Defaults:    ! A =  0.0    !
            X(new) = X(old) * A + B          A = 0.0    ! B =  0.0    !
         (NOT applied if A = B = 0.0)        B = 0.0

       Add Hourly Background Concentrations?
                        (LBACK)  -- Default: F   ! LBACK =  F !

 Receptor information
 --------------------

   Gridded receptors processed?    (LG) -- Default: F   ! LG  = F  !
   Discrete receptors processed?   (LD) -- Default: F   ! LD  = T  !
   CTSG Complex terrain receptors processed?
                                  (LCT) -- Default: F   ! LCT = F  !

 --Select range of DISCRETE receptors (only used when LD = T):

   Select ALL DISCRETE receptors by setting NDRECP flag to -1;
                               OR
   Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
      0 = discrete receptor not processed
      1 = discrete receptor processed
   using repeated value notation to select blocks of receptors:
      23*1, 15*0, 12*1
   Flag for all receptors after the last one assigned is set to 0
   (NDRECP) -- Default: -1
                                             ! NDRECP =  -1  !

 --Select range of GRIDDED receptors (only used when LG = T):
```

```
       X index of LL corner (IBGRID) -- Default: -1     ! IBGRID = -1  !
           (-1 OR 1 <= IBGRID <= NX)

       Y index of LL corner (JBGRID) -- Default: -1     ! JBGRID = -1  !
           (-1 OR 1 <= JBGRID <= NY)

       X index of UR corner (IEGRID) -- Default: -1     ! IEGRID = -1  !
           (-1 OR 1 <= IEGRID <= NX)

       Y index of UR corner (JEGRID) -- Default: -1     ! JEGRID = -1  !
           (-1 OR 1 <= JEGRID <= NY)

  Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1

!END!
--------------------------------------------------------------------------------

INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)
--------------

    Maximum relative humidity (%) used in particle growth curve
                            (RHMAX) -- Default: 98   ! RHMAX  = 0.0 !

    Modeled species to be included in computing the light extinction
     Include SULFATE?          (LVSO4) -- Default: T   ! LVSO4  = T  !
     Include NITRATE?          (LVNO3) -- Default: T   ! LVNO3  = T  !
     Include ORGANIC CARBON?   (LVOC)  -- Default: T   ! LVOC   = T  !
     Include COARSE PARTICLES? (LVPMC) -- Default: T   ! LVPMC  = T  !
     Include FINE PARTICLES?   (LVPMF) -- Default: T   ! LVPMF  = T  !

    And, when ranking for TOP-N, TOP-50, and Exceedance tables,
     Include BACKGROUND?       (LVBK)  -- Default: T   ! LVBK   = T  !

    Species name used for particulates in MODEL.DAT file
                  COARSE    (SPECPMC) -- Default: PMC ! SPECPMC = PMC !
                  FINE      (SPECPMF) -- Default: PMF ! SPECPMF = PMF !

  Extinction Efficiency (1/Mm per ug/m**3)
  ---------------------------------------
    MODELED particulate species:
              PM  COARSE      (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
              PM  FINE        (EEPMF) -- Default: 1.0 ! EEPMF  = 1.0 !
    BACKGROUND particulate species:
              PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
    Other species:
             AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
             AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
             ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
             SOIL             (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
             ELEMENTAL CARBON (EEEC)  -- Default: 10. ! EEEC   = 10.0 !

  Background Extinction Computation
  ---------------------------------

    Method used for background light extinction
                            (MVISBK) -- Default: 2   ! MVISBK =  2  !

        1 =  Supply single light extinction and hygroscopic fraction
             - IWAQM (1993) RH adjustment applied to hygroscopic background
               and modeled sulfate and nitrate
        2 =  Compute extinction from speciated PM measurements (A)
             - PATH RH adjustment applied to observed and modeled sulfate
               and nitrate
             - RH factor is capped at RHMAX
        3 =  Compute extinction from speciated PM measurements (B)
             - PATH RH adjustment applied to observed and modeled sulfate
               and nitrate
             - Receptor-hour excluded if RH>RHMAX
             - Receptor-day excluded if fewer than 6 valid receptor-hours
        4 =  Read hourly transmissometer background extinction measurements
             - PATH RH adjustment applied to modeled sulfate and nitrate
             - Hour excluded if measurement invalid (missing, interference,
               or large RH)
             - Receptor-hour excluded if RH>RHMAX
             - Receptor-day excluded if fewer than 6 valid receptor-hours
        5 =  Read hourly nephelometer background extinction measurements
             - Rayleigh extinction value (BEXTRAY) added to measurement
```

```
            - PATH RH adjustment applied to modeled sulfate and nitrate
            - Hour excluded if measurement invalid (missing, interference,
              or large RH)
            - Receptor-hour excluded if RH>RHMAX
            - Receptor-day excluded if fewer than 6 valid receptor-hours

   Additional inputs used for MVISBK = 1:
   --------------------------------------
    Background light extinction (1/Mm)
                           (BEXTBK) -- No default   ! BEXTBK = 0.0 !
    Percentage of particles affected by relative humidity
                           (RHFRAC) -- No default   ! RHFRAC = 0.0 !

   Additional inputs used for MVISBK = 2,3:
   ----------------------------------------
    Background extinction coefficients are computed from monthly
    CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3),
    coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and
    elemental carbon (BKEC).  Month 1 is January.
    (ug/m**3)

    (BKSO4)  -- No default     ! BKSO4 = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKNO3)  -- No default     ! BKNO3 = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKPMC)  -- No default     ! BKPMC = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKOC)   -- No default     ! BKOC  = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKSOIL) -- No default     ! BKSOIL= 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKEC)   -- No default     ! BKEC  = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !

   Additional inputs used for MVISBK = 2,3,5:
   ------------------------------------------
    Extinction due to Rayleigh scattering is added (1/Mm)
                          (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 0.0 !

!END!
--------------------------------------------------------------------------------

INPUT GROUP: 3 -- Processing options
-------------

Averaging time and TOP 50 Table control
---------------------------------------
    User-specified averaging time
                              (NAVG) -- Default: 0   !   NAVG =  0  !
    Top 50 table for  1-hr averages
                             (L1T50) -- Default: T   !  L1T50 = F  !
    Top 50 table for  3-hr averages
                             (L3T50) -- Default: T   !  L3T50 = F  !
    Top 50 table for 24-hr averages
                            (L24T50) -- Default: T   ! L24T50 = T  !
    Top 50 table for NAVG-hr averages
                             (LNT50) -- Default: F   !  LNT50 = F  !
    Top 50 table for length of run averages
                             (LRT50) -- Default: T   !  LRT50 = F  !

TOP 'n' Table control
---------------------

    Number of 'Top' values at each receptor
                              (NTOP) -- Default: 4   ! NTOP =  2   !
              (NTOP must be <= 4)

    Specific ranks of 'Top' values reported (NTOP values must be entered)
                     (ITOP(4) array) -- Default:     ! ITOP =  1 , 2   !
                                       1,2,3,4
```

```
    Top 'n' table for  1-hr averages
                          (L1TOPN) -- Default: F   ! L1TOPN = F  !
    Top 'n' table for  3-hr averages
                          (L3TOPN) -- Default: F   ! L3TOPN = F  !
    Top 'n' table for 24-hr averages
                          (L24TOPN) -- Default: F  ! L24TOPN = T  !
    Top 'n' table for NAVG-hr averages
                          (LNTOPN) -- Default: F   ! LNTOPN = F  !
    Top 'n' table for length of run averages
                          (LRAVG) -- Default: F    !  LRAVG = T  !


Output Units
------------
    Units for All Output       (IPRTU) -- Default: 1   ! IPRTU =  3   !
                     for             for
                Concentration   Deposition
       1 =          g/m**3         g/m**2/s
       2 =         mg/m**3        mg/m**2/s
       3 =         ug/m**3        ug/m**2/s
       4 =         ng/m**3        ng/m**2/s
       5 =       Odour Units

    Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Threshold Exceedance control
----------------------------          -- Default: -1.0

    Counts will be tabulated for each average that
    exceeds a specified non-negative threshold (output units).


    Threshold for  1-hr averages   (THRESH1)     !  THRESH1 = -1.0  !
    Threshold for  3-hr averages   (THRESH3)     !  THRESH3 = -1.0  !
    Threshold for 24-hr averages  (THRESH24)     ! THRESH24 = -1.0  !
    Threshold for NAVG-hr averages (THRESHN)     !  THRESHN = -1.0  !


Selected Day (Echo) Output Control
----------------------------------     -- Default: F
    Output 1-hr averages for selected days (LECH1)     ! LECH1  = F !
    Output 3-hr averages for selected days (LECH3)     ! LECH3  = F !
    Output 24-hr averages for selected days (LECH24)   ! LECH24 = F !
    Output NAVG-hr averages for selected days (LECHN)  ! LECHN  = F !
    Output selected information for debugging (LDEBUG) ! LDEBUG = F !

    Days selected for output IECHO(366)-- Default: 366*0
! IECHO  = 366*0  !
     (366 values must be entered)

Plot Output Options
-------------------

     Plot files can be created for selected Top-n, Exceedance and Echo
     tables selected above.  Two formats for these files are available,
     DATA and GRID.  In the DATA format, results at all receptors are
     listed along with the receptor location [x,y,val1,val2,...].
     In the GRID format, results at only gridded receptors are written,
     using a compact representation.  The gridded values are written in
     rows (x varies), starting with the most southern row of the grid.
     The GRID format is given the .GRD extension, and includes headers
     compatible with the SURFER(R) plotting software.

     A plotting and analysis file is also created for the daily peak
     visibility summary output, in DATA format only.

     Generate Plot-File Output   (LPLT) -- Default: F   ! LPLT  = F !

     Write Top-n files in GRID format?
                               (LTGRD) -- Default: F   ! LTGRD = F !

     Write Exceedance files in GRID format?
                               (LXGRD) -- Default: F   ! LXGRD = F !
     Write Echo files in GRID format?
                               (LEGRD) -- Default: F   ! LEGRD = F !
```

```
 !END!

  CALPOST Control File Input Summary ------------------------

     Replace run data with data in Puff file 1=Y:    0
                     Run starting date -- year:   90
                                         month:    1
                                           day:    6
                                   Julian day:     6
                              hour ending(0-23):   0
                             Run length (hours):   8616
                                       Species: PM10

  Every hour of data processed -- NREP = 1


  Concentration & scaling factors
                          Layer of processed data:    1
       (>0 = concentrations, -1 = dry fluxes, -2 = wet fluxes)
                  Multiplicative scaling factor: 0.0000E+00
                        Additive scaling factor: 0.0000E+00
          Hourly background concentrations used?: F


  Receptor information
                    Gridded receptors processed?: F
                   Discrete receptors processed?: T
       CTSG Complex terrain receptors processed?: F

  Discrete Receptors Processed

  (All Discrete Receptors are Used)


  Visibility Processing is NOT Selected


  Averaging time & TOP 50 table control
      User-specified averaging time (NAVG hours):     0
                 Top 50 table for  1-hr averages:     F
                 Top 50 table for  3-hr averages:     F
                 Top 50 table for 24-hr averages:     T
               Top 50 table for NAVG-hr averages:     F
          Top 50 table for length of run averages:     F


  Top "n" table control
         Number of "top" values at each receptor:     2
         Specific ranks of "top" values reported:   1   2

               Top "n" table for  1-hr averages: F
               Top "n" table for  3-hr averages: F
               Top "n" table for 24-hr averages: T
             Top "n" table for NAVG-hr averages: F
        Top "n" table for length of run averages: T


  Units requested for output:   (ug/m**3)


  Threshold Exceedance control
       Exceedances of a specified value will be counted for --


  Output options
                             Plot files created: F
       Output    1-hr averages for selected days: F
       Output    3-hr averages for selected days: F
       Output   24-hr averages for selected days: F
       Output NAVG-hr averages for selected days: F
       Output selected information for debugging: F


  Days selected for output tables
     0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000
     0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000
```

0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 000000000
0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 000000

IDENTIFICATION OF PROCESSED MODEL FILE ----------

CALPUFF 5.0 990228

REFINED SIGNIFICANT IMPACT ANALYSIS, CALPUFF, CALPINE OSPREY 3/9/00
RECEPTORS AT CHASSAHOWITZKA NWA, PROJECT ONLY
FDEP CHASSAHOWITZKA CALMET DOMAIN WITH PRECIPITATION

Chemical species names for each layer in model:
SO2 1
SO4 1
NOX 1
HNO3 1
NO3 1
PM10 1

********** NOTICE **********
NDRECP array reset to full range: all 1s

INPUT FILES

Default Name	Unit No.	File Name and Path
CALPOST.INP	5	calpost.inp
MODEL.DAT	4	calpuff.con

OUTPUT FILES

Default Name	Unit No.	File Name and Path
CALPOST.LST	7	calpost.lst

****
CALPOST Version 5.0 Level 990228
****

8616-HOUR AVERAGE CONCENTRATION AT EACH RECEPTOR FOR THE PERIOD ENDING YEAR: 90 DAY: 364 HOUR(0-23

DISCRETE RECEPTORS: PM10 1

RECEPTOR	COORDINATES (km)	CONCENTRATION	RECEPTOR	COORDINATES (km)	CONCENTRATION
1	340.300 3165.700	3.3532E-03	7	343.700 3178.300	2.6881E-03
2	340.300 3167.700	3.2407E-03	8	342.400 3180.600	2.5933E-03
3	340.300 3169.800	3.1230E-03	9	341.100 3183.400	2.4894E-03
4	340.700 3171.900	3.0019E-03	10	339.000 3183.400	2.4818E-03
5	342.000 3174.000	2.8818E-03	11	336.500 3183.400	2.4819E-03
6	343.000 3176.200	2.7743E-03	12	334.000 3183.400	2.4907E-03
			13	331.500 3183.400	2.5093E-03

****
CALPOST Version 5.0 Level 990228
****

PM10 1

TOP-50 24-HOUR AVERAGE CONCENTRATION VALUES (ug/m**3)

YEAR DAY HOUR(0-23) RECEPTOR TYPE CONCENTRATION | COORDINATES (km)

90	356	23	(0, 2)	D	5.1918E-02	340.300	3167.700
90	356	23	(0, 3)	D	5.1147E-02	340.300	3169.800
90	356	23	(0, 1)	D	5.0217E-02	340.300	3165.700
90	356	23	(0, 4)	D	4.7861E-02	340.700	3171.900
90	45	23	(0, 1)	D	4.7033E-02	340.300	3165.700
90	45	23	(0, 2)	D	4.3966E-02	340.300	3167.700
90	356	23	(0, 5)	D	4.1384E-02	342.000	3174.000
90	180	23	(0, 1)	D	4.0410E-02	340.300	3165.700
90	45	23	(0, 3)	D	3.9435E-02	340.300	3169.800
90	202	23	(0, 2)	D	3.7721E-02	340.300	3167.700
90	202	23	(0, 3)	D	3.7702E-02	340.300	3169.800
90	202	23	(0, 4)	D	3.7507E-02	340.700	3171.900
90	202	23	(0, 1)	D	3.7319E-02	340.300	3165.700
90	202	23	(0, 5)	D	3.7254E-02	342.000	3174.000
90	180	23	(0, 2)	D	3.7136E-02	340.300	3167.700
90	202	23	(0, 6)	D	3.6312E-02	343.000	3176.200
90	356	23	(0, 13)	D	3.6076E-02	331.500	3183.400
90	117	23	(0, 1)	D	3.5483E-02	340.300	3165.700
90	202	23	(0, 7)	D	3.4938E-02	343.700	3178.300
90	228	23	(0, 5)	D	3.4377E-02	342.000	3174.000
90	228	23	(0, 4)	D	3.4305E-02	340.700	3171.900
90	356	23	(0, 6)	D	3.4237E-02	343.000	3176.200
90	228	23	(0, 3)	D	3.4197E-02	340.300	3169.800
90	228	23	(0, 6)	D	3.4186E-02	343.000	3176.200
90	191	23	(0, 1)	D	3.3948E-02	340.300	3165.700
90	45	23	(0, 4)	D	3.3874E-02	340.700	3171.900
90	228	23	(0, 7)	D	3.3782E-02	343.700	3178.300
90	180	23	(0, 3)	D	3.3780E-02	340.300	3169.800
90	228	23	(0, 2)	D	3.3554E-02	340.300	3167.700
90	228	23	(0, 1)	D	3.3152E-02	340.300	3165.700
90	228	23	(0, 8)	D	3.3100E-02	342.400	3180.600
90	136	23	(0, 5)	D	3.2714E-02	342.000	3174.000
90	136	23	(0, 6)	D	3.2706E-02	343.000	3176.200
90	202	23	(0, 8)	D	3.2696E-02	342.400	3180.600
90	356	23	(0, 12)	D	3.2358E-02	334.000	3183.400
90	185	23	(0, 9)	D	3.2297E-02	341.100	3183.400
90	185	23	(0, 8)	D	3.2067E-02	342.400	3180.600
90	185	23	(0, 7)	D	3.1858E-02	343.700	3178.300
90	136	23	(0, 7)	D	3.1857E-02	343.700	3178.300
90	228	23	(0, 9)	D	3.1749E-02	341.100	3183.400
90	117	23	(0, 2)	D	3.1672E-02	340.300	3167.700
90	136	23	(0, 4)	D	3.1537E-02	340.700	3171.900
90	228	23	(0, 10)	D	3.1267E-02	339.000	3183.400
90	185	23	(0, 10)	D	3.1232E-02	339.000	3183.400
90	238	23	(0, 7)	D	3.1095E-02	343.700	3178.300
90	136	23	(0, 8)	D	3.0862E-02	342.400	3180.600
90	238	23	(0, 8)	D	3.0760E-02	342.400	3180.600
90	228	23	(0, 11)	D	3.0546E-02	336.500	3183.400
90	238	23	(0, 6)	D	3.0392E-02	343.000	3176.200
90	202	23	(0, 10)	D	3.0391E-02	339.000	3183.400

****

CALPOST Version 5.0 Level 990228

****

PM10 1

2 RANKED 24-HOUR AVERAGE CONCENTRATION VALUES AT EACH DISCRETE RECEPTOR (YEAR,DAY,ENDING HOUR) (ug/m**3)

RECEPTOR	COORDINATES (km)		1 RANK	2 RANK
1	340.300	3165.700	5.0217E-02 (90,356,23)	4.7033E-02 (90, 45,23)
2	340.300	3167.700	5.1918E-02 (90,356,23)	4.3966E-02 (90, 45,23)
3	340.300	3169.800	5.1147E-02 (90,356,23)	3.9435E-02 (90, 45,23)
4	340.700	3171.900	4.7861E-02 (90,356,23)	3.7507E-02 (90,202,23)
5	342.000	3174.000	4.1384E-02 (90,356,23)	3.7254E-02 (90,202,23)
6	343.000	3176.200	3.6312E-02 (90,202,23)	3.4237E-02 (90,356,23)
7	343.700	3178.300	3.4938E-02 (90,202,23)	3.3782E-02 (90,228,23)
8	342.400	3180.600	3.3100E-02 (90,228,23)	3.2696E-02 (90,202,23)
9	341.100	3183.400	3.2297E-02 (90,185,23)	3.1749E-02 (90,228,23)
10	339.000	3183.400	3.1267E-02 (90,228,23)	3.1232E-02 (90,185,23)
11	336.500	3183.400	3.0546E-02 (90,228,23)	3.0387E-02 (90,136,23)
12	334.000	3183.400	3.2358E-02 (90,356,23)	2.9990E-02 (90,136,23)
13	331.500	3183.400	3.6076E-02 (90,356,23)	2.9574E-02 (90,136,23)

****

CALPOST Version 5.0 Level 990228

****

SUMMARY SECTION

PM10 1

(ug/m**3)

RECEPTOR	COORDINATES (km)		TYPE	PEAK (YEAR,DAY,ENDING HOUR)	FOR RANK	FOR AVERAGE PERIOD
2	340.300	3167.700	DISCRETE	5.1918E-02 (90,356,23)	RANK 1	24-HOUR
1	340.300	3165.700	DISCRETE	4.7033E-02 (90, 45,23)	RANK 2	24-HOUR
1	340.300	3165.700	DISCRETE	3.3532E-03	RANK 1	8616-HOUR

```
**********************************************************************************************************************************
                                        CALPOST  Version 5.0          Level 990228
**********************************************************************************************************************************

 Run Title:
    CALPINE OSPRAY REGIONAL HAZE ANALYSIS, SO4                    2/6/00
    RECEPTORS AT CHASSAHOWITZKA NWA, 24-HOUR AVERAGING TIME, CALPOST
    2 SIMPLE-CYCLE NATURAL GAS FIRED CTs AT BASE LOAD, 32 DEGREES + COOLING TOWER

 ---------------------------------------------------------------------------

 INPUT GROUP: 1 -- General run control parameters
 --------------

      Option to run all periods found
      in the met. file(s)  (METRUN)        Default: 0   ! METRUN =   0  !

          METRUN = 0 - Run period explicitly defined below
          METRUN = 1 - Run all periods in CALPUFF data file(s)

      Starting date:    Year  (ISYR) --    No default   ! ISYR  =  90   !
      (used only if     Month (ISMO) --    No default   ! ISMO  =  7    !
       METRUN = 0)      Day   (ISDY) --    No default   ! ISDY  =  4    !
                        Hour  (ISHR) --    No default   ! ISHR  =  0    !

      Number of hours to process (NHRS) -- No default   ! NHRS  =  24    !

            Species to process (ASPEC) -- No default   ! ASPEC = SO4  !
            (ASPEC = VISIB for visibility processing)

      Process every hour of data?(NREP) -- Default: 1   ! NREP  =  1  !
       (1 = every hour processed,
        2 = every 2nd hour processed,
        5 = every 5th hour processed, etc.)

 Concentration and scaling factors
 ---------------------------------

       Layer/deposition code (ILAYER)   -- Default: 1   ! ILAYER =  1  !
         '1'  for CALPUFF concentrations,
         '-1' for dry deposition fluxes,
         '-2' for wet deposition fluxes.

       Scaling factors of the form:     -- Defaults:    ! A =  0.0    !
            X(new) = X(old) * A + B          A = 0.0    ! B =  0.0    !
         (NOT applied if A = B = 0.0)        B = 0.0

       Add Hourly Background Concentrations?
                         --   (LBACK)  -- Default: F   ! LBACK =  F !

 Receptor information
 --------------------

   Gridded receptors processed?     (LG) -- Default: F   ! LG  = F  !
   Discrete receptors processed?    (LD) -- Default: F   ! LD  = T  !
   CTSG Complex terrain receptors processed?
                                   (LCT) -- Default: F   ! LCT = F  !

 --Select range of DISCRETE receptors (only used when LD = T):

   Select ALL DISCRETE receptors by setting NDRECP flag to -1;
                              OR
   Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
      0 = discrete receptor not processed
      1 = discrete receptor processed
   using repeated value notation to select blocks of receptors:
      23*1, 15*0, 12*1
   Flag for all receptors after the last one assigned is set to 0
   (NDRECP) -- Default: -1
                                            ! NDRECP =  -1  !

 --Select range of GRIDDED receptors (only used when LG = T):
```

```
      X index of LL corner (IBGRID) -- Default: -1     ! IBGRID = -1  !
         (-1 OR 1 <= IBGRID <= NX)

      Y index of LL corner (JBGRID) -- Default: -1     ! JBGRID = -1  !
         (-1 OR 1 <= JBGRID <= NY)

      X index of UR corner (IEGRID) -- Default: -1     ! IEGRID = -1  !
         (-1 OR 1 <= IEGRID <= NX)

      Y index of UR corner (JEGRID) -- Default: -1     ! JEGRID = -1  !
         (-1 OR 1 <= JEGRID <= NY)

  Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)
--------------

    Maximum relative humidity (%) used in particle growth curve
                           (RHMAX) -- Default: 98   ! RHMAX  = 0.0 !

    Modeled species to be included in computing the light extinction
     Include SULFATE?          (LVSO4) -- Default: T   ! LVSO4  = T  !
     Include NITRATE?          (LVNO3) -- Default: T   ! LVNO3  = T  !
     Include ORGANIC CARBON?   (LVOC)  -- Default: T   ! LVOC   = T  !
     Include COARSE PARTICLES? (LVPMC) -- Default: T   ! LVPMC  = T  !
     Include FINE PARTICLES?   (LVPMF) -- Default: T   ! LVPMF  = T  !

    And, when ranking for TOP-N, TOP-50, and Exceedance tables,
     Include BACKGROUND?       (LVBK)  -- Default: T   ! LVBK   = T  !

    Species name used for particulates in MODEL.DAT file
                  COARSE    (SPECPMC) -- Default: PMC ! SPECPMC = PMC !
                  FINE      (SPECPMF) -- Default: PMF ! SPECPMF = PMF !

  Extinction Efficiency (1/Mm per ug/m**3)
  ---------------------------------------
    MODELED particulate species:
              PM  COARSE      (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
              PM  FINE        (EEPMF) -- Default: 1.0 ! EEPMF  = 1.0 !
    BACKGROUND particulate species:
              PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
    Other species:
             AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
             AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
             ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
             SOIL             (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
             ELEMENTAL CARBON (EEEC)  -- Default: 10. ! EEEC   = 10.0 !

  Background Extinction Computation
  ---------------------------------

    Method used for background light extinction
                           (MVISBK) -- Default: 2   ! MVISBK =  2  !

        1 =  Supply single light extinction and hygroscopic fraction
             - IWAQM (1993) RH adjustment applied to hygroscopic background
               and modeled sulfate and nitrate
        2 =  Compute extinction from speciated PM measurements (A)
             - PATH RH adjustment applied to observed and modeled sulfate
               and nitrate
             - RH factor is capped at RHMAX
        3 =  Compute extinction from speciated PM measurements (B)
             - PATH RH adjustment applied to observed and modeled sulfate
               and nitrate
             - Receptor-hour excluded if RH>RHMAX
             - Receptor-day excluded if fewer than 6 valid receptor-hours
        4 =  Read hourly transmissometer background extinction measurements
             - PATH RH adjustment applied to modeled sulfate and nitrate
             - Hour excluded if measurement invalid (missing, interference,
               or large RH)
             - Receptor-hour excluded if RH>RHMAX
             - Receptor-day excluded if fewer than 6 valid receptor-hours
        5 =  Read hourly nephelometer background extinction measurements
             - Rayleigh extinction value (BEXTRAY) added to measurement
```

```
            - PATH RH adjustment applied to modeled sulfate and nitrate
            - Hour excluded if measurement invalid (missing, interference,
              or large RH)
            - Receptor-hour excluded if RH>RHMAX
            - Receptor-day excluded if fewer than 6 valid receptor-hours

   Additional inputs used for MVISBK = 1:
   ---------------------------------------
    Background light extinction (1/Mm)
                          (BEXTBK) -- No default   ! BEXTBK = 0.0 !
    Percentage of particles affected by relative humidity
                          (RHFRAC) -- No default   ! RHFRAC = 0.0 !

   Additional inputs used for MVISBK = 2,3:
   ----------------------------------------
    Background extinction coefficients are computed from monthly
    CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3),
    coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and
    elemental carbon (BKEC).  Month 1 is January.
    (ug/m**3)

    (BKSO4)  -- No default     ! BKSO4 = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKNO3)  -- No default     ! BKNO3 = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKPMC)  -- No default     ! BKPMC = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKOC)   -- No default     ! BKOC  = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKSOIL) -- No default     ! BKSOIL= 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKEC)   -- No default     ! BKEC  = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !

   Additional inputs used for MVISBK = 2,3,5:
   ------------------------------------------
    Extinction due to Rayleigh scattering is added (1/Mm)
                         (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 0.0 !

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 3 -- Processing options
-------------

Averaging time and TOP 50 Table control
---------------------------------------
    User-specified averaging time
                             (NAVG) -- Default: 0   !   NAVG =  0  !
    Top 50 table for  1-hr averages
                            (L1T50) -- Default: T   !  L1T50 = F  !
    Top 50 table for  3-hr averages
                            (L3T50) -- Default: T   !  L3T50 = F  !
    Top 50 table for 24-hr averages
                           (L24T50) -- Default: T   ! L24T50 = T  !
    Top 50 table for NAVG-hr averages
                            (LNT50) -- Default: F   !  LNT50 = F  !
    Top 50 table for length of run averages
                            (LRT50) -- Default: T   !  LRT50 = F  !

TOP 'n' Table control
---------------------

    Number of 'Top' values at each receptor
                             (NTOP) -- Default: 4   ! NTOP =  2   !
            (NTOP must be <= 4)

    Specific ranks of 'Top' values reported (NTOP values must be entered)
                    (ITOP(4) array) -- Default:     ! ITOP =  1 , 2   !
                                       1,2,3,4
```

```
    Top 'n' table for  1-hr averages
                          (L1TOPN) -- Default: F   ! L1TOPN = F  !
    Top 'n' table for  3-hr averages
                          (L3TOPN) -- Default: F   ! L3TOPN = F  !
    Top 'n' table for 24-hr averages
                         (L24TOPN) -- Default: F   ! L24TOPN = T  !
    Top 'n' table for NAVG-hr averages
                          (LNTOPN) -- Default: F   ! LNTOPN = F  !
    Top 'n' table for length of run averages
                           (LRAVG) -- Default: F   ! LRAVG = F  !


Output Units
------------
    Units for All Output       (IPRTU) -- Default: 1   ! IPRTU =  3   !
                      for            for
                Concentration    Deposition
       1 =          g/m**3         g/m**2/s
       2 =         mg/m**3        mg/m**2/s
       3 =         ug/m**3        ug/m**2/s
       4 =         ng/m**3        ng/m**2/s
       5 =       Odour Units

    Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Threshold Exceedance control
----------------------------          -- Default: -1.0

    Counts will be tabulated for each average that
    exceeds a specified non-negative threshold (output units).


    Threshold for  1-hr averages   (THRESH1)     !  THRESH1 = -1.0  !
    Threshold for  3-hr averages   (THRESH3)     !  THRESH3 = -1.0  !
    Threshold for 24-hr averages  (THRESH24)     ! THRESH24 = -1.0  !
    Threshold for NAVG-hr averages (THRESHN)     !  THRESHN = -1.0  !


lected Day (Echo) Output Control
--------------------------------      -- Default: F
    Output 1-hr averages for selected days (LECH1)     ! LECH1   = F !
    Output 3-hr averages for selected days (LECH3)     ! LECH3   = F !
    Output 24-hr averages for selected days (LECH24)   ! LECH24  = F !
    Output NAVG-hr averages for selected days (LECHN)  ! LECHN   = F !
    Output selected information for debugging (LDEBUG) ! LDEBUG  = F !

    Days selected for output IECHO(366)-- Default: 366*0
! IECHO  = 366*0  !
     (366 values must be entered)

Plot Output Options
-------------------

     Plot files can be created for selected Top-n, Exceedance and Echo
     tables selected above.  Two formats for these files are available,
     DATA and GRID.  In the DATA format, results at all receptors are
     listed along with the receptor location [x,y,val1,val2,...].
     In the GRID format, results at only gridded receptors are written,
     using a compact representation.  The gridded values are written in
     rows (x varies), starting with the most southern row of the grid.
     The GRID format is given the .GRD extension, and includes headers
     compatible with the SURFER(R) plotting software.

     A plotting and analysis file is also created for the daily peak
     visibility summary output, in DATA format only.

     Generate Plot-File Output   (LPLT) -- Default: F   ! LPLT  = F !

     Write Top-n files in GRID format?
                           (LTGRD) -- Default: F   ! LTGRD = F !

     Write Exceedance files in GRID format?
                           (LXGRD) -- Default: F   ! LXGRD = F !
     Write Echo files in GRID format?
                           (LEGRD) -- Default: F   ! LEGRD = F !
```

!END!

CALPOST Control File Input Summary ----------

```
   Replace run data with data in Puff file 1=Y:    0
                     Run starting date -- year:   90
                                         month:    7
                                           day:    4
                                     Julian day:  185
                               hour ending(0-23):    0
                               Run length (hours):      24
                                          Species: SO4
```

Every hour of data processed -- NREP = 1

Concentration & scaling factors

```
                          Layer of processed data:    1
     (>0 = concentrations, -1 = dry fluxes, -2 = wet fluxes)
                  Multiplicative scaling factor: 0.0000E+00
                      Additive scaling factor: 0.0000E+00
        Hourly background concentrations used?: F
```

Receptor information

```
                   Gridded receptors processed?: F
                  Discrete receptors processed?: T
      CTSG Complex terrain receptors processed?: F
```

Discrete Receptors Processed

(All Discrete Receptors are Used)

Visibility Processing is NOT Selected

Averaging time & TOP 50 table control

```
    User-specified averaging time (NAVG hours):     0
               Top 50 table for  1-hr averages:     F
               Top 50 table for  3-hr averages:     F
               Top 50 table for 24-hr averages:     T
             Top 50 table for NAVG-hr averages:     F
        Top 50 table for length of run averages:     F
```

Top "n" table control

```
       Number of "top" values at each receptor:     2
       Specific ranks of "top" values reported:   1   2

              Top "n" table for  1-hr averages: F
              Top "n" table for  3-hr averages: F
              Top "n" table for 24-hr averages: T
            Top "n" table for NAVG-hr averages: F
       Top "n" table for length of run averages: F
```

Units requested for output: (ug/m**3)

Threshold Exceedance control

Exceedances of a specified value will be counted for --

Output options

```
                          Plot files created: F
     Output    1-hr averages for selected days: F
     Output    3-hr averages for selected days: F
     Output   24-hr averages for selected days: F
     Output NAVG-hr averages for selected days: F
     Output selected information for debugging: F
```

Days selected for output tables

```
   0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000
   0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000
```

0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000
0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 000000

TIFICATION OF PROCESSED MODEL FILE ----------

CALPUFF 5.0 990228

REFINED SIGNIFICANT IMPACT ANALYSIS, CALPUFF, CALPINE OSPREY 3/9/00
RECEPTORS AT CHASSAHOWITZKA NWA, PROJECT ONLY
FDEP CHASSAHOWITZKA CALMET DOMAIN WITH PRECIPITATION

Chemical species names for each layer in model:
SO2 1
SO4 1
NOX 1
HNO3 1
NO3 1
PM10 1

********** NOTICE **********
NDRECP array reset to full range: all 1s

INPUT FILES

Default Name	Unit No.	File Name and Path
CALPOST.INP	5	calpost.inp
MODEL.DAT	4	calpuff.con

OUTPUT FILES

Default Name	Unit No.	File Name and Path
CALPOST.LST	7	calpost.lst

****

CALPOST Version 5.0 Level 990228

****

SO4 1

TOP-50 24-HOUR AVERAGE CONCENTRATION VALUES (ug/m**3)

YEAR	DAY	HOUR(0-23)	RECEPTOR	TYPE	CONCENTRATION	COORDINATES (km)	
90	185	23	(0, 9)	D	1.7088E-03	341.100	3183.400
90	185	23	(0, 10)	D	1.6575E-03	339.000	3183.400
90	185	23	(0, 8)	D	1.6334E-03	342.400	3180.600
90	185	23	(0, 11)	D	1.5840E-03	336.500	3183.400
90	185	23	(0, 7)	D	1.5723E-03	343.700	3178.300
90	185	23	(0, 12)	D	1.5045E-03	334.000	3183.400
90	185	23	(0, 6)	D	1.4511E-03	343.000	3176.200
90	185	23	(0, 13)	D	1.4229E-03	331.500	3183.400
90	185	23	(0, 5)	D	1.3058E-03	342.000	3174.000
90	185	23	(0, 4)	D	1.1579E-03	340.700	3171.900
90	185	23	(0, 3)	D	1.0462E-03	340.300	3169.800
90	185	23	(0, 2)	D	9.5086E-04	340.300	3167.700
90	185	23	(0, 1)	D	8.6236E-04	340.300	3165.700
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000

0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000

****

CALPOST Version 5.0 Level 990228

****

SO4 1

2 RANKED 24-HOUR AVERAGE CONCENTRATION VALUES AT EACH DISCRETE RECEPTOR (YEAR,DAY,ENDING HOUR) (ug/m**3)

ECEPTOR	COORDINATES (km)		1 RANK	2 RANK
1	340.300	3165.700	8.6236E-04 (90,185,23)	0.0000E+00 (0, 0, 0)
2	340.300	3167.700	9.5086E-04 (90,185,23)	0.0000E+00 (0, 0, 0)
3	340.300	3169.800	1.0462E-03 (90,185,23)	0.0000E+00 (0, 0, 0)
4	340.700	3171.900	1.1579E-03 (90,185,23)	0.0000E+00 (0, 0, 0)
5	342.000	3174.000	1.3058E-03 (90,185,23)	0.0000E+00 (0, 0, 0)
6	343.000	3176.200	1.4511E-03 (90,185,23)	0.0000E+00 (0, 0, 0)
7	343.700	3178.300	1.5723E-03 (90,185,23)	0.0000E+00 (0, 0, 0)
8	342.400	3180.600	1.6334E-03 (90,185,23)	0.0000E+00 (0, 0, 0)
9	341.100	3183.400	1.7088E-03 (90,185,23)	0.0000E+00 (0, 0, 0)
10	339.000	3183.400	1.6575E-03 (90,185,23)	0.0000E+00 (0, 0, 0)
11	336.500	3183.400	1.5840E-03 (90,185,23)	0.0000E+00 (0, 0, 0)
12	334.000	3183.400	1.5045E-03 (90,185,23)	0.0000E+00 (0, 0, 0)
13	331.500	3183.400	1.4229E-03 (90,185,23)	0.0000E+00 (0, 0, 0)

****

CALPOST Version 5.0 Level 990228

****

SUMMARY SECTION

SO4 1

(ug/m**3)

RECEPTOR	COORDINATES (km)		TYPE	PEAK (YEAR,DAY,ENDING HOUR)	FOR RANK	FOR AVERAGE PERIOD
9	341.100	3183.400	DISCRETE	1.7088E-03 (90,185,23)	RANK 1	24-HOUR
0	0.000	0.000	DISCRETE	0.0000E+00 (0, 0, 0)	RANK 2	24-HOUR

```
**********************************************************************************************************************
                                        CALPOST  Version 5.0          Level 990228
**********************************************************************************************************************

 Run Title:
    CALPINE OSPRAY REGIONAL HAZE ANALYSIS, SO4                    2/6/00
    RECEPTORS AT CHASSAHOWITZKA NWA, 24-HOUR AVERAGING TIME, CALPOST
    2 SIMPLE-CYCLE NATURAL GAS FIRED CTs AT BASE LOAD, 32 DEGREES + COOLING TOWER

 ----------------------------------------------------------------------------

 INPUT GROUP: 1 -- General run control parameters
 --------------

     Option to run all periods found
     in the met. file(s)  (METRUN)        Default: 0   ! METRUN =   0  !

         METRUN = 0 - Run period explicitly defined below
         METRUN = 1 - Run all periods in CALPUFF data file(s)

     Starting date:    Year  (ISYR) --    No default   ! ISYR  =  90   !
     (used only if     Month (ISMO) --    No default   ! ISMO  =  12   !
      METRUN = 0)      Day   (ISDY) --    No default   ! ISDY  =  22   !
                       Hour  (ISHR) --    No default   ! ISHR  =  0    !

     Number of hours to process (NHRS) -- No default   ! NHRS  =  24    !

           Species to process (ASPEC) -- No default   ! ASPEC = SO4  !
           (ASPEC = VISIB for visibility processing)

     Process every hour of data?(NREP) -- Default: 1   ! NREP  =  1  !
      (1 = every hour processed,
       2 = every 2nd hour processed,
       5 = every 5th hour processed, etc.)

 Concentration and scaling factors
 ---------------------------------

       Layer/deposition code (ILAYER)   -- Default: 1   ! ILAYER =  1  !
         '1'  for CALPUFF concentrations,
         '-1' for dry deposition fluxes,
         '-2' for wet deposition fluxes.

       Scaling factors of the form:     -- Defaults:    ! A =  0.0    !
            X(new) = X(old) * A + B          A = 0.0    ! B =  0.0    !
         (NOT applied if A = B = 0.0)        B = 0.0

       Add Hourly Background Concentrations?
                          -- (LBACK)  -- Default: F   ! LBACK =  F !

 Receptor information
 --------------------

   Gridded receptors processed?    (LG) -- Default: F   ! LG  = F  !
   Discrete receptors processed?   (LD) -- Default: F   ! LD  = T  !
   CTSG Complex terrain receptors processed?
                                  (LCT) -- Default: F   ! LCT = F  !

 --Select range of DISCRETE receptors (only used when LD = T):

   Select ALL DISCRETE receptors by setting NDRECP flag to -1;
                              OR
   Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
      0 = discrete receptor not processed
      1 = discrete receptor processed
   using repeated value notation to select blocks of receptors:
      23*1, 15*0, 12*1
   Flag for all receptors after the last one assigned is set to 0
   (NDRECP) -- Default: -1
                                           ! NDRECP =  -1  !

 --Select range of GRIDDED receptors (only used when LG = T):
```

```
       X index of LL corner (IBGRID) -- Default: -1     ! IBGRID = -1  !
          (-1 OR 1 <= IBGRID <= NX)

       Y index of LL corner (JBGRID) -- Default: -1     ! JBGRID = -1  !
          (-1 OR 1 <= JBGRID <= NY)

       X index of UR corner (IEGRID) -- Default: -1     ! IEGRID = -1  !
          (-1 OR 1 <= IEGRID <= NX)

       Y index of UR corner (JEGRID) -- Default: -1     ! JEGRID = -1  !
          (-1 OR 1 <= JEGRID <= NY)

  Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)
--------------

    Maximum relative humidity (%) used in particle growth curve
                            (RHMAX) -- Default: 98   ! RHMAX  = 0.0 !

    Modeled species to be included in computing the light extinction
     Include SULFATE?          (LVSO4) -- Default: T   ! LVSO4  = T  !
     Include NITRATE?          (LVNO3) -- Default: T   ! LVNO3  = T  !
     Include ORGANIC CARBON?   (LVOC)  -- Default: T   ! LVOC   = T  !
     Include COARSE PARTICLES? (LVPMC) -- Default: T   ! LVPMC  = T  !
     Include FINE PARTICLES?   (LVPMF) -- Default: T   ! LVPMF  = T  !

    And, when ranking for TOP-N, TOP-50, and Exceedance tables,
     Include BACKGROUND?       (LVBK)  -- Default: T   ! LVBK   = T  !

    Species name used for particulates in MODEL.DAT file
                  COARSE    (SPECPMC) -- Default: PMC ! SPECPMC = PMC !
                  FINE      (SPECPMF) -- Default: PMF ! SPECPMF = PMF !

 Extinction Efficiency (1/Mm per ug/m**3)
 ----------------------------------------
    MODELED particulate species:
              PM  COARSE      (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
              PM  FINE        (EEPMF) -- Default: 1.0 ! EEPMF  = 1.0 !
    BACKGROUND particulate species:
              PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
    Other species:
             AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
             AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
             ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
             SOIL             (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
             ELEMENTAL CARBON (EEEC)  -- Default: 10. ! EEEC   = 10.0 !

 Background Extinction Computation
 ---------------------------------

    Method used for background light extinction
                            (MVISBK) -- Default: 2   ! MVISBK =  2  !

        1 =  Supply single light extinction and hygroscopic fraction
             - IWAQM (1993) RH adjustment applied to hygroscopic background
               and modeled sulfate and nitrate
        2 =  Compute extinction from speciated PM measurements (A)
             - PATH RH adjustment applied to observed and modeled sulfate
               and nitrate
             - RH factor is capped at RHMAX
        3 =  Compute extinction from speciated PM measurements (B)
             - PATH RH adjustment applied to observed and modeled sulfate
               and nitrate
             - Receptor-hour excluded if RH>RHMAX
             - Receptor-day excluded if fewer than 6 valid receptor-hours
        4 =  Read hourly transmissometer background extinction measurements
             - PATH RH adjustment applied to modeled sulfate and nitrate
             - Hour excluded if measurement invalid (missing, interference,
               or large RH)
             - Receptor-hour excluded if RH>RHMAX
             - Receptor-day excluded if fewer than 6 valid receptor-hours
        5 =  Read hourly nephelometer background extinction measurements
             - Rayleigh extinction value (BEXTRAY) added to measurement
```

```
            - PATH RH adjustment applied to modeled sulfate and nitrate
            - Hour excluded if measurement invalid (missing, interference,
              or large RH)
            - Receptor-hour excluded if RH>RHMAX
            - Receptor-day excluded if fewer than 6 valid receptor-hours

    Additional inputs used for MVISBK = 1:
    --------------------------------------
     Background light extinction (1/Mm)
                           (BEXTBK) -- No default   ! BEXTBK = 0.0 !
     Percentage of particles affected by relative humidity
                           (RHFRAC) -- No default   ! RHFRAC = 0.0 !

    Additional inputs used for MVISBK = 2,3:
    ----------------------------------------
     Background extinction coefficients are computed from monthly
     CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3),
     coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and
     elemental carbon (BKEC).  Month 1 is January.
     (ug/m**3)

     (BKSO4)  -- No default     ! BKSO4 = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKNO3)  -- No default     ! BKNO3 = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKPMC)  -- No default     ! BKPMC = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKOC)   -- No default     ! BKOC  = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKSOIL) -- No default     ! BKSOIL= 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKEC)   -- No default     ! BKEC  = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !

    Additional inputs used for MVISBK = 2,3,5:
    ------------------------------------------
     Extinction due to Rayleigh scattering is added (1/Mm)
                          (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 0.0 !

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 3 -- Processing options
--------------

Averaging time and TOP 50 Table control
---------------------------------------
    User-specified averaging time
                              (NAVG) -- Default: 0   !   NAVG =  0  !
    Top 50 table for  1-hr averages
                             (L1T50) -- Default: T   !  L1T50 = F  !
    Top 50 table for  3-hr averages
                             (L3T50) -- Default: T   !  L3T50 = F  !
    Top 50 table for 24-hr averages
                            (L24T50) -- Default: T   ! L24T50 = T  !
    Top 50 table for NAVG-hr averages
                             (LNT50) -- Default: F   !  LNT50 = F  !
    Top 50 table for length of run averages
                             (LRT50) -- Default: T   !  LRT50 = F  !

TOP 'n' Table control
---------------------

    Number of 'Top' values at each receptor
                              (NTOP) -- Default: 4   ! NTOP =  2   !
              (NTOP must be <= 4)

    Specific ranks of 'Top' values reported (NTOP values must be entered)
                     (ITOP(4) array) -- Default:     ! ITOP =  1 , 2   !
                                       1,2,3,4
```

```
    Top 'n' table for  1-hr averages
                              (L1TOPN) -- Default: F   ! L1TOPN = F  !
    Top 'n' table for  3-hr averages
                              (L3TOPN) -- Default: F   ! L3TOPN = F  !
    Top 'n' table for 24-hr averages
                             (L24TOPN) -- Default: F   ! L24TOPN = T  !
    Top 'n' table for NAVG-hr averages
                              (LNTOPN) -- Default: F   ! LNTOPN = F  !
    Top 'n' table for length of run averages
                               (LRAVG) -- Default: F   !  LRAVG = F  !


Output Units
------------
    Units for All Output       (IPRTU) -- Default: 1   ! IPRTU =  3   !
                     for            for
                Concentration   Deposition
        1 =         g/m**3         g/m**2/s
        2 =        mg/m**3        mg/m**2/s
        3 =        ug/m**3        ug/m**2/s
        4 =        ng/m**3        ng/m**2/s
        5 =     Odour Units

    Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Threshold Exceedance control
----------------------------          -- Default: -1.0

    Counts will be tabulated for each average that
    exceeds a specified non-negative threshold (output units).


    Threshold for  1-hr averages   (THRESH1)     !  THRESH1 = -1.0  !
    Threshold for  3-hr averages   (THRESH3)     !  THRESH3 = -1.0  !
    Threshold for 24-hr averages  (THRESH24)     ! THRESH24 = -1.0  !
    Threshold for NAVG-hr averages (THRESHN)     !  THRESHN = -1.0  !


Selected Day (Echo) Output Control
----------------------------------     -- Default: F
    Output 1-hr averages for selected days (LECH1)     ! LECH1   = F !
    Output 3-hr averages for selected days (LECH3)     ! LECH3   = F !
    Output 24-hr averages for selected days (LECH24)   ! LECH24  = F !
    Output NAVG-hr averages for selected days (LECHN)  ! LECHN   = F !
    Output selected information for debugging (LDEBUG) ! LDEBUG  = F !

    Days selected for output IECHO(366)-- Default: 366*0
! IECHO  = 366*0  !
     (366 values must be entered)

Plot Output Options
-------------------

     Plot files can be created for selected Top-n, Exceedance and Echo
     tables selected above.  Two formats for these files are available,
     DATA and GRID.  In the DATA format, results at all receptors are
     listed along with the receptor location [x,y,val1,val2,...).
     In the GRID format, results at only gridded receptors are written,
     using a compact representation.  The gridded values are written in
     rows (x varies), starting with the most southern row of the grid.
     The GRID format is given the .GRD extension, and includes headers
     compatible with the SURFER(R) plotting software.

     A plotting and analysis file is also created for the daily peak
     visibility summary output, in DATA format only.

     Generate Plot-File Output   (LPLT) -- Default: F   ! LPLT  = F !

     Write Top-n files in GRID format?
                               (LTGRD) -- Default: F   ! LTGRD = F !

     Write Exceedance files in GRID format?
                               (LXGRD) -- Default: F   ! LXGRD = F !
     Write Echo files in GRID format?
                               (LEGRD) -- Default: F   ! LEGRD = F !
```

!END!

CALPOST Control File Input Summary ------------------------

Replace run data with data in Puff file 1=Y: 0
Run starting date -- year: 90
month: 12
day: 22
Julian day: 356
hour ending(0-23): 0
Run length (hours): 24
Species: SO4

Every hour of data processed -- NREP = 1

Concentration & scaling factors
Layer of processed data: 1
(>0 = concentrations, -1 = dry fluxes, -2 = wet fluxes)
Multiplicative scaling factor: 0.0000E+00
Additive scaling factor: 0.0000E+00
Hourly background concentrations used?: F

Receptor information
Gridded receptors processed?: F
Discrete receptors processed?: T
CTSG Complex terrain receptors processed?: F

Discrete Receptors Processed

(All Discrete Receptors are Used)

Visibility Processing is NOT Selected

Averaging time & TOP 50 table control
User-specified averaging time (NAVG hours): 0
Top 50 table for 1-hr averages: F
Top 50 table for 3-hr averages: F
Top 50 table for 24-hr averages: T
Top 50 table for NAVG-hr averages: F
Top 50 table for length of run averages: F

Top "n" table control
Number of "top" values at each receptor: 2
Specific ranks of "top" values reported: 1 2

Top "n" table for 1-hr averages: F
Top "n" table for 3-hr averages: F
Top "n" table for 24-hr averages: T
Top "n" table for NAVG-hr averages: F
Top "n" table for length of run averages: F

Units requested for output: (ug/m**3)

Threshold Exceedance control
Exceedances of a specified value will be counted for --

Output options
Plot files created: F
Output 1-hr averages for selected days: F
Output 3-hr averages for selected days: F
Output 24-hr averages for selected days: F
Output NAVG-hr averages for selected days: F
Output selected information for debugging: F

Days selected for output tables
0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000
0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000

0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000
0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 000000

.DENTIFICATION OF PROCESSED MODEL FILE ----------

CALPUFF 5.0 990228

REFINED SIGNIFICANT IMPACT ANALYSIS, CALPUFF, CALPINE OSPREY 3/9/00
RECEPTORS AT CHASSAHOWITZKA NWA, PROJECT ONLY
FDEP CHASSAHOWITZKA CALMET DOMAIN WITH PRECIPITATION

Chemical species names for each layer in model:
SO2 1
SO4 1
NOX 1
HNO3 1
NO3 1
PM10 1

********** NOTICE **********
NDRECP array reset to full range: all 1s

INPUT FILES

Default Name	Unit No.	File Name and Path
CALPOST.INP	5	calpost.inp
MODEL.DAT	4	calpuff.con

OUTPUT FILES

Default Name	Unit No.	File Name and Path
CALPOST.LST	7	calpost.lst

****

CALPOST Version 5.0 Level 990228

****

SO4 1

TOP-50 24-HOUR AVERAGE CONCENTRATION VALUES (ug/m**3)

YEAR	DAY	HOUR(0-23)	RECEPTOR	TYPE	CONCENTRATION	COORDINATES (km)	
90	356	23	(0, 9)	D	7.5495E-04	341.100	3183.400
90	356	23	(0, 13)	D	7.5305E-04	331.500	3183.400
90	356	23	(0, 10)	D	7.5111E-04	339.000	3183.400
90	356	23	(0, 12)	D	7.4852E-04	334.000	3183.400
90	356	23	(0, 8)	D	7.4834E-04	342.400	3180.600
90	356	23	(0, 11)	D	7.4807E-04	336.500	3183.400
90	356	23	(0, 7)	D	7.4615E-04	343.700	3178.300
90	356	23	(0, 6)	D	7.4261E-04	343.000	3176.200
90	356	23	(0, 5)	D	7.3707E-04	342.000	3174.000
90	356	23	(0, 4)	D	7.1546E-04	340.700	3171.900
90	356	23	(0, 3)	D	6.7943E-04	340.300	3169.800
90	356	23	(0, 2)	D	6.2870E-04	340.300	3167.700
90	356	23	(0, 1)	D	5.6354E-04	340.300	3165.700
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000

0	0	0	(0, 0)	0.0000E+00	0.000 0.000
0	0	0	(0, 0)	0.0000E+00	0.000 0.000
0	0	0	(0, 0)	0.0000E+00	0.000 0.000
0	0	0	(0, 0)	0.0000E+00	0.000 0.000
0	0	0	(0, 0)	0.0000E+00	0.000 0.000
0	0	0	(0, 0)	0.0000E+00	0.000 0.000
0	0	0	(0, 0)	0.0000E+00	0.000 0.000
0	0	0	(0, 0)	0.0000E+00	0.000 0.000
0	0	0	(0, 0)	0.0000E+00	0.000 0.000
0	0	0	(0, 0)	0.0000E+00	0.000 0.000
0	0	0	(0, 0)	0.0000E+00	0.000 0.000
0	0	0	(0, 0)	0.0000E+00	0.000 0.000
0	0	0	(0, 0)	0.0000E+00	0.000 0.000
0	0	0	(0, 0)	0.0000E+00	0.000 0.000
0	0	0	(0, 0)	0.0000E+00	0.000 0.000
0	0	0	(0, 0)	0.0000E+00	0.000 0.000
0	0	0	(0, 0)	0.0000E+00	0.000 0.000
0	0	0	(0, 0)	0.0000E+00	0.000 0.000
0	0	0	(0, 0)	0.0000E+00	0.000 0.000
0	0	0	(0, 0)	0.0000E+00	0.000 0.000
0	0	0	(0, 0)	0.0000E+00	0.000 0.000
0	0	0	(0, 0)	0.0000E+00	0.000 0.000
0	0	0	(0, 0)	0.0000E+00	0.000 0.000
0	0	0	(0, 0)	0.0000E+00	0.000 0.000
0	0	0	(0, 0)	0.0000E+00	0.000 0.000
0	0	0	(0, 0)	0.0000E+00	0.000 0.000
0	0	0	(0, 0)	0.0000E+00	0.000 0.000

****

CALPOST Version 5.0 Level 990228

****

SO4 1

2 RANKED 24-HOUR AVERAGE CONCENTRATION VALUES AT EACH DISCRETE RECEPTOR (YEAR,DAY,ENDING HOUR) (ug/m**3)

CEPTOR	COORDINATES (km)		1 RANK	2 RANK
1	340.300	3165.700	5.6354E-04 (90,356,23)	0.0000E+00 (0, 0, 0)
2	340.300	3167.700	6.2870E-04 (90,356,23)	0.0000E+00 (0, 0, 0)
3	340.300	3169.800	6.7943E-04 (90,356,23)	0.0000E+00 (0, 0, 0)
4	340.700	3171.900	7.1546E-04 (90,356,23)	0.0000E+00 (0, 0, 0)
5	342.000	3174.000	7.3707E-04 (90,356,23)	0.0000E+00 (0, 0, 0)
6	343.000	3176.200	7.4261E-04 (90,356,23)	0.0000E+00 (0, 0, 0)
7	343.700	3178.300	7.4615E-04 (90,356,23)	0.0000E+00 (0, 0, 0)
8	342.400	3180.600	7.4834E-04 (90,356,23)	0.0000E+00 (0, 0, 0)
9	341.100	3183.400	7.5495E-04 (90,356,23)	0.0000E+00 (0, 0, 0)
10	339.000	3183.400	7.5111E-04 (90,356,23)	0.0000E+00 (0, 0, 0)
11	336.500	3183.400	7.4807E-04 (90,356,23)	0.0000E+00 (0, 0, 0)
12	334.000	3183.400	7.4852E-04 (90,356,23)	0.0000E+00 (0, 0, 0)
13	331.500	3183.400	7.5305E-04 (90,356,23)	0.0000E+00 (0, 0, 0)

****

CALPOST Version 5.0 Level 990228

****

SUMMARY SECTION

SO4 1

(ug/m**3)

RECEPTOR	COORDINATES (km)		TYPE	PEAK (YEAR,DAY,ENDING HOUR)	FOR RANK	FOR AVERAGE PERIOD
9	341.100	3183.400	DISCRETE	7.5495E-04 (90,356,23)	RANK 1	24-HOUR
0	0.000	0.000	DISCRETE	0.0000E+00 (0, 0, 0)	RANK 2	24-HOUR

```
**********************************************************************************************************************************
                                        CALPOST  Version 5.0          Level 990228
**********************************************************************************************************************************

 Run Title:
    CALPINE OSPRAY REGIONAL HAZE ANALYSIS, NO3                    2/6/00
    RECEPTORS AT CHASSAHOWITZKA NWA, 24-HOUR AVERAGING TIME, CALPOST
    2 SIMPLE-CYCLE NATURAL GAS FIRED CTs AT BASE LOAD, 32 DEGREES + COOLING TOWER

 ------------------------------------------------------------------------------

 INPUT GROUP: 1 -- General run control parameters
 --------------

      Option to run all periods found
      in the met. file(s)  (METRUN)        Default: 0   ! METRUN =   0  !

          METRUN = 0 - Run period explicitly defined below
          METRUN = 1 - Run all periods in CALPUFF data file(s)

      Starting date:    Year  (ISYR) --    No default   ! ISYR  =  90   !
      (used only if     Month (ISMO) --    No default   ! ISMO  =  8   !
       METRUN = 0)      Day   (ISDY) --    No default   ! ISDY  =  16  !
                        Hour  (ISHR) --    No default   ! ISHR  =  0   !

      Number of hours to process (NHRS) -- No default   ! NHRS  =  24    !

            Species to process (ASPEC) -- No default   ! ASPEC = NO3  !
            (ASPEC = VISIB for visibility processing)

      Process every hour of data?(NREP) -- Default: 1   ! NREP  =  1  !
       (1 = every hour processed,
        2 = every 2nd hour processed,
        5 = every 5th hour processed, etc.)

 Concentration and scaling factors
 ---------------------------------

       Layer/deposition code (ILAYER)   -- Default: 1   ! ILAYER =  1  !
         '1'  for CALPUFF concentrations,
         '-1' for dry deposition fluxes,
         '-2' for wet deposition fluxes.

       Scaling factors of the form:     -- Defaults:    ! A =  0.0    !
            X(new) = X(old) * A + B          A = 0.0    ! B =  0.0    !
         (NOT applied if A = B = 0.0)        B = 0.0

       Add Hourly Background Concentrations?
                          (LBACK)  -- Default: F   ! LBACK =  F !

 Receptor information
 --------------------

   Gridded receptors processed?    (LG) -- Default: F   ! LG  = F  !
   Discrete receptors processed?   (LD) -- Default: F   ! LD  = T  !
   CTSG Complex terrain receptors processed?
                                  (LCT) -- Default: F   ! LCT = F  !

 --Select range of DISCRETE receptors (only used when LD = T):

   Select ALL DISCRETE receptors by setting NDRECP flag to -1;
                                OR
   Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
      0 = discrete receptor not processed
      1 = discrete receptor processed
   using repeated value notation to select blocks of receptors:
      23*1, 15*0, 12*1
   Flag for all receptors after the last one assigned is set to 0
   (NDRECP) -- Default: -1
                                             ! NDRECP =  -1  !


 --Select range of GRIDDED receptors (only used when LG = T):
```

```
      X index of LL corner (IBGRID) -- Default: -1     ! IBGRID = -1  !
         (-1 OR 1 <= IBGRID <= NX)

      Y index of LL corner (JBGRID) -- Default: -1     ! JBGRID = -1  !
         (-1 OR 1 <= JBGRID <= NY)

      X index of UR corner (IEGRID) -- Default: -1     ! IEGRID = -1  !
         (-1 OR 1 <= IEGRID <= NX)

      Y index of UR corner (JEGRID) -- Default: -1     ! JEGRID = -1  !
         (-1 OR 1 <= JEGRID <= NY)

  Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)
--------------

    Maximum relative humidity (%) used in particle growth curve
                           (RHMAX) -- Default: 98   ! RHMAX  = 0.0 !

    Modeled species to be included in computing the light extinction
     Include SULFATE?          (LVSO4) -- Default: T   ! LVSO4  = T  !
     Include NITRATE?          (LVNO3) -- Default: T   ! LVNO3  = T  !
     Include ORGANIC CARBON?   (LVOC)  -- Default: T   ! LVOC   = T  !
     Include COARSE PARTICLES? (LVPMC) -- Default: T   ! LVPMC  = T  !
     Include FINE PARTICLES?   (LVPMF) -- Default: T   ! LVPMF  = T  !

    And, when ranking for TOP-N, TOP-50, and Exceedance tables,
     Include BACKGROUND?       (LVBK)  -- Default: T   ! LVBK   = T  !

    Species name used for particulates in MODEL.DAT file
                  COARSE    (SPECPMC) -- Default: PMC ! SPECPMC = PMC !
                  FINE      (SPECPMF) -- Default: PMF ! SPECPMF = PMF !

Extinction Efficiency (1/Mm per ug/m**3)
---------------------------------------
    MODELED particulate species:
              PM  COARSE      (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
              PM  FINE        (EEPMF) -- Default: 1.0 ! EEPMF  = 1.0 !
    BACKGROUND particulate species:
              PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
    Other species:
             AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
             AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
             ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
             SOIL             (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
             ELEMENTAL CARBON (EEEC)  -- Default: 10. ! EEEC   = 10.0 !

Background Extinction Computation
---------------------------------

    Method used for background light extinction
                           (MVISBK) -- Default: 2   ! MVISBK =  2  !

        1 =  Supply single light extinction and hygroscopic fraction
             - IWAQM (1993) RH adjustment applied to hygroscopic background
               and modeled sulfate and nitrate
        2 =  Compute extinction from speciated PM measurements (A)
             - PATH RH adjustment applied to observed and modeled sulfate
               and nitrate
             - RH factor is capped at RHMAX
        3 =  Compute extinction from speciated PM measurements (B)
             - PATH RH adjustment applied to observed and modeled sulfate
               and nitrate
             - Receptor-hour excluded if RH>RHMAX
             - Receptor-day excluded if fewer than 6 valid receptor-hours
        4 =  Read hourly transmissometer background extinction measurements
             - PATH RH adjustment applied to modeled sulfate and nitrate
             - Hour excluded if measurement invalid (missing, interference,
               or large RH)
             - Receptor-hour excluded if RH>RHMAX
             - Receptor-day excluded if fewer than 6 valid receptor-hours
        5 =  Read hourly nephelometer background extinction measurements
             - Rayleigh extinction value (BEXTRAY) added to measurement
```

```
            - PATH RH adjustment applied to modeled sulfate and nitrate
            - Hour excluded if measurement invalid (missing, interference,
              or large RH)
            - Receptor-hour excluded if RH>RHMAX
            - Receptor-day excluded if fewer than 6 valid receptor-hours

   Additional inputs used for MVISBK = 1:
   ---------------------------------------
    Background light extinction (1/Mm)
                          (BEXTBK) -- No default   ! BEXTBK = 0.0 !
    Percentage of particles affected by relative humidity
                          (RHFRAC) -- No default   ! RHFRAC = 0.0 !

   Additional inputs used for MVISBK = 2,3:
   ----------------------------------------
    Background extinction coefficients are computed from monthly
    CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3),
    coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and
    elemental carbon (BKEC).  Month 1 is January.
    (ug/m**3)

    (BKSO4)  -- No default     ! BKSO4 = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKNO3)  -- No default     ! BKNO3 = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKPMC)  -- No default     ! BKPMC = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKOC)   -- No default     ! BKOC  = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKSOIL) -- No default     ! BKSOIL= 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKEC)   -- No default     ! BKEC  = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !

   Additional inputs used for MVISBK = 2,3,5:
   ------------------------------------------
    Extinction due to Rayleigh scattering is added (1/Mm)
                          (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 0.0 !

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 3 -- Processing options
-------------

Averaging time and TOP 50 Table control
---------------------------------------
    User-specified averaging time
                            (NAVG) -- Default: 0   !   NAVG =  0  !
    Top 50 table for  1-hr averages
                           (L1T50) -- Default: T   !  L1T50 = F  !
    Top 50 table for  3-hr averages
                           (L3T50) -- Default: T   !  L3T50 = F  !
    Top 50 table for 24-hr averages
                          (L24T50) -- Default: T   ! L24T50 = T  !
    Top 50 table for NAVG-hr averages
                           (LNT50) -- Default: F   !  LNT50 = F  !
    Top 50 table for length of run averages
                           (LRT50) -- Default: T   !  LRT50 = F  !

TOP 'n' Table control
---------------------

    Number of 'Top' values at each receptor
                            (NTOP) -- Default: 4   ! NTOP =  2   !
             (NTOP must be <= 4)

    Specific ranks of 'Top' values reported (NTOP values must be entered)
                      (ITOP(4) array) -- Default:     ! ITOP =  1 , 2   !
                                         1,2,3,4
```

```
    Top 'n' table for  1-hr averages
                          (L1TOPN) -- Default: F   !  L1TOPN = F  !
    Top 'n' table for  3-hr averages
                          (L3TOPN) -- Default: F   !  L3TOPN = F  !
    Top 'n' table for 24-hr averages
                         (L24TOPN) -- Default: F   ! L24TOPN = T  !
    Top 'n' table for NAVG-hr averages
                          (LNTOPN) -- Default: F   !  LNTOPN = F  !
    Top 'n' table for length of run averages
                           (LRAVG) -- Default: F   !   LRAVG = F  !


Output Units
------------
    Units for All Output       (IPRTU) -- Default: 1   ! IPRTU =  3   !
                     for            for
                Concentration   Deposition
       1 =          g/m**3        g/m**2/s
       2 =         mg/m**3       mg/m**2/s
       3 =         ug/m**3       ug/m**2/s
       4 =         ng/m**3       ng/m**2/s
       5 =       Odour Units

    Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Threshold Exceedance control
----------------------------          -- Default: -1.0

    Counts will be tabulated for each average that
    exceeds a specified non-negative threshold (output units).


    Threshold for  1-hr averages   (THRESH1)     !  THRESH1 = -1.0  !
    Threshold for  3-hr averages   (THRESH3)     !  THRESH3 = -1.0  !
    Threshold for 24-hr averages  (THRESH24)     ! THRESH24 = -1.0  !
    Threshold for NAVG-hr averages (THRESHN)     !  THRESHN = -1.0  !


Selected Day (Echo) Output Control
----------------------------------     -- Default: F
    Output 1-hr averages for selected days (LECH1)     ! LECH1   = F !
    Output 3-hr averages for selected days (LECH3)     ! LECH3   = F !
    Output 24-hr averages for selected days (LECH24)   ! LECH24  = F !
    Output NAVG-hr averages for selected days (LECHN)  ! LECHN   = F !
    Output selected information for debugging (LDEBUG) ! LDEBUG  = F !

    Days selected for output IECHO(366)-- Default: 366*0
! IECHO  = 366*0  !
     (366 values must be entered)

Plot Output Options
-------------------

      Plot files can be created for selected Top-n, Exceedance and Echo
      tables selected above.  Two formats for these files are available,
      DATA and GRID.  In the DATA format, results at all receptors are
      listed along with the receptor location [x,y,val1,val2,...].
      In the GRID format, results at only gridded receptors are written,
      using a compact representation.  The gridded values are written in
      rows (x varies), starting with the most southern row of the grid.
      The GRID format is given the .GRD extension, and includes headers
      compatible with the SURFER(R) plotting software.

      A plotting and analysis file is also created for the daily peak
      visibility summary output, in DATA format only.

      Generate Plot-File Output   (LPLT) -- Default: F   ! LPLT  = F !

      Write Top-n files in GRID format?
                             (LTGRD) -- Default: F   ! LTGRD = F !

      Write Exceedance files in GRID format?
                             (LXGRD) -- Default: F   ! LXGRD = F !
      Write Echo files in GRID format?
                             (LEGRD) -- Default: F   ! LEGRD = F !
```

!END!

CALPOST Control File Input Summary ----------

```
   Replace run data with data in Puff file 1=Y:    0
                     Run starting date -- year:   90
                                         month:    8
                                           day:   16
                                      Julian day:  228
                           hour ending(0-23):      0
                          Run length (hours):       24
                                     Species: NO3
```

Every hour of data processed -- NREP = 1

Concentration & scaling factors

```
                        Layer of processed data:    1
     (>0 = concentrations, -1 = dry fluxes, -2 = wet fluxes)
                  Multiplicative scaling factor: 0.0000E+00
                      Additive scaling factor: 0.0000E+00
        Hourly background concentrations used?: F
```

Receptor information

```
                   Gridded receptors processed?: F
                  Discrete receptors processed?: T
      CTSG Complex terrain receptors processed?: F
```

Discrete Receptors Processed

(All Discrete Receptors are Used)

Visibility Processing is NOT Selected

Averaging time & TOP 50 table control

```
    User-specified averaging time (NAVG hours):     0
                Top 50 table for  1-hr averages:    F
                Top 50 table for  3-hr averages:    F
                Top 50 table for 24-hr averages:    T
              Top 50 table for NAVG-hr averages:    F
        Top 50 table for length of run averages:    F
```

Top "n" table control

```
       Number of "top" values at each receptor:     2
       Specific ranks of "top" values reported:   1   2

              Top "n" table for  1-hr averages: F
              Top "n" table for  3-hr averages: F
              Top "n" table for 24-hr averages: T
            Top "n" table for NAVG-hr averages: F
       Top "n" table for length of run averages: F
```

Units requested for output: (ug/m**3)

Threshold Exceedance control

Exceedances of a specified value will be counted for --

Output options

```
                          Plot files created: F
     Output    1-hr averages for selected days: F
     Output    3-hr averages for selected days: F
     Output   24-hr averages for selected days: F
     Output NAVG-hr averages for selected days: F
     Output selected information for debugging: F
```

Days selected for output tables

```
   0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000
   0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000
```

0000000000 0000000000 0000000000 0000000000 000000C000 0000000000 0000000000 0000000000 0000000000 0000000000
0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 000000

TIFICATION OF PROCESSED MODEL FILE ----------

CALPUFF 5.0 990228

REFINED SIGNIFICANT IMPACT ANALYSIS, CALPUFF, CALPINE OSPREY 3/9/00
RECEPTORS AT CHASSAHOWITZKA NWA, PROJECT ONLY
FDEP CHASSAHOWITZKA CALMET DOMAIN WITH PRECIPITATION

Chemical species names for each layer in model:
SO2 1
SO4 1
NOX 1
HNO3 1
NO3 1
PM10 1

********** NOTICE **********
NDRECP array reset to full range: all 1s

INPUT FILES

Default Name	Unit No.	File Name and Path
CALPOST.INP	5	calpost.inp
MODEL.DAT	4	calpuff.con

OUTPUT FILES

Default Name	Unit No.	File Name and Path
CALPOST.LST	7	calpost.lst

****
CALPOST Version 5.0 Level 990228
****

NO3 1

TOP-50 24-HOUR AVERAGE CONCENTRATION VALUES (ug/m**3)

YEAR	DAY	HOUR(0-23)	RECEPTOR	TYPE	CONCENTRATION	COORDINATES (km)	
90	228	23	(0, 1)	D	4.5310E-03	340.300	3165.700
90	228	23	(0, 2)	D	4.3913E-03	340.300	3167.700
90	228	23	(0, 3)	D	4.2728E-03	340.300	3169.800
90	228	23	(0, 4)	D	4.1215E-03	340.700	3171.900
90	228	23	(0, 5)	D	3.9732E-03	342.000	3174.000
90	228	23	(0, 6)	D	3.8098E-03	343.000	3176.200
90	228	23	(0, 7)	D	3.6518E-03	343.700	3178.300
90	228	23	(0, 8)	D	3.5132E-03	342.400	3180.600
90	228	23	(0, 9)	D	3.3127E-03	341.100	3183.400
90	228	23	(0, 10)	D	3.2898E-03	339.000	3183.400
90	228	23	(0, 11)	D	3.2445E-03	336.500	3183.400
90	228	23	(0, 12)	D	3.1777E-03	334.000	3183.400
90	228	23	(0, 13)	D	3.0926E-03	331.500	3183.400
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000

0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000

****

CALPOST Version 5.0 Level 990228

****

NO3 1

2 RANKED 24-HOUR AVERAGE CONCENTRATION VALUES AT EACH DISCRETE RECEPTOR (YEAR,DAY,ENDING HOUR) (ug/m**3)

ECEPTOR	COORDINATES (km)		1 RANK	2 RANK
1	340.300	3165.700	4.5310E-03 (90,228,23)	0.0000E+00 (0, 0, 0)
2	340.300	3167.700	4.3913E-03 (90,228,23)	0.0000E+00 (0, 0, 0)
3	340.300	3169.800	4.2728E-03 (90,228,23)	0.0000E+00 (0, 0, 0)
4	340.700	3171.900	4.1215E-03 (90,228,23)	0.0000E+00 (0, 0, 0)
5	342.000	3174.000	3.9732E-03 (90,228,23)	0.0000E+00 (0, 0, 0)
6	343.000	3176.200	3.8098E-03 (90,228,23)	0.0000E+00 (0, 0, 0)
7	343.700	3178.300	3.6518E-03 (90,228,23)	0.0000E+00 (0, 0, 0)
8	342.400	3180.600	3.5132E-03 (90,228,23)	0.0000E+00 (0, 0, 0)
9	341.100	3183.400	3.3127E-03 (90,228,23)	0.0000E+00 (0, 0, 0)
10	339.000	3183.400	3.2898E-03 (90,228,23)	0.0000E+00 (0, 0, 0)
11	336.500	3183.400	3.2445E-03 (90,228,23)	0.0000E+00 (0, 0, 0)
12	334.000	3183.400	3.1777E-03 (90,228,23)	0.0000E+00 (0, 0, 0)
13	331.500	3183.400	3.0926E-03 (90,228,23)	0.0000E+00 (0, 0, 0)

****

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****

SUMMARY SECTION

NO3 1

(ug/m**3)

RECEPTOR	COORDINATES (km)		TYPE	PEAK (YEAR,DAY,ENDING HOUR)	FOR RANK	FOR AVERAGE PERIOD
1	340.300	3165.700	DISCRETE	4.5310E-03 (90,228,23)	RANK 1	24-HOUR
0	0.000	0.000	DISCRETE	0.0000E+00 (0, 0, 0)	RANK 2	24-HOUR

CALPOST Version 5.0 Level 990228

Run Title:
CALPINE OSPRAY REGIONAL HAZE ANALYSIS, NO3 2/6/00
RECEPTORS AT CHASSAHOWITZKA NWA, 24-HOUR AVERAGING TIME, CALPOST
2 SIMPLE-CYCLE NATURAL GAS FIRED CTs AT BASE LOAD, 32 DEGREES + COOLING TOWER

INPUT GROUP: 1 -- General run control parameters

Option to run all periods found
in the met. file(s) (METRUN) Default: 0 ! METRUN = 0 !

METRUN = 0 - Run period explicitly defined below
METRUN = 1 - Run all periods in CALPUFF data file(s)

Starting date:	Year (ISYR) --	No default	! ISYR =	90 !
(used only if	Month (ISMO) --	No default	! ISMO =	12 !
METRUN = 0)	Day (ISDY) --	No default	! ISDY =	22 !
	Hour (ISHR) --	No default	! ISHR =	0 !

Number of hours to process (NHRS) -- No default ! NHRS = 24 !

Species to process (ASPEC) -- No default ! ASPEC = NO3 !
(ASPEC = VISIB for visibility processing)

Process every hour of data?(NREP) -- Default: 1 ! NREP = 1 !
(1 = every hour processed,
2 = every 2nd hour processed,
5 = every 5th hour processed, etc.)

oncentration and scaling factors

Layer/deposition code (ILAYER) -- Default: 1 ! ILAYER = 1 !
'1' for CALPUFF concentrations,
'-1' for dry deposition fluxes,
'-2' for wet deposition fluxes.

Scaling factors of the form: -- Defaults: ! A = 0.0 !
X(new) = X(old) * A + B A = 0.0 ! B = 0.0 !
(NOT applied if A = B = 0.0) B = 0.0

Add Hourly Background Concentrations?
(LBACK) -- Default: F ! LBACK = F !

Receptor information

Gridded receptors processed? (LG) -- Default: F ! LG = F !
Discrete receptors processed? (LD) -- Default: F ! LD = T !
CTSG Complex terrain receptors processed?
(LCT) -- Default: F ! LCT = F !

--Select range of DISCRETE receptors (only used when LD = T):

Select ALL DISCRETE receptors by setting NDRECP flag to -1;
OR
Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
0 = discrete receptor not processed
1 = discrete receptor processed
using repeated value notation to select blocks of receptors:
23*1, 15*0, 12*1
Flag for all receptors after the last one assigned is set to 0
(NDRECP) -- Default: -1
! NDRECP = -1 !

--Select range of GRIDDED receptors (only used when LG = T):

```
      X index of LL corner (IBGRID) -- Default: -1     ! IBGRID = -1  !
         (-1 OR 1 <= IBGRID <= NX)

      Y index of LL corner (JBGRID) -- Default: -1     ! JBGRID = -1  !
         (-1 OR 1 <= JBGRID <= NY)

      X index of UR corner (IEGRID) -- Default: -1     ! IEGRID = -1  !
         (-1 OR 1 <= IEGRID <= NX)

      Y index of UR corner (JEGRID) -- Default: -1     ! JEGRID = -1  !
         (-1 OR 1 <= JEGRID <= NY)

  Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)
-------------

    Maximum relative humidity (%) used in particle growth curve
                           (RHMAX) -- Default: 98   ! RHMAX  = 0.0 !

    Modeled species to be included in computing the light extinction
     Include SULFATE?          (LVSO4) -- Default: T   ! LVSO4  = T  !
     Include NITRATE?          (LVNO3) -- Default: T   ! LVNO3  = T  !
     Include ORGANIC CARBON?   (LVOC)  -- Default: T   ! LVOC   = T  !
     Include COARSE PARTICLES? (LVPMC) -- Default: T   ! LVPMC  = T  !
     Include FINE PARTICLES?   (LVPMF) -- Default: T   ! LVPMF  = T  !

    And, when ranking for TOP-N, TOP-50, and Exceedance tables,
     Include BACKGROUND?       (LVBK)  -- Default: T   ! LVBK   = T  !

    Species name used for particulates in MODEL.DAT file
                  COARSE    (SPECPMC) -- Default: PMC ! SPECPMC = PMC !
                  FINE      (SPECPMF) -- Default: PMF ! SPECPMF = PMF !

Extinction Efficiency (1/Mm per ug/m**3)
----------------------------------------
    MODELED particulate species:
              PM  COARSE      (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
              PM  FINE        (EEPMF) -- Default: 1.0 ! EEPMF  = 1.0 !
    BACKGROUND particulate species:
              PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
    Other species:
             AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
             AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
             ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
             SOIL             (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
             ELEMENTAL CARBON (EEEC)  -- Default: 10. ! EEEC   = 10.0 !

Background Extinction Computation
---------------------------------

    Method used for background light extinction
                           (MVISBK) -- Default: 2   ! MVISBK =  2  !

        1 =  Supply single light extinction and hygroscopic fraction
             - IWAQM (1993) RH adjustment applied to hygroscopic background
               and modeled sulfate and nitrate
        2 =  Compute extinction from speciated PM measurements (A)
             - PATH RH adjustment applied to observed and modeled sulfate
               and nitrate
             - RH factor is capped at RHMAX
        3 =  Compute extinction from speciated PM measurements (B)
             - PATH RH adjustment applied to observed and modeled sulfate
               and nitrate
             - Receptor-hour excluded if RH>RHMAX
             - Receptor-day excluded if fewer than 6 valid receptor-hours
        4 =  Read hourly transmissometer background extinction measurements
             - PATH RH adjustment applied to modeled sulfate and nitrate
             - Hour excluded if measurement invalid (missing, interference,
               or large RH)
             - Receptor-hour excluded if RH>RHMAX
             - Receptor-day excluded if fewer than 6 valid receptor-hours
        5 =  Read hourly nephelometer background extinction measurements
             - Rayleigh extinction value (BEXTRAY) added to measurement
```

```
            - PATH RH adjustment applied to modeled sulfate and nitrate
            - Hour excluded if measurement invalid (missing, interference,
              or large RH)
            - Receptor-hour excluded if RH>RHMAX
            - Receptor-day excluded if fewer than 6 valid receptor-hours

    Additional inputs used for MVISBK = 1:
    --------------------------------------
     Background light extinction (1/Mm)
                           (BEXTBK) -- No default   ! BEXTBK = 0.0 !
     Percentage of particles affected by relative humidity
                           (RHFRAC) -- No default   ! RHFRAC = 0.0 !

    Additional inputs used for MVISBK = 2,3:
    ----------------------------------------
     Background extinction coefficients are computed from monthly
     CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3),
     coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and
     elemental carbon (BKEC).  Month 1 is January.
     (ug/m**3)

     (BKSO4)  -- No default     ! BKSO4 = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKNO3)  -- No default     ! BKNO3 = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKPMC)  -- No default     ! BKPMC = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKOC)   -- No default     ! BKOC  = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKSOIL) -- No default     ! BKSOIL= 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !
     (BKEC)   -- No default     ! BKEC  = 0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0,
                                          0.0, 0.0, 0.0, 0.0 !

    Additional inputs used for MVISBK = 2,3,5:
    ------------------------------------------
     Extinction due to Rayleigh scattering is added (1/Mm)
                           (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 0.0 !

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 3 -- Processing options
-------------

Averaging time and TOP 50 Table control
---------------------------------------
    User-specified averaging time
                              (NAVG) -- Default: 0   !   NAVG =  0  !
    Top 50 table for  1-hr averages
                             (L1T50) -- Default: T   !  L1T50 =  F  !
    Top 50 table for  3-hr averages
                             (L3T50) -- Default: T   !  L3T50 =  F  !
    Top 50 table for 24-hr averages
                            (L24T50) -- Default: T   ! L24T50 =  T  !
    Top 50 table for NAVG-hr averages
                             (LNT50) -- Default: F   !  LNT50 =  F  !
    Top 50 table for length of run averages
                             (LRT50) -- Default: T   !  LRT50 =  F  !

TOP 'n' Table control
---------------------

    Number of 'Top' values at each receptor
                              (NTOP) -- Default: 4   ! NTOP =  2   !
              (NTOP must be <= 4)

    Specific ranks of 'Top' values reported (NTOP values must be entered)
                     (ITOP(4) array) -- Default:     ! ITOP =  1 , 2   !
                                       1,2,3,4
```

```
    Top 'n' table for  1-hr averages
                          (L1TOPN) -- Default: F   ! L1TOPN = F  !
    Top 'n' table for  3-hr averages
                          (L3TOPN) -- Default: F   ! L3TOPN = F  !
    Top 'n' table for 24-hr averages
                         (L24TOPN) -- Default: F   ! L24TOPN = T  !
    Top 'n' table for NAVG-hr averages
                          (LNTOPN) -- Default: F   ! LNTOPN = F  !
    Top 'n' table for length of run averages
                           (LRAVG) -- Default: F   !  LRAVG = F  !


Output Units
------------
    Units for All Output       (IPRTU) -- Default: 1   ! IPRTU =  3   !
                     for           for
                Concentration   Deposition
       1 =          g/m**3         g/m**2/s
       2 =         mg/m**3        mg/m**2/s
       3 =         ug/m**3        ug/m**2/s
       4 =         ng/m**3        ng/m**2/s
       5 =       Odour Units

    Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Threshold Exceedance control
----------------------------          -- Default: -1.0

    Counts will be tabulated for each average that
    exceeds a specified non-negative threshold (output units).


    Threshold for  1-hr averages   (THRESH1)     !  THRESH1 = -1.0  !
    Threshold for  3-hr averages   (THRESH3)     !  THRESH3 = -1.0  !
    Threshold for 24-hr averages  (THRESH24)     ! THRESH24 = -1.0  !
    Threshold for NAVG-hr averages (THRESHN)     !  THRESHN = -1.0  !


Selected Day (Echo) Output Control
----------------------------------     -- Default: F
    Output 1-hr averages for selected days (LECH1)     ! LECH1   = F !
    Output 3-hr averages for selected days (LECH3)     ! LECH3   = F !
    Output 24-hr averages for selected days (LECH24)   ! LECH24  = F !
    Output NAVG-hr averages for selected days (LECHN)  ! LECHN   = F !
    Output selected information for debugging (LDEBUG) ! LDEBUG  = F !

    Days selected for output IECHO(366)-- Default: 366*0
! IECHO  = 366*0  !
     (366 values must be entered)

Plot Output Options
-------------------

     Plot files can be created for selected Top-n, Exceedance and Echo
     tables selected above.  Two formats for these files are available,
     DATA and GRID.  In the DATA format, results at all receptors are
     listed along with the receptor location [x,y,val1,val2,...].
     In the GRID format, results at only gridded receptors are written,
     using a compact representation.  The gridded values are written in
     rows (x varies), starting with the most southern row of the grid.
     The GRID format is given the .GRD extension, and includes headers
     compatible with the SURFER(R) plotting software.

     A plotting and analysis file is also created for the daily peak
     visibility summary output, in DATA format only.

     Generate Plot-File Output   (LPLT) -- Default: F   ! LPLT  = F !

     Write Top-n files in GRID format?
                               (LTGRD) -- Default: F   ! LTGRD = F !

     Write Exceedance files in GRID format?
                               (LXGRD) -- Default: F   ! LXGRD = F !
     Write Echo files in GRID format?
                               (LEGRD) -- Default: F   ! LEGRD = F !
```

!END!

CALPOST Control File Input Summary ----------

```
Replace run data with data in Puff file 1=Y:    0
                  Run starting date -- year:   90
                                      month:   12
                                        day:   22
                                  Julian day:  356
                            hour ending(0-23):    0
                            Run length (hours):      24
                                    Species: NO3
```

Every hour of data processed -- NREP = 1

Concentration & scaling factors

```
                    Layer of processed data:    1
     (>0 = concentrations, -1 = dry fluxes, -2 = wet fluxes)
              Multiplicative scaling factor: 0.0000E+00
                  Additive scaling factor: 0.0000E+00
       Hourly background concentrations used?: F
```

Receptor information

```
                Gridded receptors processed?: F
               Discrete receptors processed?: T
    CTSG Complex terrain receptors processed?: F
```

Discrete Receptors Processed

(All Discrete Receptors are Used)

Visibility Processing is NOT Selected

Averaging time & TOP 50 table control

```
   User-specified averaging time (NAVG hours):     0
             Top 50 table for  1-hr averages:     F
             Top 50 table for  3-hr averages:     F
             Top 50 table for 24-hr averages:     T
           Top 50 table for NAVG-hr averages:     F
      Top 50 table for length of run averages:     F
```

Top "n" table control

```
      Number of "top" values at each receptor:     2
      Specific ranks of "top" values reported:   1   2

            Top "n" table for  1-hr averages: F
            Top "n" table for  3-hr averages: F
            Top "n" table for 24-hr averages: T
          Top "n" table for NAVG-hr averages: F
     Top "n" table for length of run averages: F
```

Units requested for output: (ug/m**3)

Threshold Exceedance control

Exceedances of a specified value will be counted for --

Output options

```
                          Plot files created: F
    Output   1-hr averages for selected days: F
    Output   3-hr averages for selected days: F
    Output  24-hr averages for selected days: F
    Output NAVG-hr averages for selected days: F
    Output selected information for debugging: F
```

Days selected for output tables

```
  0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000
  0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000
```

0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000
0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 000000

.DENTIFICATION OF PROCESSED MODEL FILE ----------

CALPUFF 5.0 990228

REFINED SIGNIFICANT IMPACT ANALYSIS, CALPUFF, CALPINE OSPREY 3/9/00
RECEPTORS AT CHASSAHOWITZKA NWA, PROJECT ONLY
FDEP CHASSAHOWITZKA CALMET DOMAIN WITH PRECIPITATION

Chemical species names for each layer in model:
SO2 1
SO4 1
NOX 1
HNO3 1
NO3 1
PM10 1

********** NOTICE **********
NDRECP array reset to full range: all 1s

INPUT FILES

Default Name	Unit No.	File Name and Path
CALPOST.INP	5	calpost.inp
MODEL.DAT	4	calpuff.con

OUTPUT FILES

Default Name	Unit No.	File Name and Path
CALPOST.LST	7	calpost.lst

****
CALPOST Version 5.0 Level 990228
****

NO3 1

TOP-50 24-HOUR AVERAGE CONCENTRATION VALUES (ug/m**3)

YEAR	DAY	HOUR(0-23)	RECEPTOR	TYPE	CONCENTRATION	COORDINATES (km)	
90	356	23	(0, 2)	D	6.2885E-03	340.300	3167.700
90	356	23	(0, 3)	D	6.2590E-03	340.300	3169.800
90	356	23	(0, 1)	D	6.0052E-03	340.300	3165.700
90	356	23	(0, 4)	D	5.8823E-03	340.700	3171.900
90	356	23	(0, 13)	D	5.1317E-03	331.500	3183.400
90	356	23	(0, 5)	D	5.0381E-03	342.000	3174.000
90	356	23	(0, 12)	D	4.4475E-03	334.000	3183.400
90	356	23	(0, 6)	D	4.1038E-03	343.000	3176.200
90	356	23	(0, 11)	D	3.8194E-03	336.500	3183.400
90	356	23	(0, 7)	D	3.3709E-03	343.700	3178.300
90	356	23	(0, 10)	D	3.2774E-03	339.000	3183.400
90	356	23	(0, 8)	D	3.1308E-03	342.400	3180.600
90	356	23	(0, 9)	D	2.8871E-03	341.100	3183.400
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000
0	0	0	(0, 0)		0.0000E+00	0.000	0.000

0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000
0	0	0	(0, 0)	0.0000E+00	0.000	0.000

****

CALPOST Version 5.0 Level 990228

****

NO3 1

2 RANKED 24-HOUR AVERAGE CONCENTRATION VALUES AT EACH DISCRETE RECEPTOR (YEAR,DAY,ENDING HOUR) (ug/m**3)

RECEPTOR	COORDINATES (km)		1 RANK	2 RANK
1	340.300	3165.700	6.0052E-03 (90,356,23)	0.0000E+00 (0, 0, 0)
2	340.300	3167.700	6.2885E-03 (90,356,23)	0.0000E+00 (0, 0, 0)
3	340.300	3169.800	6.2590E-03 (90,356,23)	0.0000E+00 (0, 0, 0)
4	340.700	3171.900	5.8823E-03 (90,356,23)	0.0000E+00 (0, 0, 0)
5	342.000	3174.000	5.0381E-03 (90,356,23)	0.0000E+00 (0, 0, 0)
6	343.000	3176.200	4.1038E-03 (90,356,23)	0.0000E+00 (0, 0, 0)
7	343.700	3178.300	3.3709E-03 (90,356,23)	0.0000E+00 (0, 0, 0)
8	342.400	3180.600	3.1308E-03 (90,356,23)	0.0000E+00 (0, 0, 0)
9	341.100	3183.400	2.8871E-03 (90,356,23)	0.0000E+00 (0, 0, 0)
10	339.000	3183.400	3.2774E-03 (90,356,23)	0.0000E+00 (0, 0, 0)
11	336.500	3183.400	3.8194E-03 (90,356,23)	0.0000E+00 (0, 0, 0)
12	334.000	3183.400	4.4475E-03 (90,356,23)	0.0000E+00 (0, 0, 0)
13	331.500	3183.400	5.1317E-03 (90,356,23)	0.0000E+00 (0, 0, 0)

****

CALPOST Version 5.0 Level 990228

****

SUMMARY SECTION

NO3 1

(ug/m**3)

RECEPTOR	COORDINATES (km)		TYPE	PEAK (YEAR,DAY,ENDING HOUR)	FOR RANK	FOR AVERAGE PERIOD
2	340.300	3167.700	DISCRETE	6.2885E-03 (90,356,23)	RANK 1	24-HOUR
0	0.000	0.000	DISCRETE	0.0000E+00 (0, 0, 0)	RANK 2	24-HOUR

```
**********************************************************************************************************************
                                        CALPOST  Version 5.0          Level 990228
**********************************************************************************************************************

 Run Title:
    CALPINE OSPRAY CLASS I SINIFICANT IMPACT ANALYSIS, PM10     2/6/00
    RECEPTORS AT CHASSAHOWITZKA NWA, 24-HOUR AND ANNUAL AVERAGING TIMES, CALPOST
    2 SIMPLE-CYCLE NATURAL GAS FIRED CTs AT BASE LOAD, 32 DEGREES + COOLING TOWER

 ----------------------------------------------------------------------------

 INPUT GROUP: 1 -- General run control parameters
 --------------

     Option to run all periods found
     in the met. file(s)  (METRUN)        Default: 0   ! METRUN =   0  !

         METRUN = 0 - Run period explicitly defined below
         METRUN = 1 - Run all periods in CALPUFF data file(s)

     Starting date:    Year  (ISYR) --    No default   ! ISYR  =  90   !
     (used only if     Month (ISMO) --    No default   ! ISMO  =  7    !
      METRUN = 0)      Day   (ISDY) --    No default   ! ISDY  =  4    !
                       Hour  (ISHR) --    No default   ! ISHR  =  0    !

     Number of hours to process (NHRS) -- No default   ! NHRS  =  24 !

           Species to process (ASPEC) -- No default   ! ASPEC = PM10  !
           (ASPEC = VISIB for visibility processing)

     Process every hour of data?(NREP) -- Default: 1   ! NREP  =  1  !
      (1 = every hour processed,
       2 = every 2nd hour processed,
       5 = every 5th hour processed, etc.)

 Concentration and scaling factors
 ---------------------------------

       Layer/deposition code (ILAYER)   -- Default: 1   ! ILAYER =  1  !
         '1'  for CALPUFF concentrations,
         '-1' for dry deposition fluxes,
         '-2' for wet deposition fluxes.

       Scaling factors of the form:     -- Defaults:    ! A =  0.0    !
            X(new) = X(old) * A + B          A = 0.0    ! B =  0.0    !
         (NOT applied if A = B = 0.0)        B = 0.0

       Add Hourly Background Concentrations?
                          (LBACK)  -- Default: F   ! LBACK =  F !

 Receptor information
 --------------------

   Gridded receptors processed?    (LG) -- Default: F   ! LG  = F  !
   Discrete receptors processed?   (LD) -- Default: F   ! LD  = T  !
   CTSG Complex terrain receptors processed?
                                  (LCT) -- Default: F   ! LCT = F  !

 --Select range of DISCRETE receptors (only used when LD = T):

   Select ALL DISCRETE receptors by setting NDRECP flag to -1;
                              OR
   Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
      0 = discrete receptor not processed
      1 = discrete receptor processed
   using repeated value notation to select blocks of receptors:
      23*1, 15*0, 12*1
   Flag for all receptors after the last one assigned is set to 0
   (NDRECP) -- Default: -1
                                              ! NDRECP =  -1  !

 --Select range of GRIDDED receptors (only used when LG = T):
```

```
      X index of LL corner (IBGRID) -- Default: -1     ! IBGRID = -1  !
         (-1 OR 1 <= IBGRID <= NX)

      Y index of LL corner (JBGRID) -- Default: -1     ! JBGRID = -1  !
         (-1 OR 1 <= JBGRID <= NY)

      X index of UR corner (IEGRID) -- Default: -1     ! IEGRID = -1  !
         (-1 OR 1 <= IEGRID <= NX)

      Y index of UR corner (JEGRID) -- Default: -1     ! JEGRID = -1  !
         (-1 OR 1 <= JEGRID <= NY)

  Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)
--------------

    Maximum relative humidity (%) used in particle growth curve
                          (RHMAX) -- Default: 98   ! RHMAX  = 0.0 !

    Modeled species to be included in computing the light extinction
     Include SULFATE?          (LVSO4) -- Default: T   ! LVSO4  = T  !
     Include NITRATE?          (LVNO3) -- Default: T   ! LVNO3  = T  !
     Include ORGANIC CARBON?   (LVOC)  -- Default: T   ! LVOC   = T  !
     Include COARSE PARTICLES? (LVPMC) -- Default: T   ! LVPMC  = T  !
     Include FINE PARTICLES?   (LVPMF) -- Default: T   ! LVPMF  = T  !

    And, when ranking for TOP-N, TOP-50, and Exceedance tables,
     Include BACKGROUND?       (LVBK)  -- Default: T   ! LVBK   = T  !

    Species name used for particulates in MODEL.DAT file
                  COARSE    (SPECPMC) -- Default: PMC ! SPECPMC = PMC !
                  FINE      (SPECPMF) -- Default: PMF ! SPECPMF = PMF !

Extinction Efficiency (1/Mm per ug/m**3)
---------------------------------------
    MODELED particulate species:
              PM  COARSE      (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
              PM  FINE        (EEPMF) -- Default: 1.0 ! EEPMF  = 1.0 !
    BACKGROUND particulate species:
              PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
    Other species:
             AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
             AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
             ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
             SOIL             (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
             ELEMENTAL CARBON (EEEC)  -- Default: 10. ! EEEC   = 10.0 !

Background Extinction Computation
---------------------------------

    Method used for background light extinction
                           (MVISBK) -- Default: 2   ! MVISBK =  2  !

        1 =  Supply single light extinction and hygroscopic fraction
             - IWAQM (1993) RH adjustment applied to hygroscopic background
               and modeled sulfate and nitrate
        2 =  Compute extinction from speciated PM measurements (A)
             - PATH RH adjustment applied to observed and modeled sulfate
               and nitrate
             - RH factor is capped at RHMAX
        3 =  Compute extinction from speciated PM measurements (B)
             - PATH RH adjustment applied to observed and modeled sulfate
               and nitrate
             - Receptor-hour excluded if RH>RHMAX
             - Receptor-day excluded if fewer than 6 valid receptor-hours
        4 =  Read hourly transmissometer background extinction measurements
             - PATH RH adjustment applied to modeled sulfate and nitrate
             - Hour excluded if measurement invalid (missing, interference,
               or large RH)
             - Receptor-hour excluded if RH>RHMAX
             - Receptor-day excluded if fewer than 6 valid receptor-hours
        5 =  Read hourly nephelometer background extinction measurements
             - Rayleigh extinction value (BEXTRAY) added to measurement
```

```
            - PATH RH adjustment applied to modeled sulfate and nitrate
            - Hour excluded if measurement invalid (missing, interference,
              or large RH)
            - Receptor-hour excluded if RH>RHMAX
            - Receptor-day excluded if fewer than 6 valid receptor-hours

   Additional inputs used for MVISBK = 1:
   --------------------------------------
    Background light extinction (1/Mm)
                          (BEXTBK) -- No default   ! BEXTBK = 0.0 !
    Percentage of particles affected by relative humidity
                          (RHFRAC) -- No default   ! RHFRAC = 0.0 !

   Additional inputs used for MVISBK = 2,3:
   ----------------------------------------
    Background extinction coefficients are computed from monthly
    CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3),
    coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and
    elemental carbon (BKEC).  Month 1 is January.
    (ug/m**3)

    (BKSO4)  -- No default     ! BKSO4 = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKNO3)  -- No default     ! BKNO3 = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKPMC)  -- No default     ! BKPMC = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKOC)   -- No default     ! BKOC  = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKSOIL) -- No default     ! BKSOIL= 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKEC)   -- No default     ! BKEC  = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !

   Additional inputs used for MVISBK = 2,3,5:
   ------------------------------------------
    Extinction due to Rayleigh scattering is added (1/Mm)
                          (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 0.0 !

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 3 -- Processing options
------------

Averaging time and TOP 50 Table control
---------------------------------------
    User-specified averaging time
                             (NAVG) -- Default: 0   !   NAVG =  0  !
    Top 50 table for  1-hr averages
                            (L1T50) -- Default: T   !  L1T50 = F  !
    Top 50 table for  3-hr averages
                            (L3T50) -- Default: T   !  L3T50 = F  !
    Top 50 table for 24-hr averages
                           (L24T50) -- Default: T   ! L24T50 = T  !
    Top 50 table for NAVG-hr averages
                            (LNT50) -- Default: F   !  LNT50 = F  !
    Top 50 table for length of run averages
                            (LRT50) -- Default: T   !  LRT50 = F  !

TOP 'n' Table control
---------------------

    Number of 'Top' values at each receptor
                             (NTOP) -- Default: 4   ! NTOP =  2   !
            (NTOP must be <= 4)

    Specific ranks of 'Top' values reported (NTOP values must be entered)
                    (ITOP(4) array) -- Default:     ! ITOP =  1 , 2   !
                                       1,2,3,4
```

```
    Top 'n' table for  1-hr averages
                            (L1TOPN) -- Default: F   !  L1TOPN = F  !
    Top 'n' table for  3-hr averages
                            (L3TOPN) -- Default: F   !  L3TOPN = F  !
    Top 'n' table for 24-hr averages
                           (L24TOPN) -- Default: F   ! L24TOPN = T  !
    Top 'n' table for NAVG-hr averages
                            (LNTOPN) -- Default: F   !  LNTOPN = F  !
    Top 'n' table for length of run averages
                            (LRAVG) -- Default: F   !   LRAVG = T  !


Output Units
------------
    Units for All Output       (IPRTU) -- Default: 1   ! IPRTU =  3   !
                    for              for
              Concentration    Deposition
       1 =          g/m**3        g/m**2/s
       2 =         mg/m**3       mg/m**2/s
       3 =         ug/m**3       ug/m**2/s
       4 =         ng/m**3       ng/m**2/s
       5 =       Odour Units

    Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Threshold Exceedance control
----------------------------          -- Default: -1.0

    Counts will be tabulated for each average that
    exceeds a specified non-negative threshold (output units).


    Threshold for  1-hr averages   (THRESH1)     !  THRESH1 = -1.0  !
    Threshold for  3-hr averages   (THRESH3)     !  THRESH3 = -1.0  !
    Threshold for 24-hr averages   (THRESH24)    ! THRESH24 = -1.0  !
    Threshold for NAVG-hr averages (THRESHN)     !  THRESHN = -1.0  !


    ected Day (Echo) Output Control
    -------------------------------      -- Default: F
    Output 1-hr averages for selected days (LECH1)     ! LECH1   = F !
    Output 3-hr averages for selected days (LECH3)     ! LECH3   = F !
    Output 24-hr averages for selected days (LECH24)   ! LECH24  = F !
    Output NAVG-hr averages for selected days (LECHN)  ! LECHN   = F !
    Output selected information for debugging (LDEBUG) ! LDEBUG  = F !

    Days selected for output IECHO(366)-- Default: 366*0
! IECHO  = 366*0  !
     (366 values must be entered)

Plot Output Options
-------------------

     Plot files can be created for selected Top-n, Exceedance and Echo
     tables selected above.  Two formats for these files are available,
     DATA and GRID.  In the DATA format, results at all receptors are
     listed along with the receptor location [x,y,val1,val2,...].
     In the GRID format, results at only gridded receptors are written,
     using a compact representation.  The gridded values are written in
     rows (x varies), starting with the most southern row of the grid.
     The GRID format is given the .GRD extension, and includes headers
     compatible with the SURFER(R) plotting software.

     A plotting and analysis file is also created for the daily peak
     visibility summary output, in DATA format only.

     Generate Plot-File Output   (LPLT) -- Default: F   ! LPLT  = F !

     Write Top-n files in GRID format?
                            (LTGRD) -- Default: F   ! LTGRD = F !

     Write Exceedance files in GRID format?
                            (LXGRD) -- Default: F   ! LXGRD = F !
     Write Echo files in GRID format?
                            (LEGRD) -- Default: F   ! LEGRD = F !
```

!END!

CALPOST Control File Input Summary ------------------------

```
   Replace run data with data in Puff file 1=Y:    0
                    Run starting date -- year:   90
                                        month:    7
                                          day:    4
                                  Julian day:  185
                           hour ending(0-23):    0
                          Run length (hours):      24
                                      Species: PM10

Every hour of data processed -- NREP = 1


 Concentration & scaling factors
                       Layer of processed data:    1
     (>0 = concentrations, -1 = dry fluxes, -2 = wet fluxes)
                 Multiplicative scaling factor: 0.0000E+00
                       Additive scaling factor: 0.0000E+00
          Hourly background concentrations used?: F


 Receptor information
                    Gridded receptors processed?: F
                   Discrete receptors processed?: T
       CTSG Complex terrain receptors processed?: F

 Discrete Receptors Processed

 (All Discrete Receptors are Used)


 Visibility Processing is NOT Selected


 Averaging time & TOP 50 table control
      User-specified averaging time (NAVG hours):     0
                 Top 50 table for  1-hr averages:     F
                 Top 50 table for  3-hr averages:     F
                 Top 50 table for 24-hr averages:     T
               Top 50 table for NAVG-hr averages:     F
          Top 50 table for length of run averages:     F


 Top "n" table control
         Number of "top" values at each receptor:     2
         Specific ranks of "top" values reported:   1   2

               Top "n" table for  1-hr averages: F
               Top "n" table for  3-hr averages: F
               Top "n" table for 24-hr averages: T
             Top "n" table for NAVG-hr averages: F
        Top "n" table for length of run averages: T


 Units requested for output:   (ug/m**3)


 Threshold Exceedance control
      Exceedances of a specified value will be counted for --


 Output options
                            Plot files created: F
       Output    1-hr averages for selected days: F
       Output    3-hr averages for selected days: F
       Output   24-hr averages for selected days: F
       Output NAVG-hr averages for selected days: F
       Output selected information for debugging: F


 Days selected for output tables
    0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000
    0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000
```

0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000
0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 00000

TIFICATION OF PROCESSED MODEL FILE ----------

CALPUFF 5.0 990228

REFINED SIGNIFICANT IMPACT ANALYSIS, CALPUFF, CALPINE OSPREY 3/9/00
RECEPTORS AT CHASSAHOWITZKA NWA, PROJECT ONLY
FDEP CHASSAHOWITZKA CALMET DOMAIN WITH PRECIPITATION

Chemical species names for each layer in model:
SO2 1
SO4 1
NOX 1
HNO3 1
NO3 1
PM10 1

********** NOTICE **********
NDRECP array reset to full range: all 1s

INPUT FILES

Default Name	Unit No.	File Name and Path
CALPOST.INP	5	calpost.inp
MODEL.DAT	4	calpuff.con

OUTPUT FILES

efault Name	Unit No.	File Name and Path
CALPOST.LST	7	calpost.lst

****
CALPOST Version 5.0 Level 990228
****

24-HOUR AVERAGE CONCENTRATION AT EACH RECEPTOR FOR THE PERIOD ENDING YEAR: 90 DAY: 185 HOUR(0-23):

DISCRETE RECEPTORS: PM10 1

RECEPTOR	COORDINATES (km)	CONCENTRATION	RECEPTOR	COORDINATES (km)	CONCENTRATION
1	340.300 3165.700	1.8478E-02	7	343.700 3178.300	3.1858E-02
2	340.300 3167.700	2.0326E-02	8	342.400 3180.600	3.2067E-02
3	340.300 3169.800	2.2204E-02	9	341.100 3183.400	3.2297E-02
4	340.700 3171.900	2.4398E-02	10	339.000 3183.400	3.1232E-02
5	342.000 3174.000	2.7378E-02	11	336.500 3183.400	2.9602E-02
6	343.000 3176.200	3.0002E-02	12	334.000 3183.400	2.7807E-02
			13	331.500 3183.400	2.5944E-02

****
CALPOST Version 5.0 Level 990228
****

PM10 1

TOP-50 24-HOUR AVERAGE CONCENTRATION VALUES (ug/m**3)

YEAR DAY HOUR(0-23) RECEPTOR TYPE CONCENTRATION COORDINATES (km)

90	185	23	(0,	9)	D	3.2297E-02	341.100	3183.400
90	185	23	(0,	8)	D	3.2067E-02	342.400	3180.600
90	185	23	(0,	7)	D	3.1858E-02	343.700	3178.300
90	185	23	(0,	10)	D	3.1232E-02	339.000	3183.400
90	185	23	(0,	6)	D	3.0002E-02	343.000	3176.200
90	185	23	(0,	11)	D	2.9602E-02	336.500	3183.400
90	185	23	(0,	12)	D	2.7807E-02	334.000	3183.400
90	185	23	(0,	5)	D	2.7378E-02	342.000	3174.000
90	185	23	(0,	13)	D	2.5944E-02	331.500	3183.400
90	185	23	(0,	4)	D	2.4398E-02	340.700	3171.900
90	185	23	(0,	3)	D	2.2204E-02	340.300	3169.800
90	185	23	(0,	2)	D	2.0326E-02	340.300	3167.700
90	185	23	(0,	1)	D	1.8478E-02	340.300	3165.700
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000

****

CALPOST Version 5.0 Level 990228

****

PM10 1

2 RANKED 24-HOUR AVERAGE CONCENTRATION VALUES AT EACH DISCRETE RECEPTOR (YEAR,DAY,ENDING HOUR) (ug/m**3)

RECEPTOR	COORDINATES (km)		1 RANK	2 RANK
1	340.300	3165.700	1.8478E-02 (90,185,23)	0.0000E+00 (0, 0, 0)
2	340.300	3167.700	2.0326E-02 (90,185,23)	0.0000E+00 (0, 0, 0)
3	340.300	3169.800	2.2204E-02 (90,185,23)	0.0000E+00 (0, 0, 0)
4	340.700	3171.900	2.4398E-02 (90,185,23)	0.0000E+00 (0, 0, 0)
5	342.000	3174.000	2.7378E-02 (90,185,23)	0.0000E+00 (0, 0, 0)
6	343.000	3176.200	3.0002E-02 (90,185,23)	0.0000E+00 (0, 0, 0)
7	343.700	3178.300	3.1858E-02 (90,185,23)	0.0000E+00 (0, 0, 0)
8	342.400	3180.600	3.2067E-02 (90,185,23)	0.0000E+00 (0, 0, 0)
9	341.100	3183.400	3.2297E-02 (90,185,23)	0.0000E+00 (0, 0, 0)
10	339.000	3183.400	3.1232E-02 (90,185,23)	0.0000E+00 (0, 0, 0)
11	336.500	3183.400	2.9602E-02 (90,185,23)	0.0000E+00 (0, 0, 0)
12	334.000	3183.400	2.7807E-02 (90,185,23)	0.0000E+00 (0, 0, 0)
13	331.500	3183.400	2.5944E-02 (90,185,23)	0.0000E+00 (0, 0, 0)

****

CALPOST Version 5.0 Level 990228

SUMMARY SECTION

PM10 1

(ug/m**3)

RECEPTOR	COORDINATES (km)		TYPE	PEAK (YEAR,DAY,ENDING HOUR)	FOR RANK	FOR AVERAGE PERIOD
9	341.100	3183.400	DISCRETE	3.2297E-02 (90,185,23)	RANK 1	24-HOUR
0	0.000	0.000	DISCRETE	0.0000E+00 (0, 0, 0)	RANK 2	24-HOUR
9	341.100	3183.400	DISCRETE	3.2297E-02	RANK 1	24-HOUR

```
**********************************************************************************************************************
                                        CALPOST  Version 5.0          Level 990228
**********************************************************************************************************************

 Run Title:
    CALPINE OSPRAY CLASS I SINIFICANT IMPACT ANALYSIS, PM10     2/6/00
    RECEPTORS AT CHASSAHOWITZKA NWA, 24-HOUR AND ANNUAL AVERAGING TIMES, CALPOST
    2 SIMPLE-CYCLE NATURAL GAS FIRED CTs AT BASE LOAD, 32 DEGREES + COOLING TOWER

 ------------------------------------------------------------------------------

 INPUT GROUP: 1 -- General run control parameters
 -------------

      Option to run all periods found
      in the met. file(s)  (METRUN)        Default: 0   ! METRUN =   0  !

          METRUN = 0 - Run period explicitly defined below
          METRUN = 1 - Run all periods in CALPUFF data file(s)

      Starting date:    Year  (ISYR) --    No default   ! ISYR  =  90   !
      (used only if     Month (ISMO) --    No default   ! ISMO  =  8   !
       METRUN = 0)      Day   (ISDY) --    No default   ! ISDY  =  16  !
                        Hour  (ISHR) --    No default   ! ISHR  =  0   !

      Number of hours to process (NHRS) -- No default   ! NHRS  =  24 !

            Species to process (ASPEC) -- No default   ! ASPEC = PM10  !
            (ASPEC = VISIB for visibility processing)

      Process every hour of data?(NREP) -- Default: 1   ! NREP  =  1  !
       (1 = every hour processed,
        2 = every 2nd hour processed,
        5 = every 5th hour processed, etc.)

 Concentration and scaling factors
 ---------------------------------

       Layer/deposition code (ILAYER)   -- Default: 1   ! ILAYER =  1  !
         '1'  for CALPUFF concentrations,
         '-1' for dry deposition fluxes,
         '-2' for wet deposition fluxes.

       Scaling factors of the form:     -- Defaults:    ! A =  0.0    !
            X(new) = X(old) * A + B                     ! B =  0.0    !
         (NOT applied if A = B = 0.0)       A = 0.0
                                            B = 0.0

       Add Hourly Background Concentrations?
                              (LBACK)  -- Default: F   ! LBACK =  F !

 Receptor information
 --------------------

   Gridded receptors processed?    (LG) -- Default: F   ! LG  = F  !
   Discrete receptors processed?   (LD) -- Default: F   ! LD  = T  !
   CTSG Complex terrain receptors processed?
                                  (LCT) -- Default: F   ! LCT = F  !

 --Select range of DISCRETE receptors (only used when LD = T):

   Select ALL DISCRETE receptors by setting NDRECP flag to -1;
                             OR
   Select SPECIFIC DISCRETE receptors by entering a flag (0,1) for each
      0 = discrete receptor not processed
      1 = discrete receptor processed
   using repeated value notation to select blocks of receptors:
      23*1, 15*0, 12*1
   Flag for all receptors after the last one assigned is set to 0
   (NDRECP) -- Default: -1
                                              ! NDRECP =  -1  !

 --Select range of GRIDDED receptors (only used when LG = T):

                                                                  Page: 1
```

```
      X index of LL corner (IBGRID) -- Default: -1     ! IBGRID = -1  !
         (-1 OR 1 <= IBGRID <= NX)

      Y index of LL corner (JBGRID) -- Default: -1     ! JBGRID = -1  !
         (-1 OR 1 <= JBGRID <= NY)

      X index of UR corner (IEGRID) -- Default: -1     ! IEGRID = -1  !
         (-1 OR 1 <= IEGRID <= NX)

      Y index of UR corner (JEGRID) -- Default: -1     ! JEGRID = -1  !
         (-1 OR 1 <= JEGRID <= NY)

  Note: Entire grid is processed if IBGRID=JBGRID=IEGRID=JEGRID=-1

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Visibility Parameters (ASPEC = VISIB)
--------------

    Maximum relative humidity (%) used in particle growth curve
                           (RHMAX) -- Default: 98   ! RHMAX  = 0.0 !

    Modeled species to be included in computing the light extinction
     Include SULFATE?          (LVSO4) -- Default: T   ! LVSO4  = T  !
     Include NITRATE?          (LVNO3) -- Default: T   ! LVNO3  = T  !
     Include ORGANIC CARBON?   (LVOC)  -- Default: T   ! LVOC   = T  !
     Include COARSE PARTICLES? (LVPMC) -- Default: T   ! LVPMC  = T  !
     Include FINE PARTICLES?   (LVPMF) -- Default: T   ! LVPMF  = T  !

    And, when ranking for TOP-N, TOP-50, and Exceedance tables,
     Include BACKGROUND?       (LVBK)  -- Default: T   ! LVBK   = T  !

    Species name used for particulates in MODEL.DAT file
                  COARSE    (SPECPMC) -- Default: PMC ! SPECPMC = PMC !
                  FINE      (SPECPMF) -- Default: PMF ! SPECPMF = PMF !

Extinction Efficiency (1/Mm per ug/m**3)
---------------------------------------
    MODELED particulate species:
              PM  COARSE      (EEPMC) -- Default: 0.6 ! EEPMC  = 0.6 !
              PM  FINE        (EEPMF) -- Default: 1.0 ! EEPMF  = 1.0 !
    BACKGROUND particulate species:
              PM  COARSE    (EEPMCBK) -- Default: 0.6 ! EEPMCBK = 0.6 !
    Other species:
             AMMONIUM SULFATE (EESO4) -- Default: 3.0 ! EESO4  = 3.0 !
             AMMONIUM NITRATE (EENO3) -- Default: 3.0 ! EENO3  = 3.0 !
             ORGANIC CARBON   (EEOC)  -- Default: 4.0 ! EEOC   = 4.0 !
             SOIL             (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !
             ELEMENTAL CARBON (EEEC)  -- Default: 10. ! EEEC   = 10.0 !

Background Extinction Computation
---------------------------------

    Method used for background light extinction
                           (MVISBK) -- Default: 2   ! MVISBK =  2  !

        1 =  Supply single light extinction and hygroscopic fraction
             - IWAQM (1993) RH adjustment applied to hygroscopic background
               and modeled sulfate and nitrate
        2 =  Compute extinction from speciated PM measurements (A)
             - PATH RH adjustment applied to observed and modeled sulfate
               and nitrate
             - RH factor is capped at RHMAX
        3 =  Compute extinction from speciated PM measurements (B)
             - PATH RH adjustment applied to observed and modeled sulfate
               and nitrate
             - Receptor-hour excluded if RH>RHMAX
             - Receptor-day excluded if fewer than 6 valid receptor-hours
        4 =  Read hourly transmissometer background extinction measurements
             - PATH RH adjustment applied to modeled sulfate and nitrate
             - Hour excluded if measurement invalid (missing, interference,
               or large RH)
             - Receptor-hour excluded if RH>RHMAX
             - Receptor-day excluded if fewer than 6 valid receptor-hours
        5 =  Read hourly nephelometer background extinction measurements
             - Rayleigh extinction value (BEXTRAY) added to measurement
```

```
            - PATH RH adjustment applied to modeled sulfate and nitrate
            - Hour excluded if measurement invalid (missing, interference,
              or large RH)
            - Receptor-hour excluded if RH>RHMAX
            - Receptor-day excluded if fewer than 6 valid receptor-hours

   Additional inputs used for MVISBK = 1:
   --------------------------------------
    Background light extinction (1/Mm)
                           (BEXTBK) -- No default   ! BEXTBK = 0.0 !
    Percentage of particles affected by relative humidity
                           (RHFRAC) -- No default   ! RHFRAC = 0.0 !

   Additional inputs used for MVISBK = 2,3:
   ----------------------------------------
    Background extinction coefficients are computed from monthly
    CONCENTRATIONS of ammonium sulfate (BKSO4), ammonium nitrate (BKNO3),
    coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), and
    elemental carbon (BKEC).  Month 1 is January.
    (ug/m**3)

    (BKSO4)  -- No default     ! BKSO4 = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKNO3)  -- No default     ! BKNO3 = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKPMC)  -- No default     ! BKPMC = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKOC)   -- No default     ! BKOC  = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKSOIL) -- No default     ! BKSOIL= 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !
    (BKEC)   -- No default     ! BKEC  = 0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0,
                                         0.0, 0.0, 0.0, 0.0 !

   Additional inputs used for MVISBK = 2,3,5:
   ------------------------------------------
    Extinction due to Rayleigh scattering is added (1/Mm)
                           (BEXTRAY) -- Default: 10.0 ! BEXTRAY = 0.0 !

!END!
-------------------------------------------------------------------------------

INPUT GROUP: 3 -- Processing options
-------------

Averaging time and TOP 50 Table control
---------------------------------------
   User-specified averaging time
                              (NAVG) -- Default: 0   !   NAVG =  0  !
   Top 50 table for  1-hr averages
                             (L1T50) -- Default: T   !  L1T50 = F  !
   Top 50 table for  3-hr averages
                             (L3T50) -- Default: T   !  L3T50 = F  !
   Top 50 table for 24-hr averages
                            (L24T50) -- Default: T   ! L24T50 = T  !
   Top 50 table for NAVG-hr averages
                             (LNT50) -- Default: F   !  LNT50 = F  !
   Top 50 table for length of run averages
                             (LRT50) -- Default: T   !  LRT50 = F  !

TOP 'n' Table control
---------------------

   Number of 'Top' values at each receptor
                              (NTOP) -- Default: 4   ! NTOP =  2   !
            (NTOP must be <= 4)

   Specific ranks of 'Top' values reported (NTOP values must be entered)
                    (ITOP(4) array) -- Default:     ! ITOP =  1 , 2   !
                                       1,2,3,4
```

```
    Top 'n' table for  1-hr averages
                            (L1TOPN) -- Default: F   ! L1TOPN = F  !
    Top 'n' table for  3-hr averages
                            (L3TOPN) -- Default: F   ! L3TOPN = F  !
    Top 'n' table for 24-hr averages
                            (L24TOPN) -- Default: F  ! L24TOPN = T  !
    Top 'n' table for NAVG-hr averages
                            (LNTOPN) -- Default: F   ! LNTOPN = F  !
    Top 'n' table for length of run averages
                            (LRAVG) -- Default: F    !  LRAVG = T  !


Output Units
------------
    Units for All Output       (IPRTU) -- Default: 1   ! IPRTU =  3   !
                      for              for
                Concentration    Deposition
       1 =          g/m**3         g/m**2/s
       2 =         mg/m**3        mg/m**2/s
       3 =         ug/m**3        ug/m**2/s
       4 =         ng/m**3        ng/m**2/s
       5 =       Odour Units

    Visibility: extinction expressed in 1/Mega-meters (IPRTU is ignored)


Threshold Exceedance control
----------------------------          -- Default: -1.0

    Counts will be tabulated for each average that
    exceeds a specified non-negative threshold (output units).


    Threshold for  1-hr averages   (THRESH1)     !  THRESH1 = -1.0  !
    Threshold for  3-hr averages   (THRESH3)     !  THRESH3 = -1.0  !
    Threshold for 24-hr averages   (THRESH24)    ! THRESH24 = -1.0  !
    Threshold for NAVG-hr averages (THRESHN)     !  THRESHN = -1.0  !


lected Day (Echo) Output Control
--------------------------------      -- Default: F
    Output 1-hr averages for selected days (LECH1)     ! LECH1   = F !
    Output 3-hr averages for selected days (LECH3)     ! LECH3   = F !
    Output 24-hr averages for selected days (LECH24)   ! LECH24  = F !
    Output NAVG-hr averages for selected days (LECHN)  ! LECHN   = F !
    Output selected information for debugging (LDEBUG) ! LDEBUG  = F !

    Days selected for output IECHO(366)-- Default: 366*0
! IECHO  = 366*0  !
     (366 values must be entered)

Plot Output Options
-------------------

      Plot files can be created for selected Top-n, Exceedance and Echo
      tables selected above.  Two formats for these files are available,
      DATA and GRID.  In the DATA format, results at all receptors are
      listed along with the receptor location [x,y,val1,val2,...].
      In the GRID format, results at only gridded receptors are written,
      using a compact representation.  The gridded values are written in
      rows (x varies), starting with the most southern row of the grid.
      The GRID format is given the .GRD extension, and includes headers
      compatible with the SURFER(R) plotting software.

      A plotting and analysis file is also created for the daily peak
      visibility summary output, in DATA format only.

      Generate Plot-File Output   (LPLT) -- Default: F   ! LPLT  = F !

      Write Top-n files in GRID format?
                              (LTGRD) -- Default: F   ! LTGRD = F !

      Write Exceedance files in GRID format?
                              (LXGRD) -- Default: F   ! LXGRD = F !
      Write Echo files in GRID format?
                              (LEGRD) -- Default: F   ! LEGRD = F !
```

```
 !END!

  CALPOST Control File Input Summary ------------------------

     Replace run data with data in Puff file 1=Y:    0
                     Run starting date -- year:   90
                                        month:    8
                                          day:   16
                                    Julian day:  228
                           hour ending(0-23):     0
                         Run length (hours):      24
                                      Species: PM10

 Every hour of data processed -- NREP = 1


  Concentration & scaling factors
                        Layer of processed data:    1
       (>0 = concentrations, -1 = dry fluxes, -2 = wet fluxes)
                  Multiplicative scaling factor: 0.0000E+00
                        Additive scaling factor: 0.0000E+00
          Hourly background concentrations used?: F


  Receptor information
                    Gridded receptors processed?: F
                   Discrete receptors processed?: T
       CTSG Complex terrain receptors processed?: F

  Discrete Receptors Processed

  (All Discrete Receptors are Used)


  Visibility Processing is NOT Selected


  Averaging time & TOP 50 table control
      User-specified averaging time (NAVG hours):     0
                 Top 50 table for  1-hr averages:     F
                 Top 50 table for  3-hr averages:     F
                 Top 50 table for 24-hr averages:     T
               Top 50 table for NAVG-hr averages:     F
          Top 50 table for length of run averages:     F


  Top "n" table control
         Number of "top" values at each receptor:     2
         Specific ranks of "top" values reported:   1   2

                Top "n" table for  1-hr averages: F
                Top "n" table for  3-hr averages: F
                Top "n" table for 24-hr averages: T
              Top "n" table for NAVG-hr averages: F
         Top "n" table for length of run averages: T


  Units requested for output:   (ug/m**3)


  Threshold Exceedance control
       Exceedances of a specified value will be counted for --


  Output options
                             Plot files created: F
       Output    1-hr averages for selected days: F
       Output    3-hr averages for selected days: F
       Output   24-hr averages for selected days: F
       Output NAVG-hr averages for selected days: F
       Output selected information for debugging: F


  Days selected for output tables
     0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000
     0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000  0000000000
```

0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 0000000000
0000000000 0000000000 0000000000 0000000000 0000000000 0000000000 000000

IDENTIFICATION OF PROCESSED MODEL FILE ----------

CALPUFF 5.0 990228

REFINED SIGNIFICANT IMPACT ANALYSIS, CALPUFF, CALPINE OSPREY 3/9/00
RECEPTORS AT CHASSAHOWITZKA NWA, PROJECT ONLY
FDEP CHASSAHOWITZKA CALMET DOMAIN WITH PRECIPITATION

Chemical species names for each layer in model:

SO2	1
SO4	1
NOX	1
HNO3	1
NO3	1
PM10	1

********** NOTICE **********
NDRECP array reset to full range: all 1s

INPUT FILES

Default Name	Unit No.	File Name and Path
CALPOST.INP	5	calpost.inp
MODEL.DAT	4	calpuff.con

OUTPUT FILES

Default Name	Unit No.	File Name and Path
CALPOST.LST	7	calpost.lst

********** CALPOST Version 5.0 Level 990228 **********

24-HOUR AVERAGE CONCENTRATION AT EACH RECEPTOR FOR THE PERIOD ENDING YEAR: 90 DAY: 228 HOUR(0-23):

DISCRETE RECEPTORS: PM10 1

RECEPTOR	COORDINATES (km)		CONCENTRATION	RECEPTOR	COORDINATES (km)		CONCENTRATION
1	340.300	3165.700	3.3152E-02	7	343.700	3178.300	3.3782E-02
2	340.300	3167.700	3.3554E-02	8	342.400	3180.600	3.3100E-02
3	340.300	3169.800	3.4197E-02	9	341.100	3183.400	3.1749E-02
4	340.700	3171.900	3.4305E-02	10	339.000	3183.400	3.1267E-02
5	342.000	3174.000	3.4377E-02	11	336.500	3183.400	3.0546E-02
6	343.000	3176.200	3.4186E-02	12	334.000	3183.400	2.9659E-02
				13	331.500	3183.400	2.8667E-02

********** CALPOST Version 5.0 Level 990228 **********

PM10 1

TOP-50 24-HOUR AVERAGE CONCENTRATION VALUES (ug/m**3)

YEAR	DAY	HOUR(0-23)	RECEPTOR	TYPE	CONCENTRATION	COORDINATES (km)

90	228	23	(0,	5)	D	3.4377E-02	342.000	3174.000
90	228	23	(0,	4)	D	3.4305E-02	340.700	3171.900
90	228	23	(0,	3)	D	3.4197E-02	340.300	3169.800
90	228	23	(0,	6)	D	3.4186E-02	343.000	3176.200
90	228	23	(0,	7)	D	3.3782E-02	343.700	3178.300
90	228	23	(0,	2)	D	3.3554E-02	340.300	3167.700
90	228	23	(0,	1)	D	3.3152E-02	340.300	3165.700
90	228	23	(0,	8)	D	3.3100E-02	342.400	3180.600
90	228	23	(0,	9)	D	3.1749E-02	341.100	3183.400
90	228	23	(0,	10)	D	3.1267E-02	339.000	3183.400
90	228	23	(0,	11)	D	3.0546E-02	336.500	3183.400
90	228	23	(0,	12)	D	2.9659E-02	334.000	3183.400
90	228	23	(0,	13)	D	2.8667E-02	331.500	3183.400
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000
0	0	0	(0,	0)		0.0000E+00	0.000	0.000

****

CALPOST Version 5.0 Level 990228

****

PM10 1

2 RANKED 24-HOUR AVERAGE CONCENTRATION VALUES AT EACH DISCRETE RECEPTOR (YEAR,DAY,ENDING HOUR) (ug/m**3)

RECEPTOR	COORDINATES (km)		1 RANK	2 RANK
1	340.300	3165.700	3.3152E-02 (90,228,23)	0.0000E+00 (0, 0, 0)
2	340.300	3167.700	3.3554E-02 (90,228,23)	0.0000E+00 (0, 0, 0)
3	340.300	3169.800	3.4197E-02 (90,228,23)	0.0000E+00 (0, 0, 0)
4	340.700	3171.900	3.4305E-02 (90,228,23)	0.0000E+00 (0, 0, 0)
5	342.000	3174.000	3.4377E-02 (90,228,23)	0.0000E+00 (0, 0, 0)
6	343.000	3176.200	3.4186E-02 (90,228,23)	0.0000E+00 (0, 0, 0)
7	343.700	3178.300	3.3782E-02 (90,228,23)	0.0000E+00 (0, 0, 0)
8	342.400	3180.600	3.3100E-02 (90,228,23)	0.0000E+00 (0, 0, 0)
9	341.100	3183.400	3.1749E-02 (90,228,23)	0.0000E+00 (0, 0, 0)
10	339.000	3183.400	3.1267E-02 (90,228,23)	0.0000E+00 (0, 0, 0)
11	336.500	3183.400	3.0546E-02 (90,228,23)	0.0000E+00 (0, 0, 0)
12	334.000	3183.400	2.9659E-02 (90,228,23)	0.0000E+00 (0, 0, 0)
13	331.500	3183.400	2.8667E-02 (90,228,23)	0.0000E+00 (0, 0, 0)

****

SUMMARY SECTION

PM10 1

(ug/m**3)

RECEPTOR	COORDINATES (km)		TYPE	PEAK (YEAR,DAY,ENDING HOUR)	FOR RANK	FOR AVERAGE PERIOD
5	342.000	3174.000	DISCRETE	3.4377E-02 (90,228,23)	RANK 1	24-HOUR
0	0.000	0.000	DISCRETE	0.0000E+00 (0, 0, 0)	RANK 2	24-HOUR
5	342.000	3174.000	DISCRETE	3.4377E-02	RANK 1	24-HOUR

10.1.6 Coastal Zone Management Certifications

The Osprey Energy Center is located in Polk County. Because Polk County is an interior county and the applicant is neither a federal agency nor seeking federal funding, the Project is not currently subject to review by Florida for consistency with the Florida Coastal Management Program (FCMP).

10.1.7 State Environmental Resource Permit

OSPREY ENERGY CENTER

ENVIRONMENTAL RESOURCE PERMIT STORMWATER MANAGEMENT SYSTEM

Poor Original

FORM#: 62-343.900(1)
FORM TITLE: JOINT ENVIRONMENTAL RESOURCE PERMIT APPLICATION
DATE: October 3, 1995

SECTION A

FOR AGENCY USE ONLY	
ACOE Application #	DEP/WMD Application #
Date Application Received	Date Application Received
Proposed Project Lat.	Fee Received $
Proposed Project Long.	Fee Receipt #

PART 1:
Are any of the activities described in this application proposed to occur in, on, or over wetlands or other surface waters?
☐ yes ☑ no

Is this application being filed by or on behalf of a government entity or drainage district? ☐ yes ☑ no

PART 2:

A. Type of Environmental Resource Permit Requested (check at least one). See Attachment 2 for thresholds and descriptions.

- ☐ Noticed General – include information requested in Section B.
- ☐ Standard General (Single Family Dwelling) – include information requested in Sections C and D.
- ☑ Standard General (all other Standard General projects) – include information requested in Sections C and E.
- ☐ Individual (Single Family Dwelling) – include information requested in Sections C and D.
- ☐ Individual (all other Individual projects) – include information requested in Sections C and E.
- ☐ Conceptual – include information requested in Sections C and E.
- ☐ Mitigation Bank Permit (construction) – include information requested in Sections C and F. (If the proposed mitigation bank involves the construction of a surface water management system requiring another permit defined above, check the appropriate box and submit the information requested by the applicable section.)
- ☐ Mitigation Bank (conceptual) – include information requested in Sections C and F.

B. Type of activity for which you are applying (check at least one)

- ☑ Construction or operation of a new system, other than a solid waste facility, including dredging or filling in, on or over wetlands and other surface waters.
- ☐ Construction, expansion or modification of a solid waste facility.
- ☐ Alteration or operation of an existing system which was not previously permitted by a WMD or DEP
- ☐ Modification of a system previously permitted by a WMD or DEP. Provide previous permit numbers:_____
  - ☐ Alteration of a system ☐ Extension of permit duration ☐ Abandonment of a system
  - ☐ Construction of additional phases of a system ☐ Removal of a system

C. Are you requesting authorization to use Sovereign Submerged Lands? ☐ yes ☑ no
(See Section G and Attachment 5 for more information before answering this question.)

D. For activities in, on, or over wetlands or other surface waters, check type of federal dredge and fill permit requested:

☐ Individual ☐ Programmatic General ☐ General
☐ Nationwide ☑ Not Applicable

E. Are you claiming to qualify for an exemption?

☐ yes ☑ no
If yes, provide rule number if known._____

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FORM TITLE: JOINT ENVIRONMENTAL RESOURCE PERMIT APPLICATION
DATE: October 3, 1995

PART 3: A. OWNER(S) OF LAND	B. ENTITY TO RECEIVE PERMIT (IF OTHER THAN OWNER)
Name Mr. Paul Barnett	Name
Title and Company Director Calpine Construction Finance Company, L.P.	Title and Company
Address 50 West San Fernando Street	Address
City, State, Zip San Jose, CA 95113	City, State, Zip
Telephone and Fax Tel: (617) 723-7200 Fax (617) 723-7635	Telephone and Fax
C. AGENT AUTHORIZED TO SECURE PERMIT	**D. CONSULTANT (IF DIFFERENT FROM AGENT)**
Name Alex Ghafari	Name
Title and Company Golder Associates Inc.	Title and Company
Address 5405 West Cypress Street Suite 215	Address
City, State, Zip Tampa, Florida 33607	City, State, Zip
Telephone and Fax Tel: (813) 287-1717 Fax: (813) 287 1716	Telephone and Fax

PART 4: (Please provide metric equivalent for federally funded projects):

A. Name of Project, including phase if applicable:
Osprey Energy Center

B. Is this application for part of a multi-phase project?
☐ yes ☑ no

C. Total applicant-owned area contiguous to the project?
19.5 acres; _____ ha.

D. Total area served by the system: 19.5 acres.; _____ ha.

E. Impervious area for which a permit is sought: 5.06 ± acres; _____ ha.

F. Volume of water that the system is capable of impounding:
Approximately 1.2 ± ac. ft.; _____ m^3

G. What is the total area of work in, on, or over wetlands or other surface waters?
0 acres; _____ ha. _____ sq. ft.; _____ sq. m.

H. Total volume of material to be dredged: 0 yd; _____ m

I. Number of new boat slips proposed: NA wet slips; _____ dry slips

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PART 5:

Project location (use additional sheets if needed):
County(ies): Polk

Section(s) 15	Township 28 S	Range 25 E
Section(s)	Township	Range
Section(s)	Township	Range

Land Grant name, if applicable:

Tax Parcel Identification Number: (Legal description is provided in the survey plan)

Street Address Road or other location: Not established

City, Zip Code, if applicable: Auburndale, Florida

PART 6: Describe in general terms the proposed project, system, or activity.

The Project is a new power plant facility to be constructed in Polk County, Florida. The Project Site is an undeveloped land totaling an area of 19.5 acres. No wetland or surface water bodies are present.

The site development involves the construction and operation of a storm water management system to reduce the impact to storm water quality and quantity from site development. The storm water management system consists of two dry detention ponds that detain the storm water runoff of a 25-year, 24-hour storm event and discharges through control structures into adjacent swales at a pre-development discharge rate that complies with the ERP requirements and the FDOT drainage connection permit.

The storm water management plan presented with this application will satisfy the water quality and quantity requirements established outlined by the Florida Department of Environmental Protection (FDEP), South West Florida Water Management District (SWFWMD), and FDOT.

FORM#: 62-343.900(1)
FORM TITLE: JOINT ENVIRONMENTAL RESOURCE PERMIT APPLICATION
DATE: October 3, 1995

PART 7:

A. If there have been any pre-application meetings, including on-site meetings, with regulatory staff, please list the date(s), location(s), and names of key staff and project representatives.

A pre-application meeting was held at FDEP district office in Tampa on February 22, 2000. The representatives attended the meeting were:

Mr. Randy Cooper – FDEP
Mr. Keith Laakkonen – FDEP
Mr. Alex Ghafari – Golder Associates

B. Please identify by number any MSSW/Wetland Resource/ERP/ACOE Permits pending, issued or denied for projects at the location, and any related enforcement actions.

Agency	Date	No./Type of Application	Action Taken
NA	____	____	____
____	____	____	____
____	____	____	____

C. Note: The following information is required for projects proposed to occur in, on or over wetlands that need a federal dredge and fill permit or an authorization to use state owned submerged lands. Please provide the names, addresses and zip codes of property owners whose property directly adjoins the project (excluding application) and/or (for proprietary authorizations) is located within a 500 ft. radius of the applicant's land. Please attach a plan view showing the owner's names and adjoining property lines. Attach additional sheets if necessary.

Please see Attachment A

1. 2.

3. 4.

5. 6.

7. 8.

FORM#: 62-343.900(1)
FORM TITLE: JOINT ENVIRONMENTAL RESOURCE PERMIT APPLICATION
DATE: October 3, 1995

PART 8:

A. By signing this application form, I am applying, or I am applying on behalf of the applicant, for the permit and any proprietary authorizations identified above, according to the supporting data and other incidental information field with this application. I am familiar with the information contained in this application and represent that such information is true, complete and accurate. I understand this is an application and not a permit, and that work prior to approval is a violation. I understand that this application and any permit issued or proprietary authorization issued pursuant thereto, does not relieve me of any obligation for obtaining any other required federal, state, water management district or local permit prior to commencement of construction. I agree, or I agree on behalf of the applicant, to operate and maintain the permitted system unless the permitting agency authorizes transfer of the permit to a responsible operation entity. I understand that knowingly making any false statement or representation in this application is a violation of Section 373.430, F.S. and 18 U.S.C. Section 1001.

Richard A. Zwolak, AICP - Golder Associates Inc
Typed/Printed Name of Applicant (if no Agent is used) or Agent (if one is so authorized below)

Signature of Applicant/Agent _____ Date _____

Director of Environmental Planning
(Corporate Title if applicable)

AN AGENT MAY SIGN ABOVE ONLY IF THE APPLICANT COMPLETES THE FOLLOWING:

B. I hereby designate and authorize the agent listed above to act on my behalf, or on behalf of my corporation, as the agent in the processing of this application for the permit and/or proprietary authorization indicated above; and to furnish, on request, supplemental information in support of the application. In addition, I authorize the above-listed agent to bind me, or my corporation, to perform any requirements which may be necessary to procure the permit or authorization indicated above. I understand that knowingly making any false statement or representation in this application is a violation of Section 373.430, F.S. and 18 U.S.C. Section 1001.

Paul Barnett
Typed/Printed Name of Applicant Signature of Applicant Date

Director
(Corporate Title if applicable)

Please note: The applicant's original signature (not a copy) is required above.

PERSON AUTHORIZING ACCESS TO THE PROPERTY MUST COMPLETE THE FOLLOWING:

A. I either own the property described in this application or I have legal authority to allow access to the property, and I consent, after receiving prior notification, to any site visit on the property by agents or personnel from the Department of Environmental Protection, the Water Management District and the U.S. Army Corps of Engineers necessary for the review and inspection of the proposed project specified in this application. I authorize these agents or personnel to enter the property as many times as may be necessary to make such review and inspection. Further, I agree to provide entry to the project site for such agents or personnel to monitor permitted work if a permit is granted.

Paul Barnett
Typed/Printed Name of Applicant Signature of Applicant Date

Director
(Corporate Title if applicable)

FORM#: 62-343.900(1)
FORM TITLE: JOINT ENVIRONMENTAL RESOURCE PERMIT APPLICATION
DATE: October 3, 1995

SECTION C
Environmental Resource Permit Notice of Receipt of Application

Note: this form does not need to be submitted for noticed general permits.

This information is required in addition to that required in other sections of the application. Please submit five copies of this notice of receipt of application and all attachments with the other required information. Please submit all information on 8 1/2" x 11" paper.

Project Name:	Osprey Energy Center
County:	Polk
Owner:	Calpine Construction Finance Company, L.P.
Applicant:	Golder Associates Inc. (Authorized Agent)
Applicant's Address:	5405 West Cypress Street, Suite 215 Tampa, FL 33607

1. **Indicate the project boundaries on a USGS quadrangle map. Attach a location map showing the boundary of the proposed activity. The map should also contain a north arrow and a graphic scale; show Section(s), Township(s), and Range(s); and must be of sufficient detail to allow a person unfamiliar with the site to find it.**

   A USGS quadrangle map with project boundary delineation is presented as Figure 2.2 in the SWMP.

2. **Provide the names of all wetlands, or other surface waters that would be dredged, filled, impounded, diverted, drained, or would receive discharge (either directly or indirectly), or would otherwise be impacted by the proposed activity, and specify if they are in an Outstanding Florida Water or Aquatic Preserve:**

   No wetland areas nor Outstanding Florida Water or Aquatic Preserve have been identified at the site or would be impacted by the Project development.

3. **Attach a depiction (plan and section views), which clearly shows the works or other facilities proposed to be constructed. Use multiple sheets, if necessary. Use a scale sufficient to show the location and type of works.**

   A drainage and site plan layout and a section view for the proposed plant are presented in Sheet DP-1 and DP-2 respectively.

4. **Briefly describe the proposed project (such as "construct dock with boat shelter", "replace two existing culverts", "construct surface water management system to serve 150 acre residential development"):**

   The project is a new 527-MW combined-cycle power plant identified as the Osprey Energy Center (OEC). The Project will be located on vacant land in Polk County. The proposed project involves designing and constructing a storm water management system to treat and contain excess storm water generated due to development of the property. The Project Site is 19.5 acres that will be developed as a combined cycle, natural gas fired, power plant.

5. **Specify the acreage of wetlands or other surface waters, if any, that are proposed to be filled, excavated, or otherwise disturbed or impacted by the proposed activity:**
   filled 0 **ac.; excavated** 0 **ac.; other impacts** _____ **ac.**

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6. **Provide a brief statement describing any proposed mitigation for impacts to wetlands and other surface waters (attach additional sheets if necessary):**

No wetland will be impacted by the project development.

FOR AGENCY USE ONLY

Application Name: _____

Application Number: _____

Office where the application can be inspected:

_____

_____

Note to Notice recipient: The information in this notice has been submitted by the applicant, and has not been verified by the agency. It may be incorrect, incomplete or may be subject to change.

SECTION E

INFORMATION REQUESTED FOR STANDARD GENERAL, INDIVIDUAL, AND CONCEPTUAL ENVIRONMENTAL RESOURCE PERMIT APPLICATIONS NOT RELATED TO A SINGLE FAMILY DWELLING UNIT

Please provide the information requested below if the proposed project requires either a standard general, individual, or conceptual approval environmental resource permit and is not related to an individual, single family dwelling unit, duplex or quadraplex. The information listed below represents the level of information that is usually required for a specific project will vary depending on the nature and location of the site and the activity proposed. Conceptual approvals generally do not require the same level of detail as a construction permit. However, providing a greater level of detail will reduce the need to submit additional information at a later date. If an item does not apply to your project, proceed to the next item. Please submit all information that is required by the Department on either 8-½ in. x 11-in. paper or 11-in. x 17-in. paper. Larger drawings may be submitted to supplement but not replace these smaller drawings.

I. SITE INFORMATION

A. Provide a map(s) of the project area and vicinity delineating USDA/SCS soil types.

A portion of the USDA Soil Survey of Polk County, Florida, showing the project area and vicinity is provided as Figure 2.4 in the Storm Water Management Plan (SWMP). A description of soil type and characteristics are also included in this figure.

B. Provide recent aerials, legible for photo interpretation with a scale of 1" = 400 ft, or more detailed, with project boundaries delineated on the aerial.

An aerial photographic map of the site and the surrounding area at a scale 1" = 200' is provided as Figure E.1 (Attachment E-1). The site boundaries are delineated on the map.

C. Identify the seasonal high water or mean high tide elevation and normal pool or mean low tide elevation for each on site wetland or surface water, including receiving waters into which runoff will be discharged. Include dates, datum, and methods used to determine these elevations.

No wetland areas or water bodies exist at the Project Site.

D. Identify the wet season high water tables at the locations representative of the entire project site. Include dates, datum, and methods used to determine these elevations.

The soil map of the site vicinity indicates that the site is approximately 80-percent Tavares soil and the remaining 20-percent is Adamsville soil type located in the northern portion of the Site. Soil map and characteristics are presented in Figure 2.4. According to the USDA Soil Survey of Polk County, the Seasonal High Water Table (SHWT) for Tavares soil occurs at approximately 3.5 to 6.0 feet below land surface (bls) and at 2.0 to 3.5 feet bls for Adamsville.

Multiple piezometers and borings were installed at the site in order to investigate soil profile and characteristics. The water table was observed to be approximately 14 to 15 feet bls and therefore the Seasonal High Water Table at this location is in the range of 8 to 10 feet bls. For the purpose of this analysis, conservative numbers were used. The existing average ground elevation is 142.5 at the south portion (Detention Pond #1) location and 145 feet at the north side (Detention Pond #2) location. A conservative SHWT is assumed to be at elevation 136.0 feet (6.5 feet bls) at Pond #1 and 143.0 feet (2.0 feet bls) at Pond #2.

II. ENVIRONMENTAL CONSIDERATIONS

A. Provide results of any wildlife surveys that have been conducted on the site, and provide any comments pertaining to the project from the Florida Game and Fresh Water Fish Commission and the U.S. Fish and Wildlife Service.

Important faunal species, for the purpose of a Site Certification Application, are those animal species listed as endangered, threatened, or of special concern by the USFWS, or the Florida Fish and Wildlife Conservation Commission (previously known as the Florida Game and Freshwater Fish Commission (FGFWFC). No listed animal species were observed on the proposed Osprey Energy Center Site during the field survey conducted in October, 1999. Prior to this survey, literature and agency surveys were undertaken to determine the species that could potentially be present in the habitats found on the Project Site or within five miles. No important animal species were observed on the Site, nor are any expected to occur due to the disturbed nature of the Site and low ecological value.

B. Provide a description of how water quantity, quality, hydroperiod, and habitat will be maintained in on-site wetlands and other surface waters that will be preserved or will remain undisturbed.

No wetlands or surface water bodies exist at the Site.

C. Provide a narrative description of any proposed mitigation plans, including purpose, maintenance, monitoring, and construction sequence and techniques, and estimated costs.

Not applicable. No impact is anticipated.

D. Describe how boundaries of wetlands or other surface waters were determined. If there has ever been a jurisdictional declaratory statement, a formal wetland determination, a formal determination, a validated informal determination, or a revalidated jurisdictional determination, provide the identifying number.

Not applicable. No wetlands exist at the Project Site.

E. Impact Summary Tables:

1. For all projects, complete Tables 1, 2 and 3 as applicable.

Not applicable.

2. **For docking facilities or other structures constructed over wetlands or other surface waters, provide the information requested in Table 4.**

Not applicable.

3. **For shoreline stabilization projects, provide the information requested in Table 5.**

Not applicable.

III. PLANS

Provide clear, detailed plans for the system including specifications, plan (overhead) views, cross sections (with the locations of the cross sections shown on the corresponding plan view), and profile (longitudinal) views of the proposed project. The plans must be signed and sealed by an appropriate registered professional as required by law. Plans must include a scale and a north arrow. These plans should show the following:

A. **Project area boundary and total land area, including distances and orientation from roads or other land marks;**

The project area boundary and orientation relative to existing road is presented in the drainage plan Figure DP-1. The project land consists of one parcel totaling 19.5 acres. This figure is based on a survey map that depicts adjacent road, benchmarks, and existing conditions and features.

B. **Existing land use and land cover (acreage and percentages), and on-site natural communities, including wetlands and other surface waters, aquatic communities, and uplands. Use the Florida Land Use Cover & Classification System (FLUCCS)(Level 3) for projects proposed in the South Florida Water Management District, the St. Johns River Water Management District, and the Suwannee River Water Management District and use the National Wetlands Inventory (NWI) for projects proposed in the Southwest Florida Water Management District. Also identify each community with a unique identification number which must be consistent in all exhibits.**

The existing land use and land cover and on-site natural communities, including wetlands and other surface waters, have been identified using the FLUCCS Level 3 are presented as follows:

AREA DESIGNATION	FLUCCS	Area (acres)	Area (%)
Undeveloped Land within Urban Areas	191	4.2	21.6%
Non-producing Citrus Grove	224	15.26	78.4%
TOTAL		19.5	100%

Poor Original

C. The existing topography extending at least 100 feet off the project area, and including adjacent wetlands and other surface waters. All topography shall include the location and a description of known benchmarks, referenced to NGVD. For systems waterward of the mean high water (MHW) or seasonal high water lines, show water depths, referenced to mean low water (MLW) in tidal areas or seasonal low water in non-tidal areas, and list the range between MHW and MLW. For docking facilities, indicate the distance to, location of, and depths of the nearest navigational channel and access routes to the channel.

A survey plan that depicts the project boundary, existing topography, and other features is provided in the survey plan as part of the engineering plans set. All elevations are referenced to USCS&G Datum 1929 benchmark and is considered very close to the NGVD datum.

D. If the project is in the known flood plain of a stream or other water course, identify the following: 1) the flood plain boundary and approximate flooding elevations; and 2) the 100-year flood elevation and floodplain boundary of any lake, stream or other watercourse located on or adjacent to the site;

The project site is not in the flood plain of a stream or watercourse. Based on the Flood Insurance Rate Map (FIRM), Panel Number 1202610345 B, for Polk County, the Site where development is in Flood Zone "C" outside the 100-year flood plain.

E. The boundaries of wetlands and other surface waters within the project area. Distinguish those wetlands and other surface waters that have been delineated by any binding jurisdictional determination;

Not applicable.

F. Proposed land use, land cover and natural communities (acreage and percentages), including wetlands and other surface waters, undisturbed uplands, aquatic communities, impervious surfaces, and water management areas. Use the same classification system and community identification number used in III (B) above.

The proposed land uses, land cover, and acreage are presented as follows:

AREA DESIGNATION	FLUCCS	Area (acres)	Area (%)
Electrical Power Facility (Gas Turbine)	8312	19.5	100%
TOTAL		19.5	100%

G. Proposed impacts to wetlands and other surface waters, and any proposed connections/outfalls to other surface waters or wetlands;

No wetland areas will be impacted as part of the proposed development. Discharge outfalls for the storm water detention ponds will be connected to the adjacent road swales as shown on the drainage plan (DP-1).

H. Proposed buffer zones;

Poor Original

Wetland buffer is not applicable. The limits of the proposed development are depicted on the plans and shows buffer zones from existing road, and property lines.

I. Pre- and post-development drainage patterns and basin boundaries showing the direction of flows, including any off-site runoff being routed through or around the system; and connections between wetlands and other surface waters;

The pre-development drainage patterns and basin boundaries are presented in Figure 2.1 of the SWMP. The Post-development condition is presented in the Drainage Plan (DP-1). A description of each condition is also described in details in the SWMP.

J. Location of all water management areas with details of size, side slopes, and designed water depths;

The water management areas and various details are presented in the drainage and details plans. Additional information pertained to engineering calculations are provided in the SWMP.

K. Location and details of all water control structures, control elevations, any seasonal water level regulation schedules; and the location and description of benchmarks (minimum of one benchmark per structure);

Refer to drainage plan and details shown in (Sheets DP-1, and DP-2).

L. Location, dimensions and elevations of all proposed structures, including docks, seawalls, utility lines, roads, and buildings;

The location of proposed structures which include buildings, turbines, tanks, and facility accessories are shown on the layout plan (Sheet SP-1). Finish Floor Elevation (FFE) for buildings, turbine engines, tanks and accessories will be built above the 100-year elevation. Proposed FFEs are shown in the Drainage Plan (DP-1).

M. Location, size, and design capacity of the internal water management facilities;

The water management facility components are shown on the drainage plans and details (Sheets DP-1 and DP-2). The sizes of various hydraulic components are shown on the drainage plans and design capacity calculations are included in Storm Water Management Plan.

Storm water management controls are designed to comply with applicable federal, state, and local regulation. Storm water calculations were performed using the Soil Conservation Service (SCS) methods. Peak discharges and runoff volumes were determined using methods approved by the SWFWMD and FDOT.

Onsite drainage will be accomplished through gravity flow. The general site grading will establish a working surface for construction and plant operation areas, provide positive drainage from buildings and structures, and provide adequate soil overage for underground utilities. The drainage system will consist of mild overland slopes, ditches, culverts, and detention ponds. The drainage ditches

and culverts are designed to carry the 25-year storm peak runoff flow without producing a headwater elevation above the bottom of the roadway base course.

N. Rights-of-way and easements for the system, including all on-site and off-site areas to be reserved for water management purposes, and rights-of-way and easements for the existing drainage system, if any;

Onsite easements are not required for the proposed water management system at the developed site. No existing drainage system exists at the site.

O. Receiving waters or surface water management systems into which runoff from the developed site will be discharged;

The runoff from the developed site will be discharged through a control structure into the adjacent road swales at a pre-development discharge rate. Additional information is provided in the SWMP.

P. Location and details of the erosion, sediment and turbidity control measures to be implemented during each phase of construction and all permanent control measures to be implemented in post-development conditions;

Temporary measures will be used during construction phase to control erosion and sediment transport from the site. These measures will be implemented in accordance with the Best Management Practices (BMP) and guidelines of the Surface Water Pollution Prevention Plan (SWPPP) prepared for the project. In general, silt fence and hay bales will be used to filter sediment washed from grading areas where the ground slopes away from the site. Silt fence will be installed also to protect existing wetlands and other surface water conveyance. The disturbed areas during construction and grading operations will be seeded with vegetation as permanent control measures upon completion of construction. Erosion and Sediment Control Plan and details are provided in Sheet EP-1 and EP-2 of the construction plans.

Q. Location, grading, design water levels, and planting details of all mitigation areas;

Information is provided in the SWMP and engineering plans.

R. Site grading details, including perimeter site grading;

The proposed grading elevations are provided in the Drainage Plan (Sheet DP-1). The proposed elevations are intended to be a general guidance for the layout of the site drainage and runoff flow pattern. More detailed plans will be prepared by the EPC contractor prior to construction. However the main concept and layout should remain the same.

S. Disposal site for any excavated material, including temporary and permanent disposal sites;

The excavated materials from the site that are suitable and meet the project specifications will be used as backfill material at the site. Construction debris and unsuitable excavated materials will be disposed of at local permitted landfill facilities in an approved manner and in conformance with applicable state and local regulations.

T. Dewatering plan details;

No dewatering is anticipated during project construction.

U. For marina facilities, locations of any sewage pumpout facilities, fueling facilities, boat repair and maintenance facilities, and fish cleaning stations;

Not applicable.

V. Location and description of any nearby existing offsite features which might be affected by the proposed construction or development such as stormwater management ponds, buildings or other structures, wetlands or other surface waters;

The proposed project was designed to prevent or minimize offsite impacts.

W. For phased projects, provide a master development plan.

No additional phases are planned for this project.

IV. CONSTRUCTION SCHEDULE AND TECHNIQUES

Provide a construction schedule, and a description of construction techniques, sequencing and equipment. This information should specifically include the following:

A. Method for installing any pilings or seawall slabs;

No piling installation is proposed on this project at this point pending review of the preliminary geotechnical evaluation for soil bearing capacity and settlement requirements. Seawall slabs or pilings in surface water is not applicable.

B. Schedule of implementation of temporary or permanent erosion and turbidity control measures;

Prior to beginning any construction or earth disturbing activities, the onsite areas, existing ditches and swales, and adjacent open lands will be protected by sediment containment and erosion controls. These shall include silt fences, hay bales, sediment basins, and grassing. The erosion controls will be installed at the beginning of the project and related environmental protection features will be maintained throughout the construction period. The sediment and control plan at the site will be implemented as recommended and outlined in the Surface Water Pollution Prevention Plan (SWPPP) for construction activities prepared for this project as required by the NPDES General Permit.

C. For projects that involve dredging or excavation in wetlands or other surface waters, describe the method of excavation, and the type of material to be excavated;

Not applicable. No wetlands or surface water bodies exist at the Site.

D. For projects that involve fill in wetlands or other surface waters, describe the source and type of fill material to be used. For shoreline stabilization projects that involve the installation of riprap, state how these materials are to be placed, (i.e., individually or with heavy equipment) and whether the rocks will be underlain with filter cloth;

Not applicable.

E. If dewatering is required, detail the dewatering proposal including the methods that are proposed to contain the discharge, methods of isolating dewatering areas, and indicate the period dewatering structures will be in place (Note: a consumptive use or water use permit may by required);

No dewatering is anticipated during project construction.

F. Methods for transporting equipment and materials to and from the work site. If barges are required for access, provide the low water depths and draft of the fully loaded barge;

The equipment and materials will be shipped to the vicinity via railroad and will be transported to the site by trucks and trailers that will reach the site via existing roadways.

G. Demolition plan for any existing structures to be removed; and

No buildings or structures exist at the site, and therefore, demolition is not required.

H. Identify the schedule and party responsible for completing monitoring, record drawings, and as-built certifications for the project when completed.

The final construction schedule for this project will be announced based on the project status at a later date. The preliminary schedule indicates a construction start date of April 2001 and a complete date of April 2003. The EPC contractor will be responsible for completing the record drawings and as-built certifications for the project when completed.

V. DRAINAGE INFORMATION

A. Provide pre-development and post-development drainage calculations, signed and sealed by an appropriate registered professional, as follows:

Drainage calculations and support documents are presented in the Stormwater Management Plan (SWMP) provided with the ERP permit application. The SWMP document and engineering plans are signed and sealed by a registered Professional Engineer.

1. Runoff characteristics, including area, runoff curve number or runoff coefficient, and time of concentration for each drainage basin;

Refer to the SWMP Sections 4.1 and 4.2.

2. Water table elevations (normal and seasonal high) including aerial extent and magnitude of any proposed water table draw down;

Refer to the SWMP Section 2.4.

3. Receiving water elevations (normal, wet season, design storm);

Refer to the SWMP Section 2.5.

4. Design storms used including rainfall depth, duration, frequency, and distribution;

Refer to the SWMP Sections 3.14 and 3.15.

5. Runoff hydrograph(s) for each drainage basin, for all required design storm event(s);

Refer to the SWMP Sections 4.1 and 4.2.

6. Stage-storage computations for any area such as a reservoir, close basin, detention area, or channel, used in storage routing;

Refer to the SWMP Sections 4.1 and 4.2 and related appendices.

7. Stage-discharge computations for any storage areas at a selected control point, such as control structure or natural restriction;

Refer to the SWMP Section 4.2.

8. Flood routings through on-site conveyance and storage areas;

Refer to the SWMP.

9. Water surface profiles in the primary drainage system for each required design storm event(s);

Refer to the SWMP.

10. Runoff peak rates and volumes discharged from the system for each required design storm event(s);

Refer to the SWMP Section 4.0.

11. Tail water history and justification (time and elevation); and

Refer to the SWMP Section 2.5.

12. Pump specifications and operating curves for range of possible operating conditions (if used in system).

The drainage system is a gravity flow system. No pumping mechanism is required.

B. Provide the results of any percolation tests, where appropriate, and soil borings that are representative of the actual site conditions;

No percolation test has been performed at the site. The percolation rates used in the design and analysis were based on the SCS soil data provided for each type of soil. Conservative numbers with at least a Factor of Safety of 3 were used in the design. Multiple soil borings and description of soil profiles data are provided in Figure 2.5 and 2.6 of the SWMP.

C. Provide the acreage, and percentages of the total project, of the following:

Detailed acreage and percentages of land coverage for the pre and post development are presented in the SWMP Section 4.0 and related appendices.

1. Impervious surfaces, excluding wetlands;

Refer to the SWMP Appendix C.

2. Pervious surfaces (green areas, not including wetlands);

Refer to the SWMP Appendix C.

3. Lakes, canals, retention areas, other open water areas; and

Refer to the SWMP Appendix C.

4. Wetlands.

Refer to the SWMP Appendix C.

D. Provide an engineering analysis of floodplain storage and conveyance (if applicable), including:

Based on the Flood Insurance Rate Map (FIRM) for Polk County, the portion of the site where development is proposed, is located in Flood Zone C outside the 100-year flood plain. Therefore, no encroachment to the flood plain is anticipated.

1. Hydraulic calculations for all proposed traversing works;

Not Applicable.

2. Backwater water surface profiles showing upstream impact of traversing works;

Not Applicable.

3. Location and volume of encroachment within regulated floodplain(s); and

Not Applicable.

4. Plan for compensating floodplain storage, if necessary, and calculations required for determining minimum building and road flood elevations.

Not Applicable.

E. Provide an analysis of the water quality treatment system including:

1. A description of the proposed stormwater treatment methodology that addresses the type of treatment, pollution abatement volumes, and recovery analysis; and

Refer to the SWMP Section 4.2.1 and Appendix B.

2. Construction plans and calculations that address stage-storage and design elevations, which demonstrate compliance with the appropriate water quality treatment criteria.

Refer to the SWMP Section 4.2.1 and engineering plans.

F. Provide a description of the engineering methodology, assumptions and references for the parameters listed above, and a copy of all such computations, engineering plans, and specifications used to analyze the system. If a computer program is used for the analysis, provide the name of the program, a description of the program, input and output data, two diskette copies, if available, and justification for model selection.

Engineering methodology and support documents and calculation are presented in the SWMP along with the engineering plans. The Interconnected Channel and Pond Routing (ICPR version 2.11) and MODERET (version 6.0) are the computer models used in the hydrology and hydraulic modeling and analysis. A brief description of the models and setup is discussed in the SWMP Section 3.0. Model input and output results are also included in the appendices.

VI. Operation and Maintenance and Legal Documentation

A. Describe the overall maintenance and operation schedule for the proposed system.

The project will be operated and maintained by the permittee. Regular maintenance will be provided for the proposed system. Sufficient access to storm water management devices has been provided in the design of the system. The maintenance program will include periodic inspections of facility equipment, systems, and stormwater management devices to detect conditions that may cause breakdowns or failures. Each stormwater system and related

equipment will be inspected for cracks or structural failures, deterioration of the unit, stains, stressed or overgrown vegetation, and the need for cleaning the unit. Problems detected during routine inspections will be addressed and corrected as soon as possible, but in no case more than three months after detection. Grassed areas will be mowed and vegetation in the detention pond areas will be controlled, as needed.

B. Identify the entity that will be responsible for operating and maintaining the system in perpetuity, if different than the permittee, a draft document enumerating the enforceable affirmative obligations on the entity to properly operate and maintain the system for its expected life, and documentation of the entity's financial responsibility for long-term maintenance. If the proposed operation and maintenance entity is not a property owner's association, provide proof of the existence of an entity, or the future acceptance of the system by an entity which will operate and maintain the system. If a property owner's association is the proposed operation and maintenance entity, provide copies of the articles of incorporation for the association and copies of the declaration, restrictive covenants, deed restrictions, or other operational documents that assign responsibility for the operation and maintenance of the system. Provide information ensuring the continued adequate access to the system for maintenance purposes. Before transfer of the system to the operating entity will be approved, the permittee must document that the transferee will be bound by all terms and conditions of the permit.

The project will be owned and maintained by the permittee.

C. Provide copies of all proposed conservation easements, storm water management system easements, property owner's association documents, and plats for the property containing the proposed system.

The storm water management system will be located on the project site and will be maintained by the permittee. No special easements are required for the system.

D. Provide indication of how water and waste water service will be supplied. Letters of commitment from off-site suppliers must be included.

Potable water and wastewater will be supplied by the City of Aurbundale via connection to the existing utility lines adjacent to the Site property.

E. Provide a copy of the boundary survey and/or legal description and acreage of the total land area of contiguous property owned/controlled by the applicant.

A boundary survey and legal description of the site is provided with the engineering plans.

VII. Water Use

A. Will the surface water system be used for water supply, including landscape irrigation, or recreation.
There is no plan to use the surface water for irrigation purposes or water supply .

B. If a Consumptive Use or Water Use permit has been issued for the project, state the permit number.

As of the date of this application, no Consumptive Use or Water permit has been issued for this project.

C. If no Consumptive Use or Water Use permit has been issued for the project, indicate if such a permit will be required and when the application for a permit will be submitted.

Authorization for a Consumptive Use Permit will be sought through the Power Plant Siting Act process. A copy of the application of the CUP is provided with the SCA document.

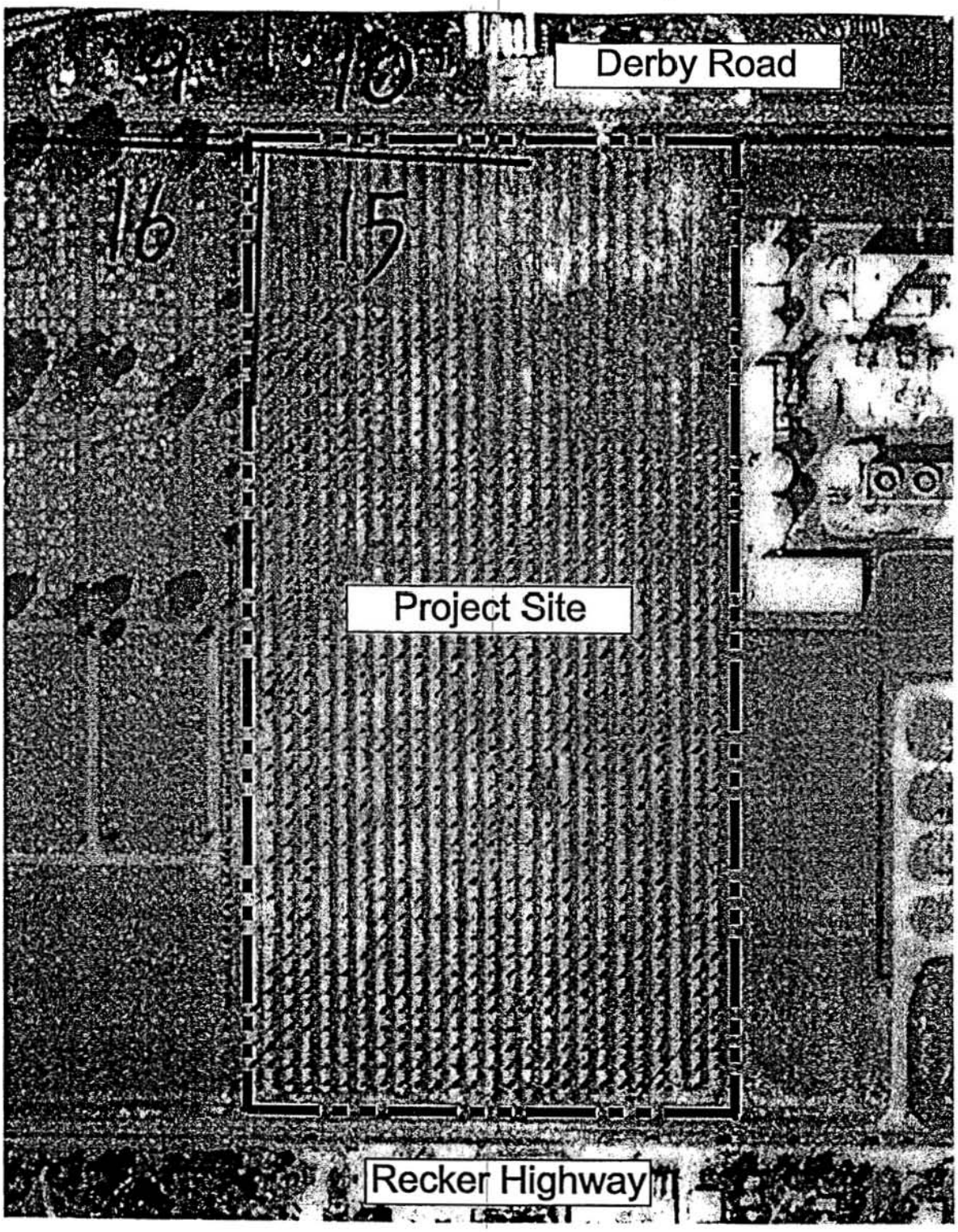
B. Indicate how any existing wells located within the project site will be utilized or abandoned.

No supply wells currently exist at the Site.

ATTACHMENT E-1

IMAGE QUALITY

AS YOU REVIEW THE NEXT FEW PAGES, PLEASE NOTE THAT THE ORIGINAL DOCUMENT WAS OF POOR QUALITY.



Golder Associates

Tampa, Florida

Aerial Photograph of Site

Client / Project

Calpine Construction Finance Copany, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	1"=200'	Job No.	993-9570
CHK BY:	RAZ	DATE:	02/04/00	FIGURE	E.1
REV BY:	–	FILE No.:	fig_E_1.dwg		

STORMWATER MANAGEMENT PLAN

OSPREY ENERGY CENTER

POLK COUNTY, FLORIDA

Prepared by:

Golder Associates Inc.
5405 West Cypress Street
Suite 215
Tampa, Florida 33607

Project No.: 993-9570/003-9501
Date: February 2000

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1.0 INTRODUCTION

Calpine Construction Finance Company, L.P. (Calpine) is proposing to own and operate a new 527-MW combined-cycle power plant identified as the Osprey Energy Center. The Project will be located on a 19.5 acre Site in the City of Auburndale, Florida. The proposed Site is located adjacent to an existing electrical power plant and to Tampa Electric Company's Recker Substation and associated 230-kilovolts (kV) transmission lines.

The licensing of power plants in Florida requires compliance with federal, state, regional, and local laws, regulations, and ordinances. The primary law governing the licensing of the Project is the Florida Electrical Power Plant Siting Act (FEPPSA). Certification of the proposed Project begins with the submittal of a Site Certification Application (SCA) to FDEP as set forth in FEPPSA and Chapter 62-17, Florida Administrative Code (F.A.C.), Electrical Power Plant Siting.

The federal and state permit applications for this Project are an integral part of the SCA. The application for an Environmental Resource Permit (ERP), encompassing the stormwater and drainage plans, constitutes one part of the support documentation in the SCA. Therefore, information pertaining to the ERP is being provided as a standalone report with the associated support documents. Since the Site is a non-producing citrus grove with no on-site surface water or wetland features, development of this land minimizes potential environmental impacts that might otherwise be associated with the Site development and construction.

1.1 PURPOSE

The purpose of this document is to present the Stormwater Management Plan (SWMP) that describes the measures proposed to control stormwater runoff at the Project. The proposed measures are intended to reduce the impact to water quantity and quality as a result of Site development during construction and operation. This plan provides a master plan of the stormwater management facility and documents the drainage analysis and calculations, assumptions, methods, and criteria used in preparing the plan for the Site development.

1.2 PROJECT DESCRIPTION

The Project will be located in Polk County approximately 1.5 miles from downtown Auburndale. The Project Site is bordered on the east by the existing Auburndale Power Plant and Tampa Electric Company's Recker Substation. Recker Highway (State Road 655) forms the southern boundary of the Site, Auburndale's Memorial Park Cemetery forms the western boundary, and Derby Avenue (CR 544A) forms the northern boundary.

The Site is located in the west one-half of the northwest one-quarter of the northwest one-quarter of Section 15, Township 28 South, Range 25 East. The Osprey Energy Center will be constructed on a 19.5-acre Site. The Site is currently a non-producing citrus grove, which has not been maintained or harvested for several years. With the exception of the citrus trees, the Site is undeveloped. There are no surface water bodies, wetlands, or significant wildlife habitats on the Site.

1.3 DESIGN CRITERIA

The stormwater control measures are designed to comply with the applicable federal, state, and local regulations. The SWMP drainage analysis and calculations were prepared in accordance with the following regulatory agencies and regulations:

Regulatory Agency	Regulations
Southwest Florida Water Management District (SWFWMD)	Chapter 40D-4 and 42D F.A.C.
Florida Department of Environmental Protection (FDEP)	Environmental Resource Permit (ERP) (using SWFWMD criteria)
Florida Department of Transportation (FDOT)	FDOT Chapter 14-86 F.A.C. (Handbook for Drainage Connection Permit)
City of Aurbundale	Section 8.2.1-3, 8.4.1-3 (Land Development Regulations)
Polk County	Land Development Regulations

1.4 PROJECT BENCHMARK

The benchmark of this Project is based on the USC&GS Datum 1929 and is considered very close to the NGVD datum 1929. All elevations in this report and plans are referenced to the USC&GS datum. The primary Project benchmark elevation is 148.99 feet USC&GS provided by Polk County Engineering Department.

2.0 PRE- AND POST-DEVELOPMENT CONDITIONS

2.1 EXISTING CONDITION

The Project Site consists of 19.5 acres of non-producing citrus grove. No wetlands are on the Site. The land was used for agricultural purposes and is considered undeveloped property.

The existing Site runoff drainage pattern is mainly to the south except for the northern portion (approximately ¼ of the total Site) which drains to the north. Swales along Recker Highway and Derby Avenue intercept the Site runoff and convey the runoff through a drainage system to a nearby channeled watercourse, Lake Lena Run, and ultimately to the Peace River via connected creeks and lake systems. Existing Site drainage conditions, flow patterns, and basin boundaries are presented in **Figure 2.1**. FDOT has jurisdiction over the Recker Highway drainage system and, therefore, a drainage connection permit is required by FDOT to discharge stormwater runoff to their drainage facility. Polk County has jurisdiction over the Derby Avenue drainage system.

Based on the USGS map and the topographical survey conducted at the Site and adjacent lands, no offsite inflows are expected from adjacent properties. The Site is located on top of a local ridge at land elevation of 148± feet. A portion of the USGS map for the Project location is presented in **Figure 2.2**.

2.2 PROPOSED DEVELOPMENT

The facility will be developed as indicated in the Site Plan (SP-1). The power generation facility will consist of combustion turbines, heat recovery steam generators, a steam turbine, switchyard, maintenance and control/office building, water treatment area, various storage tanks for plant operations, and a facility access road.

The proposed stormwater management facility will consist of two sub-basins. The south sub-basin, identified as B-101, and the north sub-basin, identified as B-102. The post-development sub-basins, drainage patterns and contributing areas will remain the same as the pre-development conditions. Perimeter swales, culverts, and land overflow will capture the stormwater in each sub-basin and convey the runoff to a dry- detention pond system. The runoff from the contributing

southern portion (14.8 acres) of the Site will drain south to Detention Pond #1 that discharges stormwater through a control structure into the FDOT drainage facility along Recker Highway. The runoff from the contributing northern portion (4.66 acres) of the Site will drain north to Detention Pond #2 that discharges stormwater through a control structure into the county drainage swale along Derby Avenue.

2.3 FLOOD ZONES AND FINISHED FLOOR ELEVATIONS

Based on the Flood Insurance Rate Map (FIRM), Panel Number 1202610345 B, Polk County, the Site is located in Flood Zone C outside the 100-year floodplain (**Figure 2.3**).

Finish Floor Elevation (FFE) for buildings, turbine foundations, tanks and accessories will be built above the 100-year elevation. Proposed FFEs for buildings and turbines are shown on the drainage plans (DP-1).

2.4 SOIL DATA

The soil map of the Site vicinity indicates that the Site is approximately 80-percent Tavares soil and the remaining 20-percent is Adamsville soil type located in the northern portion of the Site. Soil map and characteristics are presented in **Figure 2.4**. According to the USDA Soil Survey of Polk County, the Seasonal High Water Table (SHWT) for Tavares soil occurs at approximately 3.5 to 6.0 feet below land surface (bls) and at 2.0 to 3.5 feet bls for Adamsville soil.

Multiple piezometers and borings were installed at the Site in order to investigate soil profile and characteristics. The water table was observed to be approximately 14 to 15 feet bls. The average ground elevation is 142.5 at the Detention Pond #1 location and 145 feet at Detention Pond #2 location. A conservative SHWT is assumed and set to be at elevation 136.0 feet at Pond #1 and 143.0 feet at Pond #2. Borings and piezometers locations are presented in **Figure 2.5**. Boring soil profiles are provided in **Figure 2.6**.

Percolation rates for both types of soils are identified in the SCS to have a rate of six to 20 inches per hour (inch/hr) for Tavares soil and a rate of grater than six inch/hr for Adamsville soil. Conservative percolation rates with a Factor of Safety (FS) of three were used in the design and analysis in addition to an FS of two used by the infiltration model.

2.5 TAIL WATER CONDITION

The tail water condition at the discharge outfall were based on the highest elevation of swale top of bank that the water can reach prior to overflow at the road and adjacent properties. The maximum tail water elevation used in the analysis was approximately six inches below the highest point of the paved road at the specific section location.

3.0 METHOD OF ANALYSIS

This section presents the hydrology and hydraulics methods used in developing the SWMP and identifies various elements required for the task. The following sub-sections describe each of the major elements in developing the parameters required for the computer model used in the analysis.

3.1 HYDROLOGY

3.1.1 Development of Runoff Hydrographs

The Soil Conservation Service (SCS) Unit Hydrograph was used to develop the stormwater runoff hydrographs for the identified sub-basins. The method continuously tracks soil storage and infiltration rates and calculates stormwater runoff rates throughout a storm event. It requires a rainfall distribution for the stormwater being simulated and various parameters describing the physical features of the drainage sub-basins. The SCS Unit hydrograph generates runoff hydrographs using pre-selected rainfall distribution and shape factors, storm duration, total rainfall amounts, basin areas, SCS runoff Curve Numbers (CN), and Time of Concentration (TOC).

3.1.2 Runoff Curve Numbers (CN)

The runoff curve numbers were estimated using the SCS Technical Release Number 55 (TR 55) methodology. Soils types and hydrologic sub-groups were determined using the SCS Soil Survey for Polk County. Existing vegetation cover was determined from aerial photography, Site survey, and field inspection. CN values of each sub-basin for pre-and post-development are presented in the appendices.

3.1.3 Time of Concentration

Times of concentration were computed using the Lag method and TR 55 methodology by determining the path of longest travel time within each of the sub-basins. Flow velocities were estimated from slopes and land cover and presented for each section of the travel path. TOC of each sub-basin for pre-and post-development are presented in the appendices.

3.1.4 Rainfall Depth, Duration, and Frequency

The rainfall depths used in the drainage analysis were obtained from the SWFWMD's Permit Information Manual "Management and Storage of Surface Waters". Since a drainage connection to FDOT drainage system is required that is considered in a watershed with positive outfall, calculations for a post-improved peak rate to the pre-improved peak rate for all frequencies (2-year thru 100-year) for the critical duration (1-hour thru 10-days) are provided in conformance with the FDOT criteria.

The rainfall depths and duration used in the analysis are shown below:

Storm Return Frequency	Rainfall Depth	Permit Requirement
25-year, 24-hour storm	7.25 inches (1)	ERP
100-year thru 2-year Critical Duration (1-hour thru 240-hour)	See note (2)	FDOT Connection Permit

(1) **Figure 3.1**: Rainfall Intensity - 25-year, 24-hour storm.

(2) FDOT Intensity-Duration-Frequency (IDF) Zone 8 (FDOT **Figure 5-9**) and Precipitation Depth Data **Figure 5-13 thru 5-17.**

3.1.5 Rainfall Distribution

A 25-year, 24-hour design storm was used for designing the stormwater management and outlet system for the Project. The Florida Modified II (FLOMD) rainfall distribution was used throughout the 24-hour duration as a recommended distribution method for the ERP requirements. FDOT Rainfall Distribution Curves were used for the FDOT connection permit.

3.2 HYDRAULICS

3.2.1 Hydrographs Routing

Percolation through soil is accepted by FDOT District I as a means of discharging runoff but is not recognized by the SWFWMD/ERP criteria as a positive outfall. The runoff generated during a storm event will be conveyed to a dry detention pond system for treatment and to control offsite discharges.

The Interconnected Channel and Pond Routing Model (ICPR version 2.11) and MODERET (version 6.0) were used for the hydrology and hydraulics computer modeling and analysis. Both models simulate a synthetic single storm event, continuously tracking rainfall flowrates throughout the watershed, changes in surface storage, water levels, and discharge rate as a function of time.

The ICPR model generates storage and discharge hydrographs, including stage-storage, peak stages and peak discharge by hydrodynamically routing the previously developed SCS runoff hydrographs through the drainage system.

MODRET model calculates the infiltration and overflow discharges versus stage elevations during a storm event. MODRET uses the Green & Ampt infiltration method to calculate unsaturated infiltration and the MODFLOW model to calculate saturated infiltration. MODFLOW is a three-dimensional numerical model developed by the USGS and has been used extensively in groundwater modeling.

The MODERET has the capability of generating runoff hydrographs and routing the discharges via outfall overflow and ground infiltration. However, its overflow capability is limited in flexibility as compared to the ICPR. Therefore, data related to the proposed outfall discharges versus stages relationship were extracted from the ICPR and applied to the MODERET to mimic the discharge overflow through the outfall structure.

3.2.2 Modeling Setup

The model setup consists of nodes and reaches that represent and mimic the hydraulics of the proposed Site condition. Nodes are used to identify specific locations along a drainage system for which stage elevations are to be computed such as the detention ponds. Boundary conditions are also specified by assigning stage-time relationship. Reaches such as piping and ditches are used to connect nodes and convey water between them.

Modeling Connectivity Schematics of the proposed hydraulic is presented in **Figure 3.2**. This figure identifies the sub-basins contributing to each node to simulate the surface water control system and show the interconnectivity between nodes and reaches. The input data for the model setup pertaining to stage-storage and various hydraulic link connectivity components are provided in the appendices.

4.0 MASTER DRAINAGE ANALYSIS

A stormwater management system will be implemented at the Site to address the water quality and quantity from runoff generated by Site development. The proposed stormwater management system will address the following main design criteria:

1. Treat on-site stormwater runoff.
2. Attain the post- to pre-developed peak discharge runoff generated from the Site development.

On-site drainage will be accomplished through gravity flow. The general Site grading will establish a working surface for construction and plant operating areas, provide positive drainage from buildings and structures, and provide adequate soil coverage for underground utilities.

4.1 PRE-DEVELOPMENT ANALYSIS

As discussed in the previous section, the majority of the existing Site topography slopes south toward Recker Highway. Based on the topographic survey and the USGS map, there is no indication of offsite runoff. Runoff characteristics and calculations for the existing condition to estimate the pre-existing peak discharge rates for each sub-basin are presented in Appendix A. This appendix includes basin areas and percentage of surface coverage, runoff curve number, time of concentration, and drainage calculations to establish the existing peak runoff discharge rate. Based on the pre-development condition, the direct contributing runoff area to the southern portion is approximately 14.8 acres and generates a pre-development peak discharge flow rate of 14.89 cfs for the south sub-basin (B-001) and 16.74 cfs for the north sub-basin (N-002) based on a 25-year, 24-hour storm event of 7.25 inches magnitude. The input basin summary for the FDOT storm frequencies and the output results of runoff hydrographs for the pre-development condition are also included in Appendix A.

4.2 POST-DEVELOPMENT ANALYSIS

The proposed developed areas will be drained by sheet flow to a perimeter ditch and culvert system that contains and captures the runoff from the developed area. The runoff is then conveyed to dry detention ponds that treat the water to comply with the water quality criteria and discharges the runoff at a rate that does not exceed the pre-existing peak discharge flow at a

specific storm frequency. The following describes the water quality and quantity design and the proposed measures to comply with these requirements.

4.2.1 Water Quality Requirements

The high soil permeability and depth to the groundwater table at this Site will provide a viable means for retaining the water quality volume to percolate through the bottom of the pond to meet the quality criteria.

Treatment of on-site runoff will be accomplished via an on line treatment system. The runoff from each sub-basin will be conveyed to dry detention ponds. The water quality volume will be retained and discharged through percolation at the bottom of the ponds. The required volume to be treated to meet the water quality requirements is 1/2 inch of runoff from the contributing area of each sub-basin.

The contributing area of south sub-basin B-101 is 14.80 acres.
Required treatment volume calculation for sub-basin B-101:

One inch over the contributing area:
14.80 acres x 1/2 inch x 1/12 = 0.62 ac-ft.

The contributing area of north sub-basin B-102 is 4.66 acres.
Required treatment volume calculation for sub-basin B-102:

One inch over the contributing area:
4.66 acres x 1/2 inch x 1/12 = 0.20 ac-ft.

Water quality volume to be treated by Pond #1 requires approximately 0.9 feet above the bottom of the pond. Pond bottom elevation is set at 140.50 feet. The water level for the design of water quality and weir overflow discharge elevation was set at 141.40 feet and Top of Bank is set at 143.0 feet.

Water quality volume to be treated by Pond #2 requires approximately 0.8 feet above the bottom of the pond. Pond bottom elevation is set at 144.50 feet. The water level for the design of water quality and weir overflow discharge elevation was set at 145.30 feet and Top of Bank is set at 146.0 feet.

The retention volume for the water quality is required to be available within 72 hours. The treatment volume recovered within 36 hours can be counted as part of the storage volume for water quantity. Drawdown calculations for both ponds show that the recovered period is less than 36 hours. Water quality calculations and the recovery time using MODERET are presented in Appendix B.

4.2.2 Water Quantity Requirements

SWFWMD Chapter 40D-4 and 40D-42 Basis for Review requires a positive outfall from the stormwater detention facilities if the volume of runoff generated by rainfall event after development is not totally retained. As discussed in the previous section, the drainage of the Site is not in a closed basin and a positive drainage outfall exists for the system.

The 25-year, 24-hour rainfall event will be the design criteria for the stormwater management facility for the north and south outfalls at the Project Site. The detention pond system will detain the stormwater runoff during a storm event and will discharge water through a control structure at a rate that does not exceed the pre-development runoff rate of the same storm event.

Post-development basins and runoff characteristics and calculations for the proposed condition are presented in Appendix C. This Appendix includes basin areas and percentage of surface coverage, runoff curve number and drainage calculations. Stage-storage information for the detention ponds and stage-discharge for various hydraulic components are presented in the model input of this Appendix. Basin summary that presents the input data and the output results of runoff hydrograph, peak discharge rates and volume discharged for the post-development condition are also included in Appendix C.

As discussed in the previous section, a drainage connection permit for the FDOT facility is required for the southern sub-basin only. Calculations for the required storm frequency and critical storm event for the pre-and post development conditions were provided in Appendix D.

Based on the model stage-storage calculation, the maximum water stage elevations and the peak discharge rates for the 25-year, 24-hour storm and the FDOT critical events for the 100-year thru 2-year storm frequency are within the allowable range. A basin summary table for all the storm frequencies, allowable discharges, and peak stage elevations is presented below and included in Appendix D. The following tables present a summary of the stormwater management system components and design values.

TABLE 4.1
STORMWATER MANAGEMENT FACILITY SUMMARY

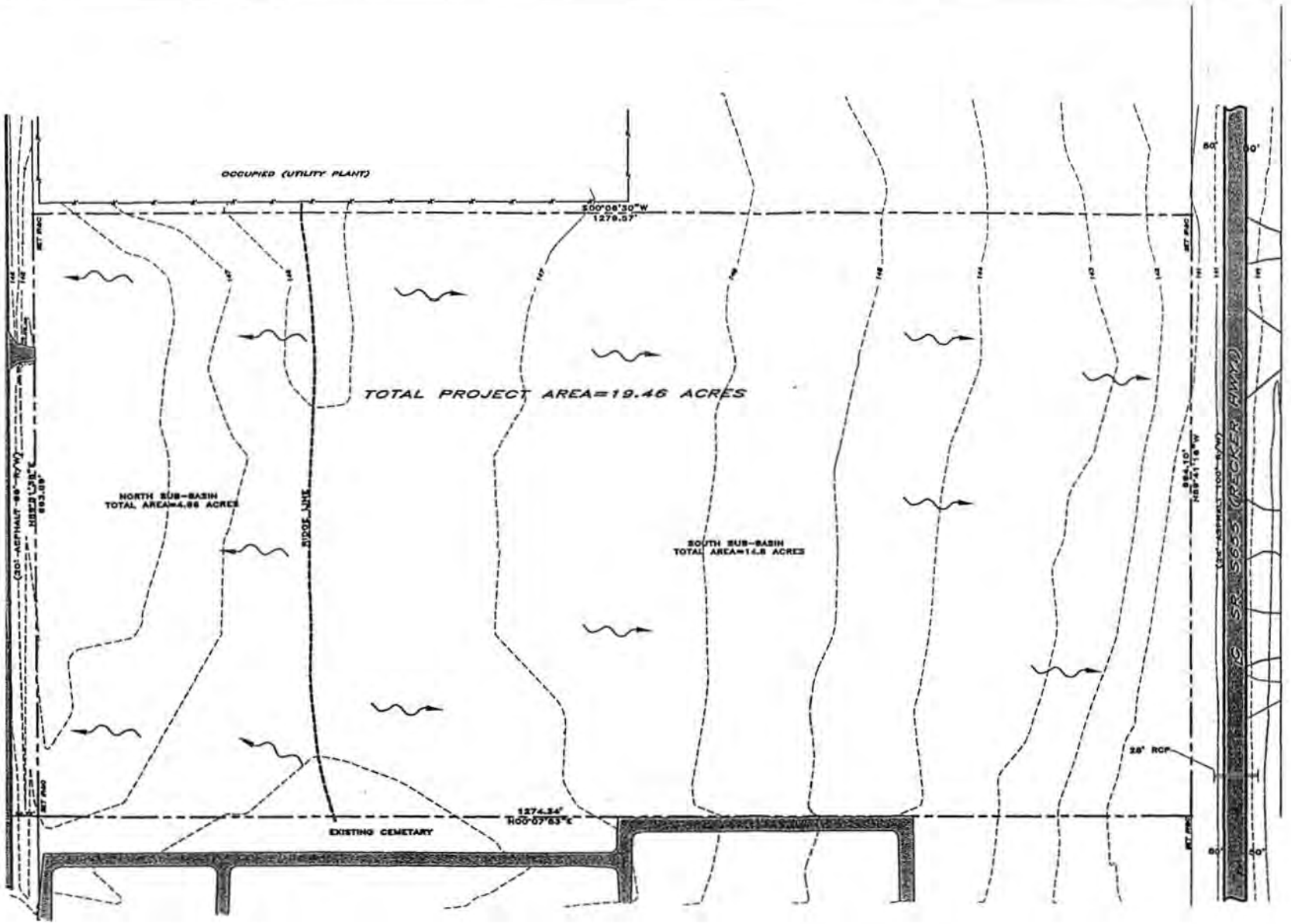
SYSTEM COMPONENTS	VALUE / DESCRIPTION	NOTES
Pond system	Detention Pond	Pond #1 and #2.
Treatment system	Percolation through bottom of ponds	
SHWL	136.0 feet pond #1, 143.0 feet pond #2	
Water quality volume	0.62 ac-ft. pond #1, 0.20 ac-ft. pond #2	
Max. design high water level	142.5 feet pond #1, 145.5 feet pond #2	
Pond Top of Bank	143.0 feet pond #1, 146.0 feet pond #2	
Flood zone	Zone C, outside the 100-year floodplain.	

TABLE 4.2
BASIN SUMMARY

STORM EVENT	RAINFALL DISTRIBUTION (FDOT IDF ZONE 8)	RAINFALL DEPTH (INCHES)	PRE-DEVELOPMENT PEAK DISCHARGE (CFS)	POST-DEVELOPMENT PEAK DISCHARGE (CFS)	PEAK STAGE ELEVATION (FEET)
100-yr, 1-hr	FDOT (1hr)	4.6	11.15	9.22	141.74
100-yr, 2-hr	FDOT (2hr)	5.6	12.37	12.11	141.85
100-yr, 4-hr	FDOT (4hr)	6.8	15.42	14.67 (1) / 12.69 (2)	142.01 (1) / 141.87 (2)
100-yr, 8-hr (3)	FDOT (8hr)	8.0	15.38	15.02 (1) / 13.11 (2)	142.03 (1) / 141.89 (2)
100-yr, 24-hr	FDOT (24hr)	10.56	8.22	9.40	141.75
100-yr, 72-hr	FDOT (72hr)	13.0	7.83	7.20	141.69
100-yr, 168-hr	FDOT (168hr)	16.0	6.40	6.37	141.67
100-yr, 240-hr	FDOT (240hr)	18.0	8.34	8.25	141.73
50-yr, 8-hr	FDOT (8hr)	7.36	13.25	11.33	141.86
25-yr, 8-hr	FDOT (8hr)	6.56	10.68	10.62	141.78
10-yr, 8-hr	FDOT (8hr)	5.6	7.78	7.60	141.71
5-yr, 8-hr	FDOT (8hr)	4.88	5.81	5.46	141.66
3-yr, 8-hr	FDOT (8hr)	4.4	4.64	4.37	141.62
2-yr, 8-hr	FDOT (8hr)	3.84	3.39	3.05	141.57
25-yr,24-hr (N-101)	FLOMD	7.0	14.89	11.83	141.82
25-yr,24-hr (N-102)	FLOMD	7.0	16.74	4.04	145.58

Notes: (1) No infiltration is used; (2) Infiltration is used; (3) Critical storm event

FIGURES



N

120' 0

scale

LEGEND

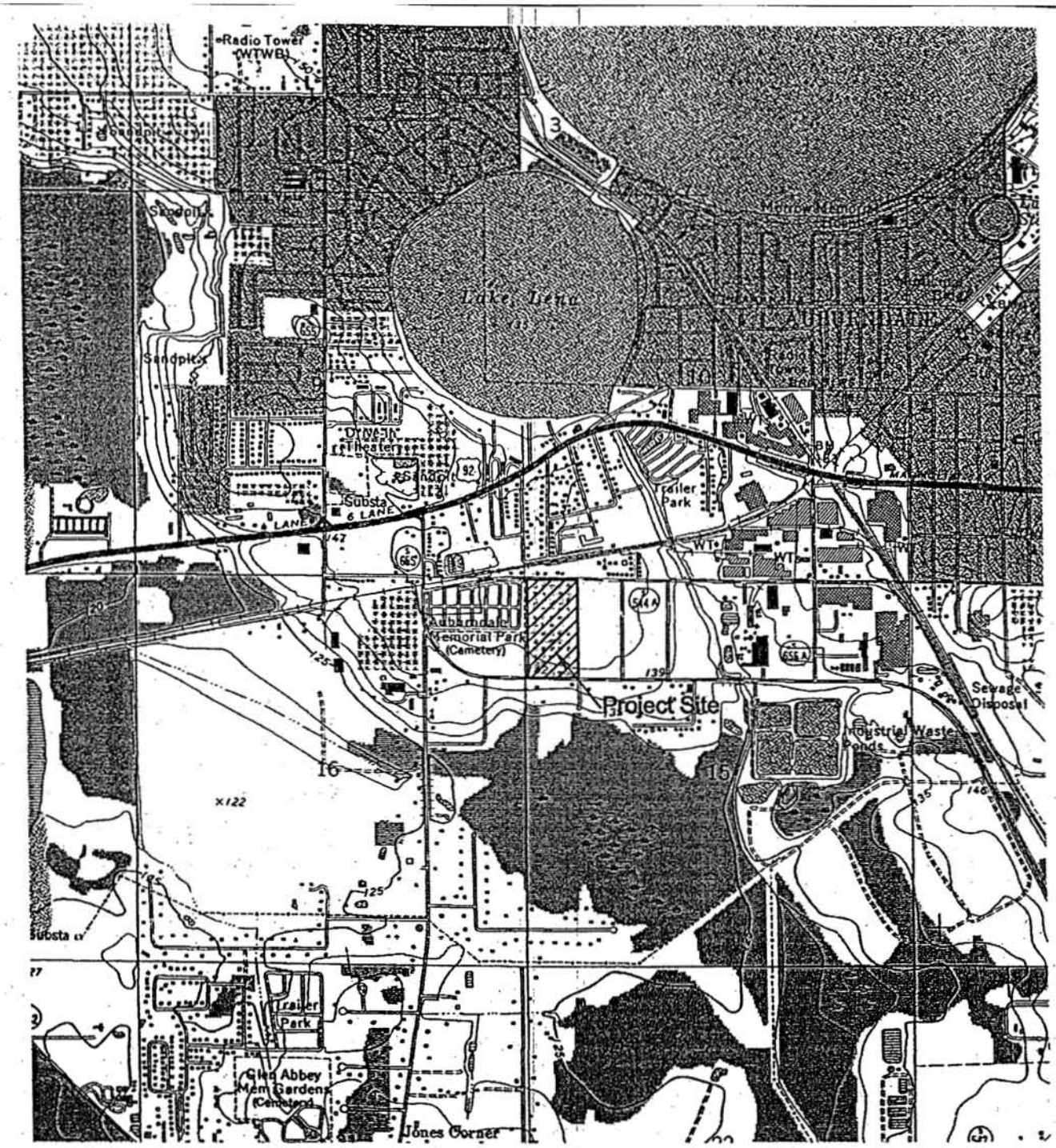
- FENCE LINE
- PROPERTY LINE
- RUNOFF
- RIDGE LINE
- EXISTING CONTOURS
- BENCHMARK

Golder Associates — Tampa, Florida

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

Pre-Development Drainage Co

CAD BY:	CDT	SCALE:	1"=120'
CHK BY:	AG	DATE:	02/09/00
REV BY:		FILE No.:	fig2_1.dwg



LEGEND

PROJECT SITE

N

0 1000' 2000'

1"=2000'

REFERENCE

USGS 7.5 Minute Topographical Quadrangle, Auburndale, Florida

Golder Associates

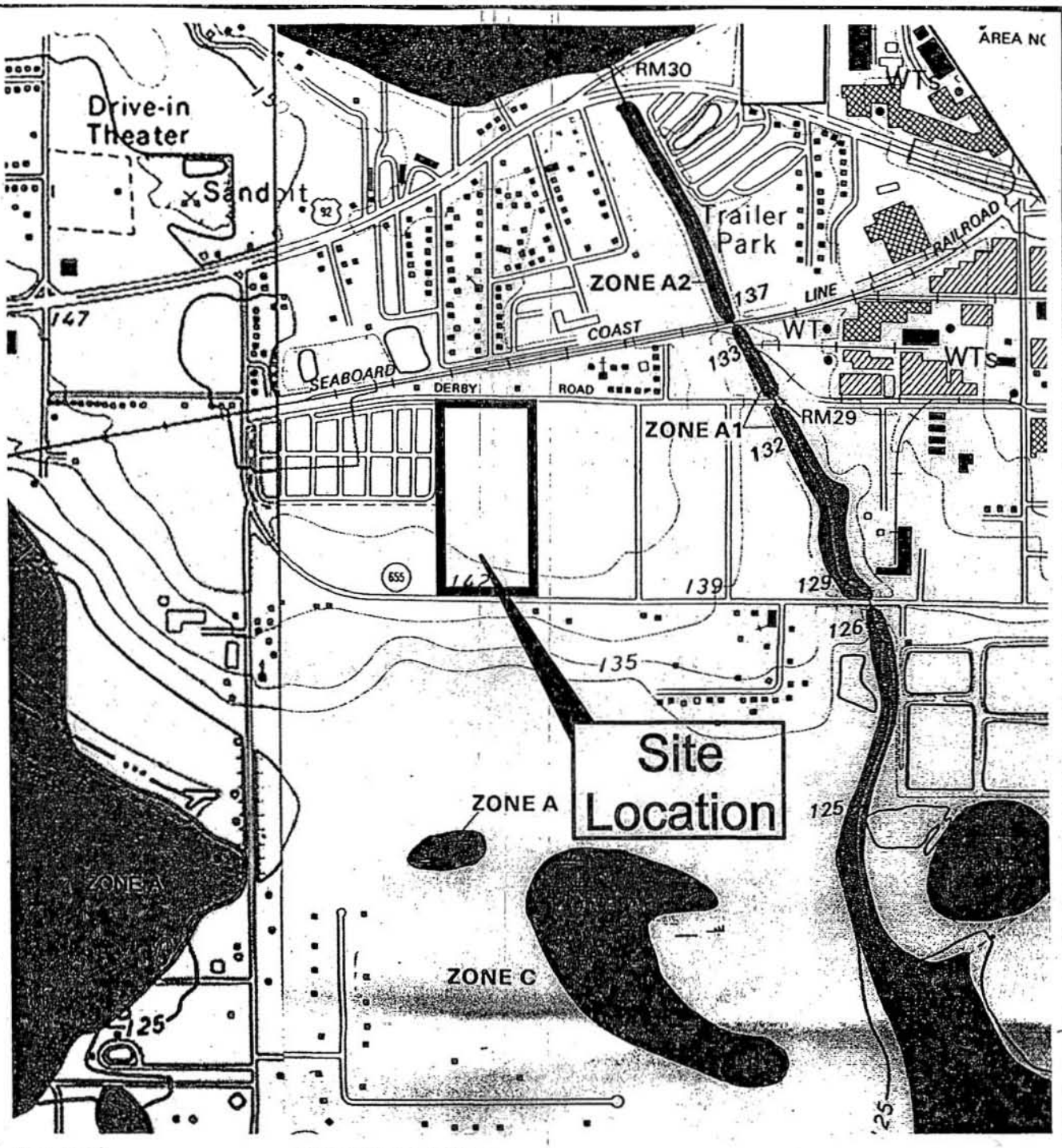
Tampa, Florida

USGS Topographical Map

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: 1"=2000'	Job No. 993-9570
CHK BY: RAZ	DATE: 02/08/00	FIGURE 2.2
REV BY: –	FILE No.: fig2_2.dwg	



Legend

100-Year Floodplain

Zone Description

Zone A: Area of 100-year flood; base flood elevations and flood hazard factors not determined.

Zone A1-2: Areas of 100-year flood; base flood elevations and flood hazard factors determined.

Zone C: Areas of minimal flooding (no shading)

N

0 500' 1000' 2000'

1"=2000'

REFERENCE

Flood Insurance Rate Map, Polk County, Florida, Panels 345 and 350 of 1025, January 19, 1983

Golder Associates

Tampa, Florida

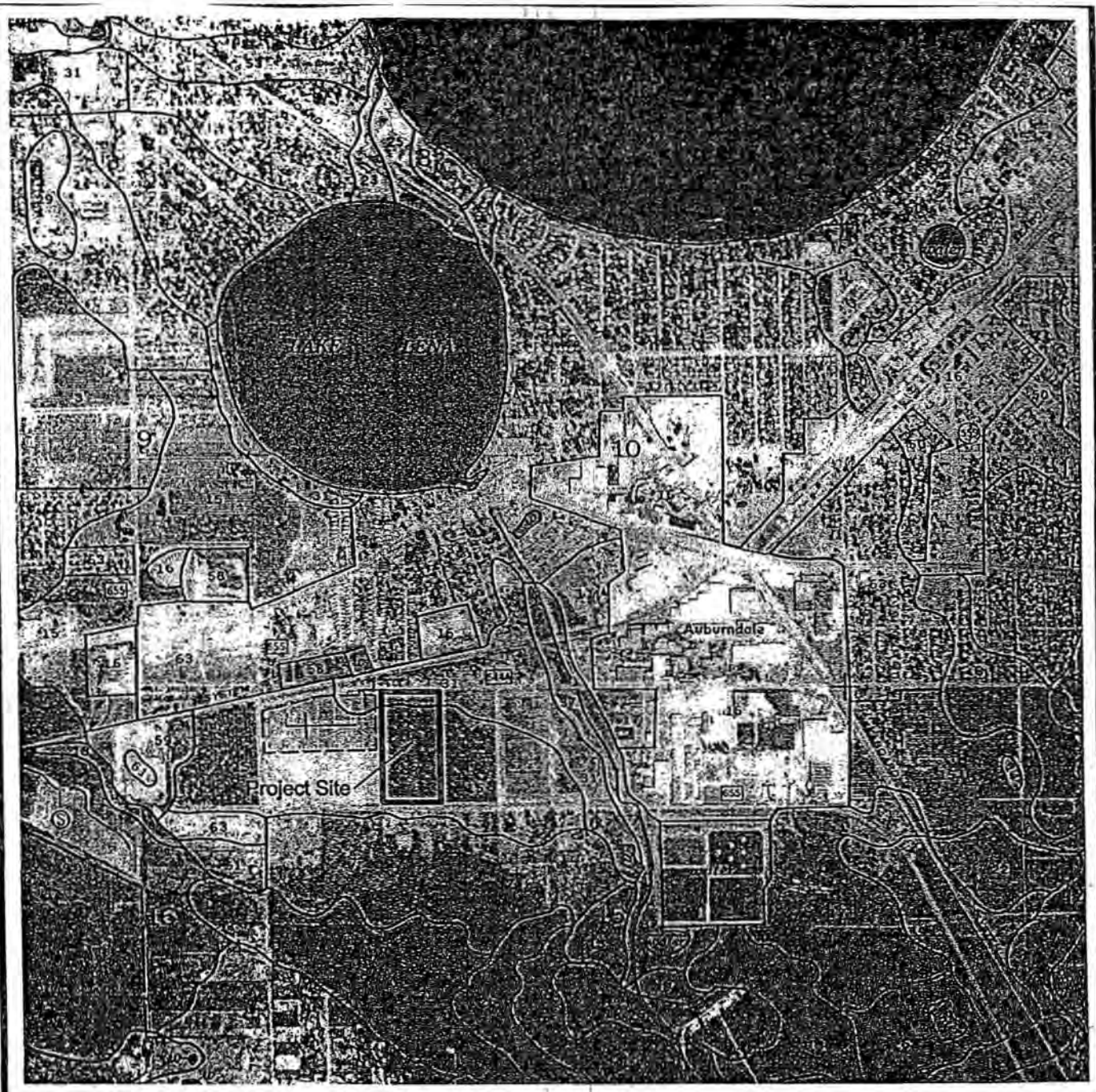
Floodplain Map

Client / Project

Calpine Construction Finance Company, L.P.

Osprey Energy Center

CAD BY: CDT	SCALE: 1"=2000'	Job No. 993-9570
CHK BY: CA	DATE: 01/13/00	FIGURE 2.3
REV BY: --	FILE No.: fig2_3.dwg	



MAP SYMBOL AND SOIL NAME	HYDROLOGIC GROUP	FLOODING			HIGH WATER TABLE			PERMEABILITY INCHES/HR.
		FREQUENCY	DURATION	MONTHS	DEPTH (FT)	KIND	MONTHS	
#15(TAVARES)	A	NONE	-	-	3.5-6.0	APPARENT	JUN-DEC	>6.0
#31(ADAMSVILLE)	C	NONE	-	-	2.0-3.5	APPARENT	JUN-NOV	6.0-20

N

0 500' 1000' 2000'

Scale: 1"=2000'

Reference: USDA / SCS Soil Survey, Polk County, Florida

Golder Associates

Tampa, Florida

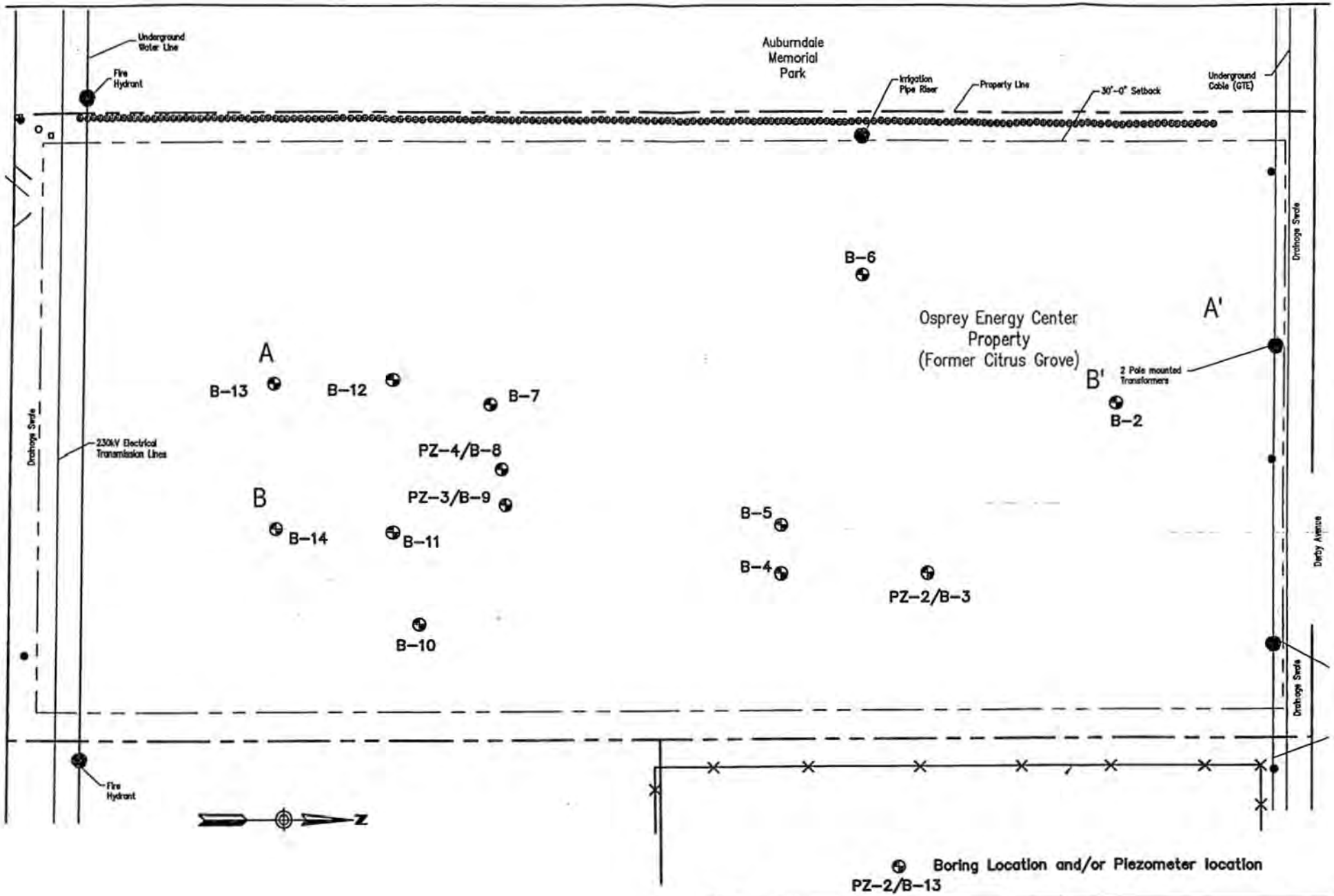
USDA Soil Survey Map

Client / Project

Calpine Construction Finance Company, L.P.

Osprey Energy Center

CAD BY: CDT	SCALE: 1"=2000'	Job No. 993-9570
CHK BY: RAZ	DATE: 02/09/00	FIGURE 2.4
REV BY: --	FILE No.: fig2_4.dwg	

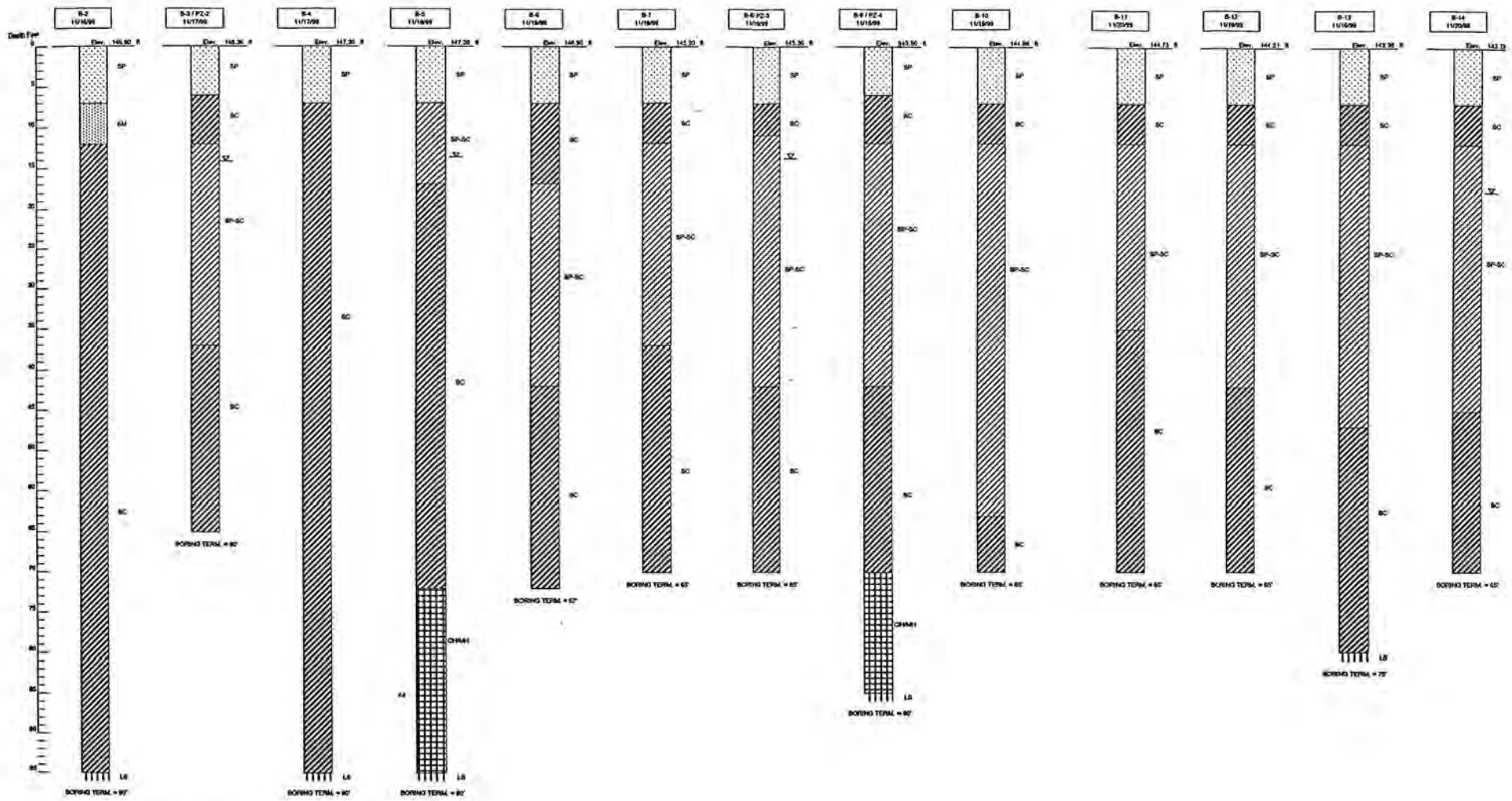


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Boring and Piezometer Locat

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	1"=100'
CHK BY:	—	DATE:	02/09/00
REV BY:	AG	FILE No.:	fig2_5.dwg



LEGEND

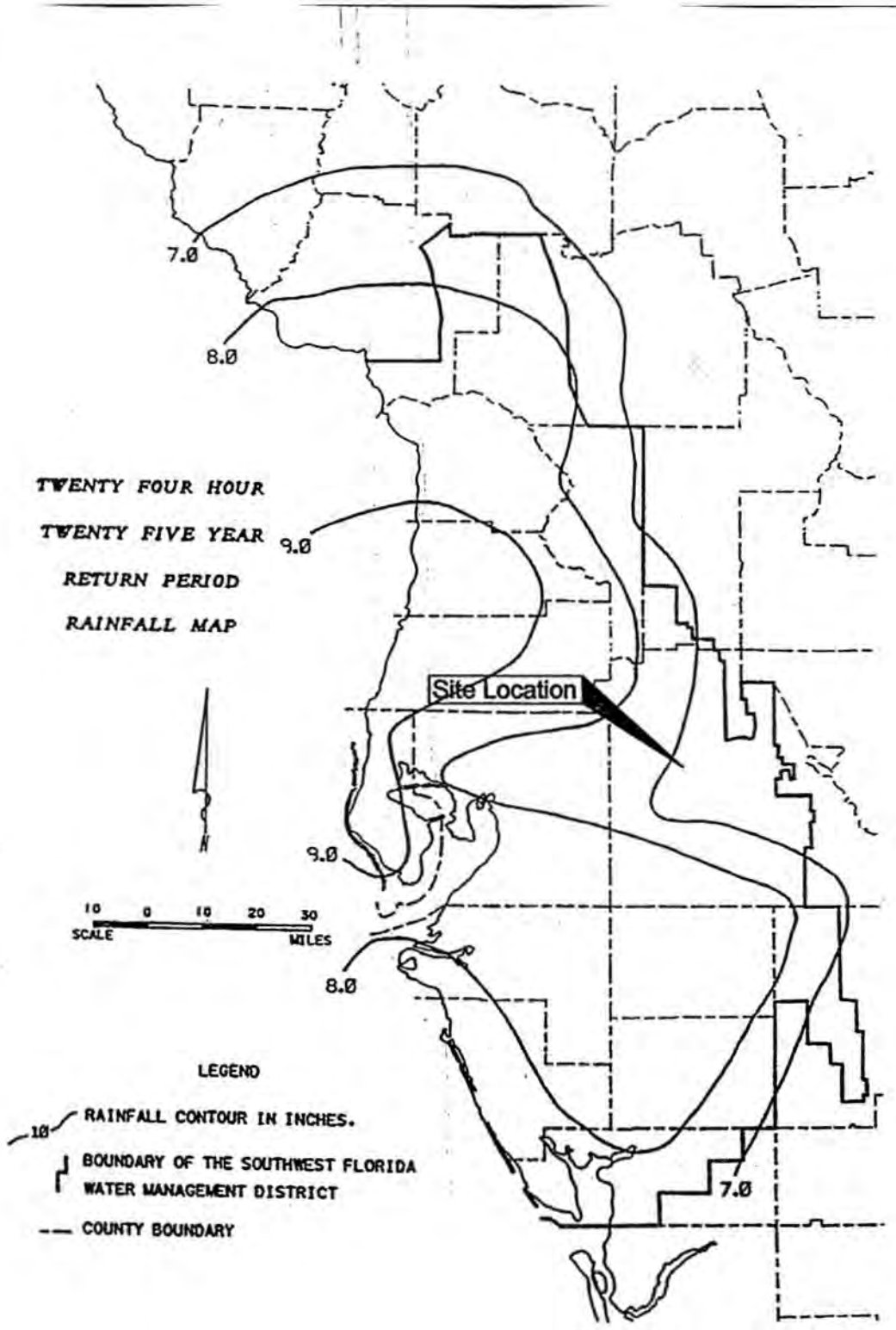
- Fine SAND (SP) with occasional trace to little clay and silt
- Fine silty SAND (SM)
- Fine SAND with little clay (SP-SC)
- Fine clayey SAND (SC)
- Sandy CLAY (CH/MH)
- Fractured LIMESTONE encountered at end of boring (LS)
- N — Standard Penetration Resistance (blows per foot)
- ref — Refusal: >50 Blows per 6 inch Penetration into Soil
- SP — Unified Soil Classification System Designation
- ▽ — Depth of Ground Water Table Encountered on Day of Drilling

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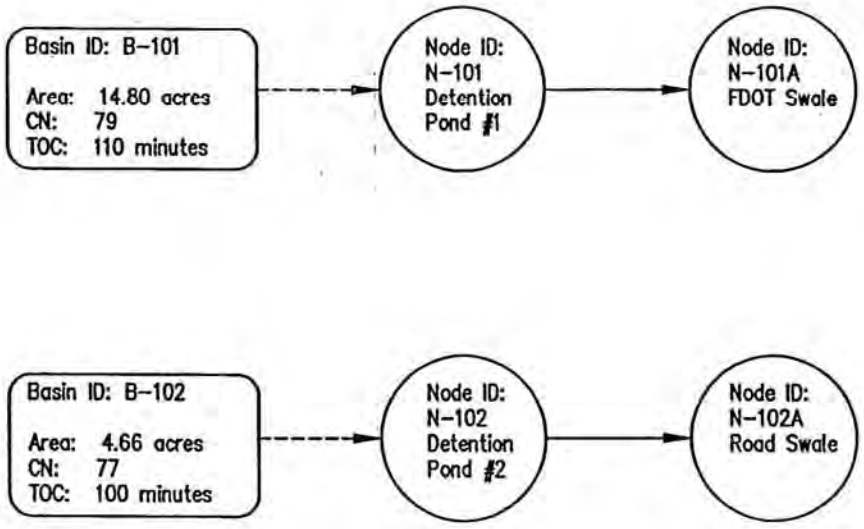
Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

Boring Profiles

CAD BY:	CDT	SCALE:	As Shown
CHK BY:	AG	DATE:	02/10/00
REV BY:	—	FILE No.:	fig2_6.dwg



Golder Associates — Tampa, Florida		SWFWMD Rainfall Map	
Client / Project: Calpine Construction Finance Company, L.P. Osprey Energy Center	CAD BY: CDT	SCALE: NTS	Job No. 993-9570
	CHK BY: AG	DATE: 02/09/00	FIGURE 3.1
	REV BY: –	FILE No.: fig3_1.dwg	



LEGEND:

- NODE
- BASIN/SUB-BASIN
- HYDRAULIC LINK
- RUNOFF CONEYANCE

Golder Associates — Tampa, Florida

MODELING CONNECTIVITY SCHEMATIC
PROPOSED CONDITION

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: JPE	SCALE: N.T.S.	Job No.	993-9570
CHK BY: AG	DATE: 02/10/2000	FIGURE	3.2
REV BY: AG	FILE No.: FIG3.2.DWG		

APPENDIX A

PRE-DEVELOPMENT CONDITION

OSPREY ENERGY CENTER

PRE-DEVELOPMENT CALCULATIONS

WORKSHEET FOR COMPUTING SCS RUNOFF CURVE NUMBERS
PRE-DEVELOPMENT CONDITION

Project Title: OSPREY ENERGY CENTER
Project Location: POLK COUNTY, FLORIDA

Basin ID: B-001 (South Basin)
Drainage Area (acres): 14.80

SurfaceType	Land Use Type	Description	SCS Soil Type from Soil Survey	Hydrologic Group	CN_i SCS Curve Number Value	A_i (acres) Area Covered by CN Value	% Area	$A_i \times CN_i$ Weighted CN Value
Pervious	Agricultural	Citrus grove, undeveloped land	Tavares	A	64	14.80	100.00%	947.20
TOTAL						**14.80**	**100%**	**947.20**
COMPOSITE CN VALUE					**64.00**	***Use CN = 64***		

Basin ID: B-002 (North Basin)
Drainage Area (acres): 4.66

SurfaceType	Land Use Type	Description	SCS Soil Type from Soil Survey	Hydrologic Group	CN_i SCS Curve Number Value	A_i (acres) Area Covered by CN Value	% Area	$A_i \times CN_i$ Weighted CN Value
Pervious	Agricultural	Citrus grove, undeveloped land	Adamsville	C	82	4.66	100.00%	382.12
TOTAL						**4.66**	**100%**	**382.12**
COMPOSITE CN VALUE					**82.00**	***Use CN = 82***		

Notes:
- Composite CN Value = $\Sigma A_i \times CN_i \div \Sigma A_i$

Runoff curve numbers for arid and semiarid rangelands[1]

Cover description		Curve numbers for hydrologic soil group-			
Cover type	Hydrologic condition[2]	A[3]	B	C	D
Herbaceous-mixture of grass, weeds and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen-mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper-pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub-major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

[1] Average runoff condition, and $I_a = 0.2S$. For range in humid regions, use table 2-2c.

[2] *Poor:* <30% ground cover (litter, grass, and brush overstory).
Fair: 30 to 70% ground cover.
Good: >70% ground cover.

[3] Curve numbers for group A have been developed only for desert shrub.

Runoff curve numbers for other agricultural lands[1]

Cover description		Curve numbers for hydrologic soil group-			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range-continuous forage for grazing.[2]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow-continuous grass, protected from grazing and generally mowed for hay.	-	30	58	71	78
Brush-brush-weed-grass mixture with brush the major element.[3]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	[4]30	48	65	73
Woods-grass combination (orchard or tree farm).[5]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods.[6]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	[4]30	55	70	77
Farmsteads-buildings, lanes, driveways, and surrounding lots.	-	59	74	82	86

[1] Average runoff condition, and $I_a = 0.2S$.

[2] *Poor:* <50% ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: >75% ground cover and lightly or only occasionally grazed.

[3] *Poor:* <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

[4] Actual curve number is less than 30; use CN = 30 for runoff computations.

[5] CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

[6] *Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

WORKSHEET FOR COMPUTING TIME OF CONCENTATION (LAG METHOD)
PRE-DEVELOPMENT CONDITION

Project Title: OSPREY ENERGY CENTER
Project Location: POLK COUNTY, FLORIDA

	Sub-basin ID:	B-001	B-002
1.	Surface Description	Grove	Grove
2.	CN Value	64	82
2.	Hydraulic Length (L_h)	1100	300
3.	Watercourse Land slope, Y%	0.72	1
4.	$S = \frac{1000}{CN} - 10$	5.63	2.20
5.	$L_a = \frac{L_h^{0.8} (S+1)^{0.7}}{(1900\ Y)^{0.5}}$ (hrs)	0.63	0.11
6.	$T_c = \frac{5 L_a}{3}$ (hrs)	1.05	0.19
	T_c (minutes)	63	11
	USE TOC (minutes)	**60**	**10**

OSPREY ENERGY CENTER

PRE-DEVELOPMENT INPUT/OUTPUT

25-YR, 24-HR

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PRE-DEVELOPMENT CONDITION
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Basin Summary - SIM-1 **********

***		
Basin Name:	B-001	B-002
Group Name:	PRE	PRE
Node Name:	N-001	N-002
Hydrograph Type:	UH	UH
Unit Hydrograph:	UH256	UH256
Peaking Factor:	256.00	256.00
Spec Time Inc (min):	8.00	1.33
Comp Time Inc (min):	8.00	1.33
Rainfall File:	FLMOD	FLMOD
Rainfall Amount (in):	7.25	7.25
Storm Duration (hr):	24.00	24.00
Status:	ONSITE	ONSITE
Time of Conc. (min):	60.00	10.00
Lag Time (hr):	0.00	0.00
Area (acres):	14.80	4.66
Vol of Unit Hyd (in):	1.00	1.00
Curve Number:	64.00	82.00
DCIA (%):	0.00	0.00
Time Max (hrs):	12.67	12.04
Flow Max (cfs):	12.49	16.74
Runoff Volume (in):	3.19	5.15
Runoff Volume (cf):	171472	87102

OSPREY ENERGY CENTER

PRE-DEVELOPMENT INPUT/OUTPUT

FDOT (100-YR THRU 2-YR)

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PRE-DEVELOPMENT - FDOT 2-YR, 8-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Basin Summary - SIM-1 **********

***

Basin Name:	B-001
Group Name:	PRE
Node Name:	N-001
Hydrograph Type:	UH
Unit Hydrograph:	UH256
Peaking Factor:	256.00
Spec Time Inc (min):	8.00
Comp Time Inc (min):	8.00
Rainfall File:	FDOT-8
Rainfall Amount (in):	3.84
Storm Duration (hr):	8.00
Status:	ONSITE
Time of Conc. (min):	60.00
Lag Time (hr):	0.00
Area (acres):	14.80
Vol of Unit Hyd (in):	1.00
Curve Number:	64.00
DCIA (%):	0.00
Time Max (hrs):	5.20
Flow Max (cfs):	3.39
Runoff Volume (in):	0.88
Runoff Volume (cf):	47467

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PRE-DEVELOPMENT - FDOT 3-YR, 8-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Basin Summary - SIM-1 **********

***

Basin Name:	B-001
Group Name:	PRE
Node Name:	N-001
Hydrograph Type:	UH
Unit Hydrograph:	UH256
Peaking Factor:	256.00
Spec Time Inc (min):	8.00
Comp Time Inc (min):	8.00
Rainfall File:	FDOT-8
Rainfall Amount (in):	4.40
Storm Duration (hr):	8.00
Status:	ONSITE
Time of Conc. (min):	60.00
Lag Time (hr):	0.00
Area (acres):	14.80
Vol of Unit Hyd (in):	1.00
Curve Number:	64.00
DCIA (%):	0.00
Time Max (hrs):	5.07
Flow Max (cfs):	4.64
Runoff Volume (in):	1.20
Runoff Volume (cf):	64722

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PRE-DEVELOPMENT - FDOT 5-YR, 8-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Basin Summary - SIM-1 **********

***

Basin Name:	B-001
Group Name:	PRE
Node Name:	N-001
Hydrograph Type:	UH
Unit Hydrograph:	UH256
Peaking Factor:	256.00
Spec Time Inc (min):	8.00
Comp Time Inc (min):	8.00
Rainfall File:	FDOT-8
Rainfall Amount (in):	4.88
Storm Duration (hr):	8.00
Status:	ONSITE
Time of Conc. (min):	60.00
Lag Time (hr):	0.00
Area (acres):	14.80
Vol of Unit Hyd (in):	1.00
Curve Number:	64.00
DCIA (%):	0.00
Time Max (hrs):	4.93
Flow Max (cfs):	5.81
Runoff Volume (in):	1.50
Runoff Volume (cf):	80730

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PRE-DEVELOPMENT - FDOT 10-YR, 8-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Basin Summary - SIM-1 **********

***

Basin Name:	B-001
Group Name:	PRE
Node Name:	N-001
Hydrograph Type:	UH
Unit Hydrograph:	UH256
Peaking Factor:	256.00
Spec Time Inc (min):	8.00
Comp Time Inc (min):	8.00
Rainfall File:	FDOT-8
Rainfall Amount (in):	5.60
Storm Duration (hr):	8.00
Status:	ONSITE
Time of Conc. (min):	60.00
Lag Time (hr):	0.00
Area (acres):	14.80
Vol of Unit Hyd (in):	1.00
Curve Number:	64.00
DCIA (%):	0.00
Time Max (hrs):	4.67
Flow Max (cfs):	7.78
Runoff Volume (in):	1.98
Runoff Volume (cf):	106484

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PRE-DEVELOPMENT - FDOT 25-YR, 8-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Basin Summary - SIM-1 **********

***

Basin Name:	B-001
Group Name:	PRE
Node Name:	N-001
Hydrograph Type:	UH
Unit Hydrograph:	UH256
Peaking Factor:	256.00
Spec Time Inc (min):	8.00
Comp Time Inc (min):	8.00
Rainfall File:	FDOT-8
Rainfall Amount (in):	6.56
Storm Duration (hr):	8.00
Status:	ONSITE
Time of Conc. (min):	60.00
Lag Time (hr):	0.00
Area (acres):	14.80
Vol of Unit Hyd (in):	1.00
Curve Number:	64.00
DCIA (%):	0.00
Time Max (hrs):	4.53
Flow Max (cfs):	10.68
Runoff Volume (in):	2.67
Runoff Volume (cf):	143438

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PRE-DEVELOPMENT - FDOT 50-YR, 8-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Basin Summary - SIM-1 **********

***

Basin Name:	B-001
Group Name:	PRE
Node Name:	N-001
Hydrograph Type:	UH
Unit Hydrograph:	UH256
Peaking Factor:	256.00
Spec Time Inc (min):	8.00
Comp Time Inc (min):	8.00
Rainfall File:	FDOT-8
Rainfall Amount (in):	7.36
Storm Duration (hr):	8.00
Status:	ONSITE
Time of Conc. (min):	60.00
Lag Time (hr):	0.00
Area (acres):	14.80
Vol of Unit Hyd (in):	1.00
Curve Number:	64.00
DCIA (%):	0.00
Time Max (hrs):	4.53
Flow Max (cfs):	13.25
Runoff Volume (in):	3.28
Runoff Volume (cf):	176039

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PRE-DEVELOPMENT - FDOT 100-YR, 1-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Basin Summary - SIM-1 **********

***

Basin Name:	B-001
Group Name:	PRE
Node Name:	N-001
Hydrograph Type:	UH
Unit Hydrograph:	UH256
Peaking Factor:	256.00
Spec Time Inc (min):	8.00
Comp Time Inc (min):	8.00
Rainfall File:	FDOT-1
Rainfall Amount (in):	4.60
Storm Duration (hr):	1.00
Status:	ONSITE
Time of Conc. (min):	60.00
Lag Time (hr):	0.00
Area (acres):	14.80
Vol of Unit Hyd (in):	1.00
Curve Number:	64.00
DCIA (%):	0.00
Time Max (hrs):	1.20
Flow Max (cfs):	11.15
Runoff Volume (in):	1.32
Runoff Volume (cf):	70759

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PRE-DEVELOPMENT - FDOT 100-YR, 2-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Basin Summary - SIM-1 **********

***

Basin Name:	B-001
Group Name:	PRE
Node Name:	N-001
Hydrograph Type:	UH
Unit Hydrograph:	UH256
Peaking Factor:	256.00
Spec Time Inc (min):	8.00
Comp Time Inc (min):	8.00
Rainfall File:	FDOT-2
Rainfall Amount (in):	5.60
Storm Duration (hr):	2.00
Status:	ONSITE
Time of Conc. (min):	60.00
Lag Time (hr):	0.00
Area (acres):	14.80
Vol of Unit Hyd (in):	1.00
Curve Number:	64.00
DCIA (%):	0.00
Time Max (hrs):	1.60
Flow Max (cfs):	12.37
Runoff Volume (in):	1.98
Runoff Volume (cf):	106484

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PRE-DEVELOPMENT - FDOT 100-YR, 4-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Basin Summary - SIM-1 **********

***

Basin Name:	B-001
Group Name:	PRE
Node Name:	N-001
Hydrograph Type:	UH
Unit Hydrograph:	UH256
Peaking Factor:	256.00
Spec Time Inc (min):	8.00
Comp Time Inc (min):	8.00
Rainfall File:	FDOT-4
Rainfall Amount (in):	6.80
Storm Duration (hr):	4.00
Status:	ONSITE
Time of Conc. (min):	60.00
Lag Time (hr):	0.00
Area (acres):	14.80
Vol of Unit Hyd (in):	1.00
Curve Number:	64.00
DCIA (%):	0.00
Time Max (hrs):	3.20
Flow Max (cfs):	15.42
Runoff Volume (in):	2.85
Runoff Volume (cf):	153065

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PRE-DEVELOPMENT - FDOT 100-YR, 8-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Basin Summary - SIM-1 **********

***

Basin Name:	B-001
Group Name:	PRE
Node Name:	N-001
Hydrograph Type:	UH
Unit Hydrograph:	UH256
Peaking Factor:	256.00
Spec Time Inc (min):	8.00
Comp Time Inc (min):	8.00
Rainfall File:	FDOT-8
Rainfall Amount (in):	8.00
Storm Duration (hr):	8.00
Status:	ONSITE
Time of Conc. (min):	60.00
Lag Time (hr):	0.00
Area (acres):	14.80
Vol of Unit Hyd (in):	1.00
Curve Number:	64.00
DCIA (%):	0.00
Time Max (hrs):	4.53
Flow Max (cfs):	15.38
Runoff Volume (in):	3.78
Runoff Volume (cf):	203075

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PRE-DEVELOPMENT - FDOT 100-YR, 24-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Basin Summary - SIM-1 **********

***

Basin Name:	B-001
Group Name:	PRE
Node Name:	N-001
Hydrograph Type:	UH
Unit Hydrograph:	UH256
Peaking Factor:	256.00
Spec Time Inc (min):	8.00
Comp Time Inc (min):	8.00
Rainfall File:	FDOT-24
Rainfall Amount (in):	10.56
Storm Duration (hr):	24.00
Status:	ONSITE
Time of Conc. (min):	60.00
Lag Time (hr):	0.00
Area (acres):	14.80
Vol of Unit Hyd (in):	1.00
Curve Number:	64.00
DCIA (%):	0.00
Time Max (hrs):	12.40
Flow Max (cfs):	8.22
Runoff Volume (in):	5.91
Runoff Volume (cf):	317453

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PRE-DEVELOPMENT - FDOT 100-YR, 72-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Basin Summary - SIM-1 **********

***

Basin Name:	B-001
Group Name:	PRE
Node Name:	N-001
Hydrograph Type:	UH
Unit Hydrograph:	UH256
Peaking Factor:	256.00
Spec Time Inc (min):	8.00
Comp Time Inc (min):	8.00
Rainfall File:	FDOT-72
Rainfall Amount (in):	13.00
Storm Duration (hr):	72.00
Status:	ONSITE
Time of Conc. (min):	60.00
Lag Time (hr):	0.00
Area (acres):	14.80
Vol of Unit Hyd (in):	1.00
Curve Number:	64.00
DCIA (%):	0.00
Time Max (hrs):	60.13
Flow Max (cfs):	7.83
Runoff Volume (in):	8.06
Runoff Volume (cf):	432763

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PRE-DEVELOPMENT - FDOT 100-YR, 168-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Basin Summary - SIM-1 **********

***

Basin Name:	B-001
Group Name:	PRE
Node Name:	N-001
Hydrograph Type:	UH
Unit Hydrograph:	UH256
Peaking Factor:	256.00
Spec Time Inc (min):	8.00
Comp Time Inc (min):	8.00
Rainfall File:	FDOT-168
Rainfall Amount (in):	16.00
Storm Duration (hr):	168.00
Status:	ONSITE
Time of Conc. (min):	60.00
Lag Time (hr):	0.00
Area (acres):	14.80
Vol of Unit Hyd (in):	1.00
Curve Number:	64.00
DCIA (%):	0.00
Time Max (hrs):	160.00
Flow Max (cfs):	6.40
Runoff Volume (in):	10.79
Runoff Volume (cf):	579663

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PRE-DEVELOPMENT - FDOT 100-YR, 240-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Basin Summary - SIM-1 **********

***

Basin Name:	B-001
Group Name:	PRE
Node Name:	N-001
Hydrograph Type:	UH
Unit Hydrograph:	UH256
Peaking Factor:	256.00
Spec Time Inc (min):	8.00
Comp Time Inc (min):	8.00
Rainfall File:	FDOT-240
Rainfall Amount (in):	18.00
Storm Duration (hr):	240.00
Status:	ONSITE
Time of Conc. (min):	60.00
Lag Time (hr):	0.00
Area (acres):	14.80
Vol of Unit Hyd (in):	1.00
Curve Number:	64.00
DCIA (%):	0.00
Time Max (hrs):	184.00
Flow Max (cfs):	8.34
Runoff Volume (in):	12.65
Runoff Volume (cf):	679713

APPENDIX B
WATER QUALITY CALCULATIONS

OSPREY ENERGY CENTER

WATER QUALITY CALCULATIONS

POND #1 (NODE N-101)

IMAGE QUALITY

AS YOU REVIEW THE NEXT FEW PAGES, PLEASE NOTE THAT THE ORIGINAL DOCUMENT WAS OF POOR QUALITY.

MODRET

SUMMARY OF UNSATURATED & SATURATED INPUT PARAMETERS

PROJECT NAME : OEC POND #1
POLLUTION VOLUME RUNOFF DATA USED
UNSATURATED ANALYSIS EXCLUDED

Pond Bottom Area	30,056.00 ft²
Pond Volume between Bottom & DHWL	65,775.00 ft³
Pond Length to Width Ratio (L/W)	5.70
Elevation of Effective Aquifer Base	100.00 ft
Elevation of Seasonal High Groundwater Table	136.00 ft
Elevation of Starting Water Level	140.50 ft
Elevation of Pond Bottom	140.50 ft
Design High Water Level Elevation	142.50 ft
Avg. Effective Storage Coefficient of Soil for Unsaturated Analysis	0.20
Unsaturated Vertical Hydraulic Conductivity	2.00 ft/d
Factor of Safety	2.00
Saturated Horizontal Hydraulic Conductivity	4.00 ft/d
Avg. Effective Storage Coefficient of Soil for Saturated Analysis	0.20
Avg. Effective Storage Coefficient of Pond/Exfiltration Trench	1.00

Hydraulic Control Features:

	Top	Bottom	Left	Right
Groundwater Control Features - Y/N	N	N	N	N
Distance to Edge of Pond	0.00	0.00	0.00	0.00
Elevation of Water Level	0.00	0.00	0.00	0.00
Impervious Barrier - Y/N	N	N	N	N
Elevation of Barrier Bottom	0.00	0.00	0.00	0.00

MODRET

SUMMARY OF RESULTS

PROJECT NAME : OEC POND #1

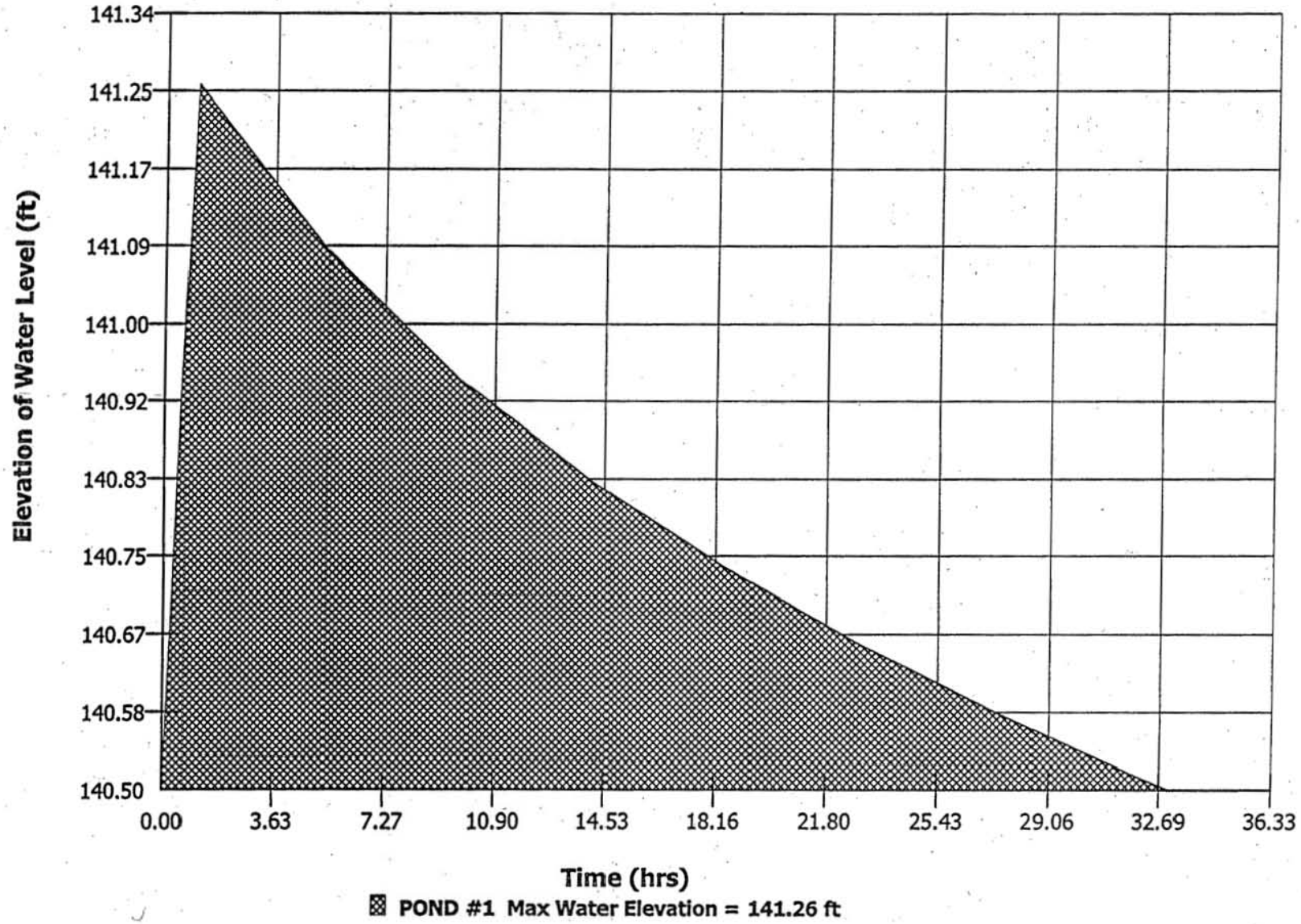
CUMULATIVE TIME (hrs)	WATER ELEVATION (feet)	INSTANTANEOUS INFILTRATION RATE (cfs)	AVERAGE INFILTRATION RATE (cfs)	CUMULATIVE OVERFLOW (ft^3)
00.00 - 0.00	136.000	0.000 *		
			0.00000	
0.00	136.000	0.53805		
			0.51252	
1.00	141.261	0.48699		0.00
			0.37530	
5.38	141.081	0.33186		0.00
			0.28841	
9.75	140.943	0.26009		0.00
			0.23176	
14.13	140.832	0.21349		0.00
			0.19522	
18.50	140.738	0.18254		0.00
			0.16986	
22.88	140.657	0.16026		0.00
			0.15067	
27.25	140.585	0.14381		0.00
			0.13694	
31.63	140.519	0.13138		0.00
			0.12582	
33.02	140.500			0.00

Maximum Water Elevation: 141.261 feet @ 1.00 hours Recovery @ 33.023 hours

* Time increment when there is no runoff

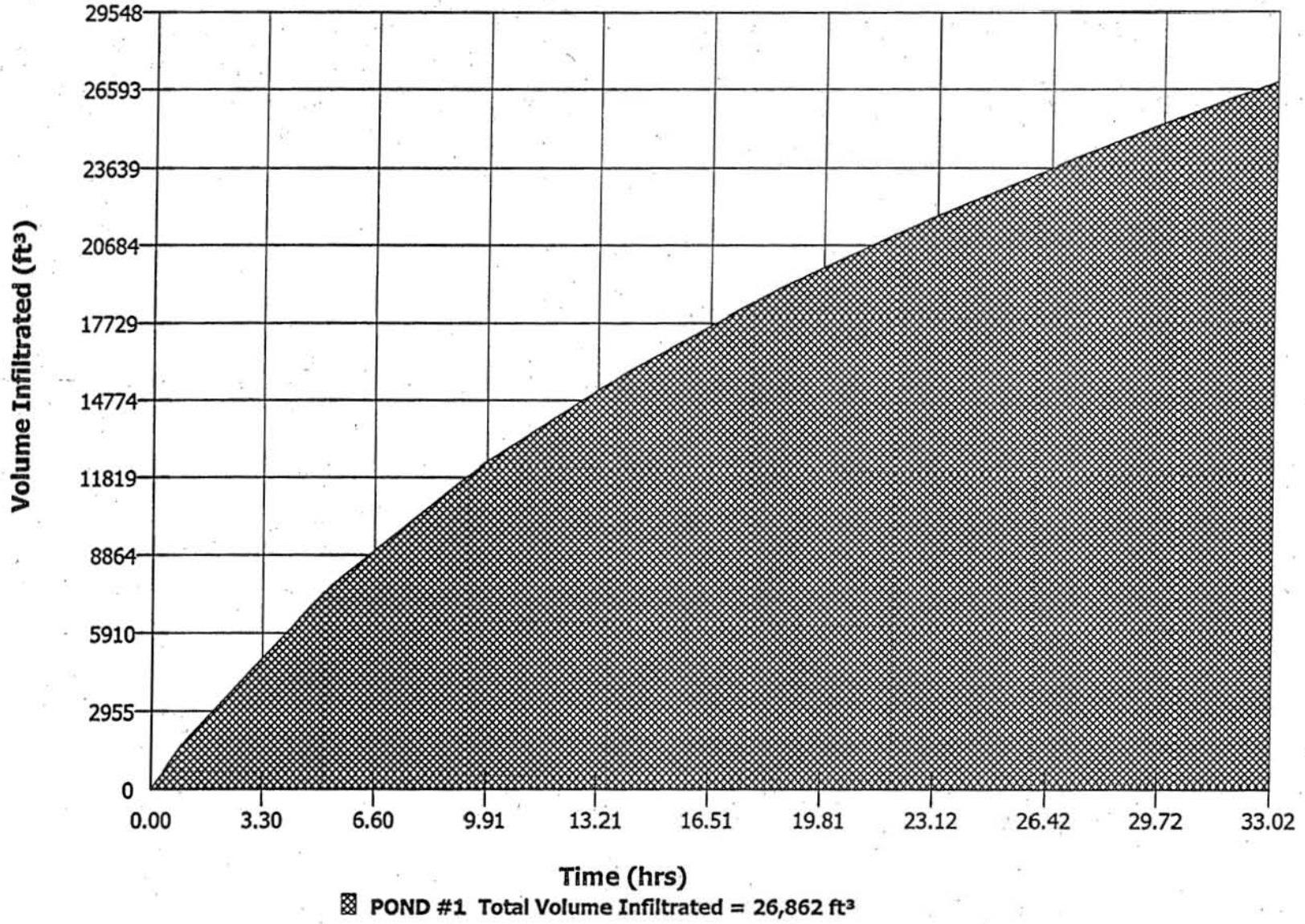
MODRET

INFILTRATION : OSPREY ENERGY CENTER



MODRET

INFILTRATION : OSPREY ENERGY CENTER



OSPREY ENERGY CENTER

WATER QUALITY CALCULATIONS

POND #2 (NODE N-102)

MODRET

SUMMARY OF UNSATURATED & SATURATED INPUT PARAMETERS

PROJECT NAME : OEC POND #2
POLLUTION VOLUME RUNOFF DATA USED
UNSATURATED ANALYSIS EXCLUDED

Pond Bottom Area	5,350.00 ft²
Pond Volume between Bottom & DHWL	17,424.00 ft³
Pond Length to Width Ratio (L/W)	30.00
Elevation of Effective Aquifer Base	110.00 ft
Elevation of Seasonal High Groundwater Table	143.00 ft
Elevation of Starting Water Level	144.50 ft
Elevation of Pond Bottom	144.50 ft
Design High Water Level Elevation	146.00 ft
Avg. Effective Storage Coefficient of Soil for Unsaturated Analysis	0.20
Unsaturated Vertical Hydraulic Conductivity	2.00 ft/d
Factor of Safety	2.00
Saturated Horizontal Hydraulic Conductivity	3.00 ft/d
Avg. Effective Storage Coefficient of Soil for Saturated Analysis	0.20
Avg. Effective Storage Coefficient of Pond/Exfiltration Trench	1.00

Hydraulic Control Features:

	Top	Bottom	Left	Right
Groundwater Control Features - Y/N	N	N	N	N
Distance to Edge of Pond	0.00	0.00	0.00	0.00
Elevation of Water Level	0.00	0.00	0.00	0.00
Impervious Barrier - Y/N	N	N	N	N
Elevation of Barrier Bottom	0.00	0.00	0.00	0.00

MODRET

SUMMARY OF RESULTS

PROJECT NAME : OEC POND #2

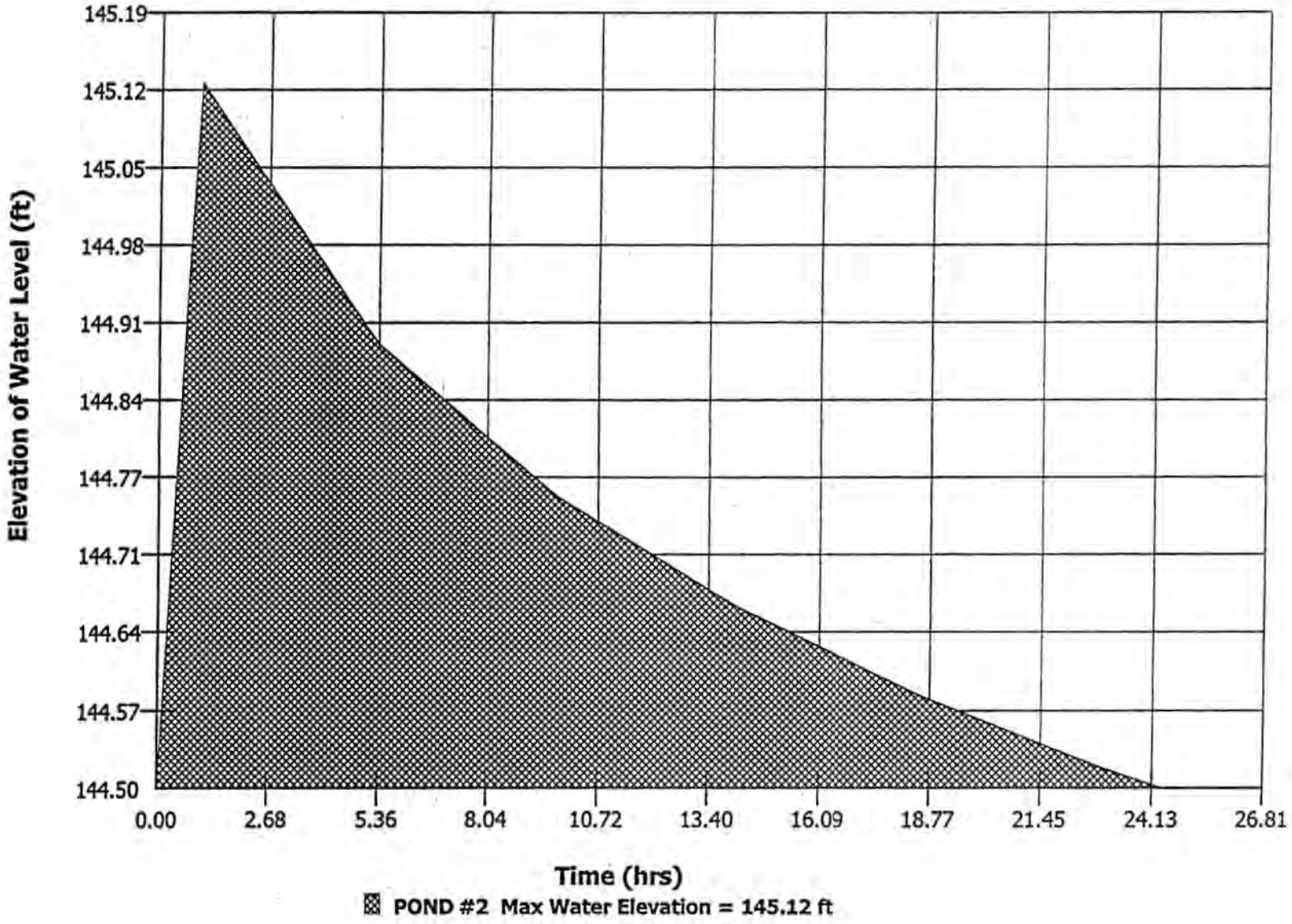
CUMULATIVE TIME (hrs)	WATER ELEVATION (feet)	INSTANTANEOUS INFILTRATION RATE (cfs)	AVERAGE INFILTRATION RATE (cfs)	CUMULATIVE OVERFLOW (ft^3)
00.00 - 0.00	143.000	0.000 *		
			0.00000	
0.00	143.000	0.49942		
			0.44785	
1.00	145.124	0.39627		0.00
			0.17064	
5.38	144.892	0.13534		0.00
			0.10005	
9.75	144.757	0.08601		0.00
			0.07198	
14.13	144.659	0.06426		0.00
			0.05654	
18.50	144.582	0.05178		0.00
			0.04702	
22.88	144.519	0.04363		0.00
			0.04024	
24.37	144.500	0.03751		0.00
			0.03479	
31.63	144.417	0.03316		0.00
			0.03154	
36.00	144.374			0.00

Maximum Water Elevation: 145.124 feet @ 1.00 hours Recovery @ 24.371 hours

* Time increment when there is no runoff

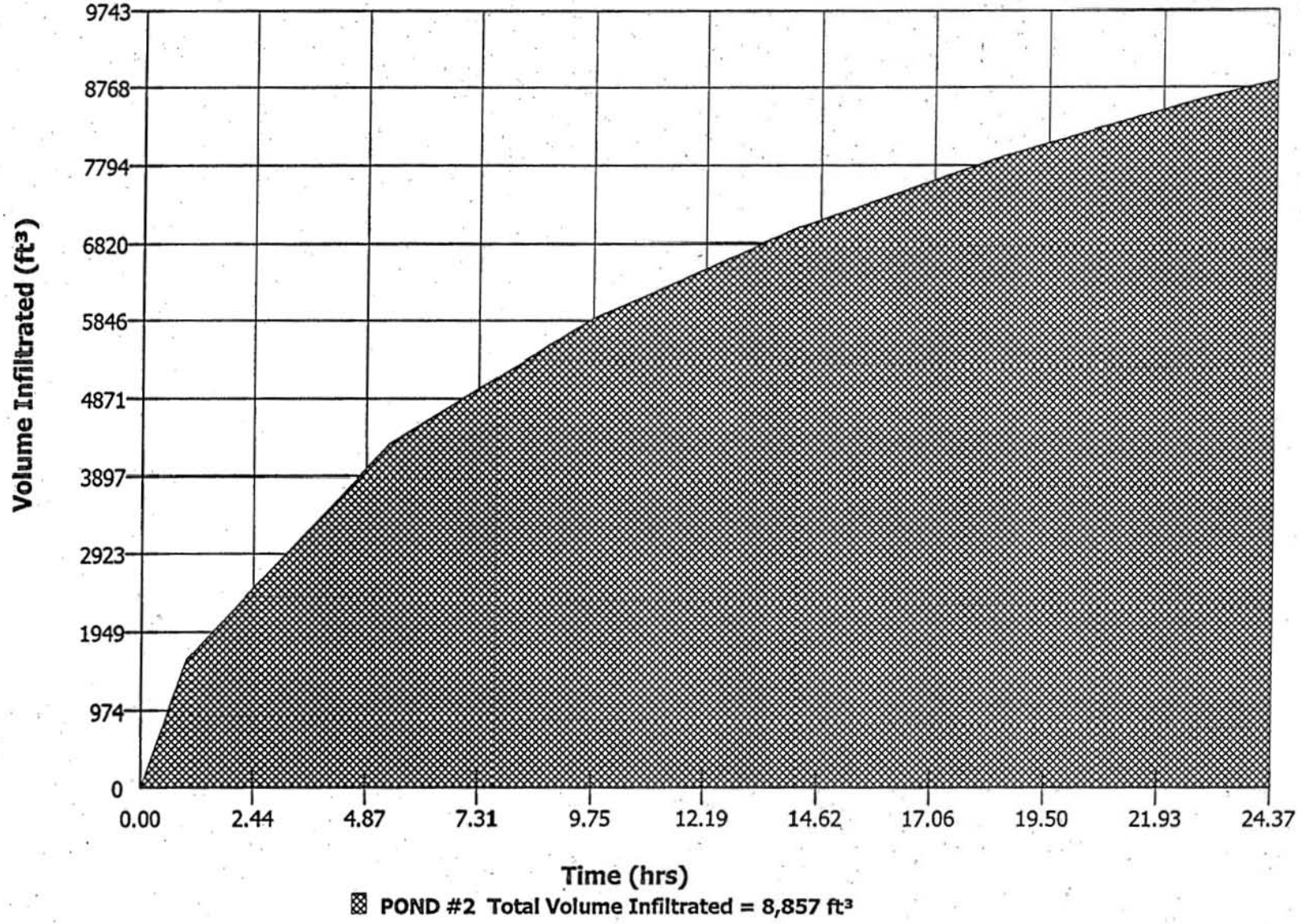
MODRET

INFILTRATION : OEC POND #2



MODRET

INFILTRATION : OEC POND #2



APPENDIX C

POST-DEVELOPMENT CONDITION

(25-YEAR, 24-HOUR)

OSPREY ENERGY CENTER

POST-DEVELOPMENT CALCULATIONS

WORKSHEET FOR COMPUTING PROJECT AREAS

PROJECT TITLE: OSPREY ENERGY CENTER
PROJECT LOCATION: POLK COUNTY, FLORIDA

SURFACE DESCRIPRTION	PERCENTAGE	AREA (sq.ft)	AREA (acres)	COMMENTS
Total project area			*19.46*	*Total project area*
Developed project site area			*19.46*	
Site drainage contributing area			*19.46*	
Offsite drainage contributing area			*0*	
NORTH SUB-BASIN			4.66	
Paved road & parking		12,198	0.28	
Pervious/grass area		190,792	4.38	
Sub-basin impervious area	**6.01%**		**0.28**	
Sub-basin semi-impervious area	**0.00%**		**-**	
Sub-basin pervious area	**93.99%**		**4.38**	
TOTAL SUB-BASIN AREA	**100.00%**		**4.66**	
SOUTH SUB-BASIN			14.80	
Paved road & parking		84,070	1.93	
Tanks		3,920	0.09	Four tanks
Buildings		82,764	1.90	Control room + generator building
Water pumps pad		2,265	0.05	
Cooler Tower		24,150	0.55	
Switchyard pad foundations		2,200	0.05	
Misc equip. pads.		2,700	0.06	Storage tank, standby generato, and switcgear bldgs.
Gravel area		110,400	2.53	at Switchyard & turbines
Grass area		332,219	7.63	
Sub-basin impervious area	**31.34%**		**4.64**	
Sub-basin semi-impervious area	**17.12%**		**2.53**	
Sub-basin pervious area	**51.53%**		**7.63**	
TOTAL SUB-BASIN AREA	**100.00%**		**14.80**	
TOTAL PROJECT AREA CALCULATIONS				
Total impervious area	**25.28%**		**4.92**	
Total semi-impervious gravel area	**13.02%**		**2.53**	
Total Pervious area	**61.70%**		**12.01**	
PROJECT TOTAL	**100.00%**		**19.46**	

WORKSHEET FOR COMPUTING SCS RUNOFF CURVE NUMBERS
POST-DEVELOPMENT CONDITION

Project Title: OSPREY ENERGY CENTER
Project Location: POLK COUNTY, FLORIDA

Sub-basin ID: B-101
Drainage Area (acres): 14.80

SurfaceType	Land Use Type	Description	SCS Soil Type from Soil Survey	Hydrologic Group	CN_i SCS Curve Number Value	A_i (acres) Area Covered by CN Value	% Area	$A_i \times CN_i$ Weighted CN Value
Impervious	Pavement/Strucures	Road, Buildings, Tanks, & Structures	NA	NA	98	4.64	31.4%	454.7
Semi-impervious	Gravel	Gravel areas (Switchyard & turbines)	NA	NA	80	2.53	17.1%	202.4
Pervious	Grass	Landscaping/grass	NA	A	68	7.63	51.6%	518.8
TOTAL						**14.80**	**100%**	**1176.0**
COMPOSITE CN VALUE					**79.46**	***Use CN = 79***		

Sub-basin ID: B-102
Drainage Area (acres): 4.66

SurfaceType	Land Use Type	Description	SCS Soil Type from Soil Survey	Hydrologic Group	CN_i SCS Curve Number Value	A_i (acres) Area Covered by CN Value	% Area	$A_i \times CN_i$ Weighted CN Value
Impervious	Pavement/Strucures	Road, Buildings, Tanks, & Structures	NA	NA	98	0.28	6.0%	27.4
Semi-impervious	Gravel	Gravel areas (Switchyard & turbines)	NA	NA	80	0.00	0.0%	0.0
Pervious	Grass	Landscaping/grass	NA	A	75	4.38	94.0%	328.5
TOTAL						**4.66**	**100%**	**355.9**
COMPOSITE CN VALUE					**76.38**	***Use CN = 77***		

Notes:
- Composite CN Value $= \Sigma A_i \times CN_i \div \Sigma A_i$

WORKSHEET FOR COMPUTING TIME OF CONCENTATION (T_c) OR TRAVEL TIME (T_t)
POST-DEVELOPMENT CONDITION

Project Title: OSPREY ENERGY CENTER
Project Location: POLK COUNTY, FLORIDA

Sub-basin ID: B-102

Check one: ☐ Present ☒ Developed

Check one: ☒ T_c ☐ T_t through subarea _____

NOTES

Sheet flow (Applicable to T_c only)		Segment ID		AB				
1. Surface description				Grass				
2. Manning's roghness coeff., n				0.4				
3. Flow length, L (total L≤ 300 ft)			ft	300				
4. Two-yr 24-hr rainfall, P_2			in	4				
5. Land slope, s			ft/ft	0.002				
6. $T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\, s^{0.4}}$	Compute T_t		hr	1.94	+	0.00	=	1.94
Shallow concentrated flow		Segment ID						
7. Surface description (paved or unpaved)								
8. Flow length, L			ft	0				
9. Watercourse slope, s			ft/ft	0				
10. Average velocity, V			ft/s	0				
11. $T_t = \frac{L}{3600\,V}$	Compute T_t		hr	0.00	+	0.00	=	0.000
Channel flow		Segment ID						
12. Cross sectional flow area, a			ft^2	0		0		
13. Wetted perimeter, P_w			ft	0		0		
14. Hydraulic radius, r=a/p_w	Compute r		ft	0.000		0.000		
15. Channel slope, s			ft/ft	0		0		
16. Manning's roghness coeff., n				0		0		
17. $V = \frac{1.49\, r^{2/3}\, S^{1/2}}{n}$	Compute V		ft/s	0.00		0.00		
18. Flow length, L			ft	0		0		
19. $T_t = \frac{L}{3600\,V}$	Compute T_t		hr	0.00	+	0.00	=	0.000
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)							hr	1.94

Use TOC= 100 minutes

OSPREY ENERGY CENTER

POST-DEVELOPMENT INPUT

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.11) [1]
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POST DEVELOPMENT INPUT
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Input Report **********

--------Class: Node--------

Name: N-101 Base Flow(cfs): 0 Init Stage(ft): 140.5
Group: POST Length(ft): 0 Warn Stage(ft): 0
Comment: DETENTION POND

Stage(ft)	Area(ac)
140.5	0.69
142.5	0.82

--------Class: Node--------

Name: N-101A Base Flow(cfs): 0 Init Stage(ft): 139.75
Group: POST Length(ft): 0 Warn Stage(ft): 0
Comment: FDOT DRAINAGE SWALE

Time(hrs)	Stage(ft)
0	139.75
12	141
24	140

--------Class: Node--------

Name: N-102 Base Flow(cfs): 0 Init Stage(ft): 144.5
Group: POST Length(ft): 0 Warn Stage(ft): 0
Comment:

Stage(ft)	Volume(af)	Bottom Area(ac): 0
144.5	0	
146	0.4	

--------Class: Node--------

Name: N-102A Base Flow(cfs): 0 Init Stage(ft): 144.5
Group: POST Length(ft): 0 Warn Stage(ft): 0
Comment:

Time(hrs)	Stage(ft)
0	144
12	145
24	144.25

--------Class: Basin--------

Basin: B-101 Node: N-101 Status: On Site Type: SCS Unit Hydr
Group: POST
Unit Hydrograph: UH256 Peak Factor: 256
Rainfall File: FLMOD Storm Duration(hrs): 24
Rainfall Amount(in): 7.25
Area(ac): 14.8 Concentration Time(min): 110
Curve #: 79 Lag Time(hrs): 0
DCIA(%): 0

SOUTH SUB-BASIN

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POST DEVELOPMENT INPUT
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Input Report **********

--------Class: Basin----------

Basin: B-102 Node: N-102 Status: On Site Type: SCS Unit Hydr
Group: POST
Unit Hydrograph: UH256 Peak Factor: 256
Rainfall File: FLMOD Storm Duration(hrs): 24
Rainfall Amount(in): 7.25
Area(ac): 4.88 Concentration Time(min): 100
Curve #: 77 Lag Time(hrs): 0
DCIA(%): 0

NORTH SUB-BASIN

--------Class: Basin----------

Basin: B-001 Node: N-001 Status: On Site Type: SCS Unit Hydr
Group: PRE
Unit Hydrograph: UH256 Peak Factor: 256
Rainfall File: FLMOD Storm Duration(hrs): 24
Rainfall Amount(in): 7.25
Area(ac): 14.8 Concentration Time(min): 60
Curve #: 64 Lag Time(hrs): 0
DCIA(%): 0

SOUTH SUB-BASIN

--------Class: Basin----------

Basin: B-002 Node: N-002 Status: On Site Type: SCS Unit Hydr
Group: PRE
Unit Hydrograph: UH256 Peak Factor: 256
Rainfall File: FLMOD Storm Duration(hrs): 24
Rainfall Amount(in): 7.25
Area(ac): 4.66 Concentration Time(min): 10
Curve #: 82 Lag Time(hrs): 0
DCIA(%): 0

NORTH SUB-BASIN

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.11) [3]
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POST DEVELOPMENT INPUT
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Input Report **
--------Class: Drop Structure--
Name: DO-101 From Node: N-101 Length(ft): 120
Group: POST To Node: N-101A Count: 1

Outlet Cntrl Spec: Use dc or tw Inlet Cntrl Spec: Use dn
Upstream Geometry: Hor Ellipse Downstream Geometry: Hor Ellipse

	UPSTREAM	DOWNSTREAM
Span(in):	30	30
Rise(in):	19	19
Invert(ft):	139.85	139.75
Manning's N:	0.013	0.013
Top Clip(in):	0	0
Bottom Clip(in):	0	0

Entrance Loss Coef: 0.3 Flow: Positive
Exit Loss Coef: 0.1 Equation: Aver Conveyance

Upstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall 29 1
Downstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall 29 1

SOUTH DISCHARGE OUTFALL
*** Weir 1 of 1 for Drop Structure DO-101 *** [TABLE]
Count: 1 Bottom Clip(in): 0
Type: Horiz Top Clip(in): 0
Flow: Positive Weir Discharge Coef: 3.2
Geometry: Rectangular Orifice Discharge Coef: 0.6

Span(in): 37 Invert(ft): 141.4
Rise(in): 49 Control Elev(ft): 141.4

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.11) [4]
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POST DEVELOPMENT INPUT
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Input Report **********

--------Class: Drop Structure----------

Name: DO-102	From Node: N-102	Length(ft): 30
Group: POST	To Node: N-102A	Count: 1

Outlet Cntrl Spec: Use dc or tw Inlet Cntrl Spec: Use dn
Upstream Geometry: Hor Ellipse Downstream Geometry: Hor Ellipse

	UPSTREAM	DOWNSTREAM
Span(in):	18	18
Rise(in):	12	12
Invert(ft):	144.35	144.2
Manning's N:	0.013	0.013
Top Clip(in):	0	0
Bottom Clip(in):	0	0

Entrance Loss Coef: 0.3 Flow: Both
Exit Loss Coef: 0.1 Equation: Aver Conveyance

Upstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall 29 1
Downstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall 29 1

NORTH DISCHARGE OUTFALL

*** Weir 1 of 1 for Drop Structure DO-102 *** [TABLE]

Count: 1		Bottom Clip(in):	0
Type: Horiz		Top Clip(in):	0
Flow: Both		Weir Discharge Coef:	3.2
Geometry: Rectangular		Orifice Discharge Coef:	0.6
Span(in):	24	Invert(ft):	145.3
Rise(in):	36	Control Elev(ft):	145.3

```
Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.11) [5]
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   POST DEVELOPMENT INPUT
   OSPREY ENERGY CENTER
   POLK COUNTY, FLORIDA

   ********** Input Report ************************************************************
   --------Class: Simulation-----------------------------------------------------------
 C:\OSPREY\SIM-1
 Execution: Both
    Header: POST-DEVELOPMENT - FDOT 50-YR, 8-HR
            OSPREY ENERGY CENTER
            POLK COUNTY, FLORIDA
---------HYDRAULICS-----------------------------HYDROLOGY--------------------
        Max Delta Z (ft): 1
          Delta Z Factor: 0.05          Override Defaults: No
     Time Step Optimizer: 10
Drop Structure Optimizer: 10
      Sim Start Time(hrs): 0
        Sim End Time(hrs): 24
       Min Calc Time(sec): 0
       Max Calc Time(sec): 15
         To Hour:   PInc(min):                To Hour:   PInc(min):
         30         15                        30         15
---------GROUP SELECTIONS-----------------------------------------------------------
+ BASE      [02/08/00]      - PRE      [02/01/00]      + POST      [02/08/00]
- DOT       [ NO RUN ]
```

OSPREY ENERGY CENTER

POST-DEVELOPMENT OUTPUT
(NODE N-101 & N-102)

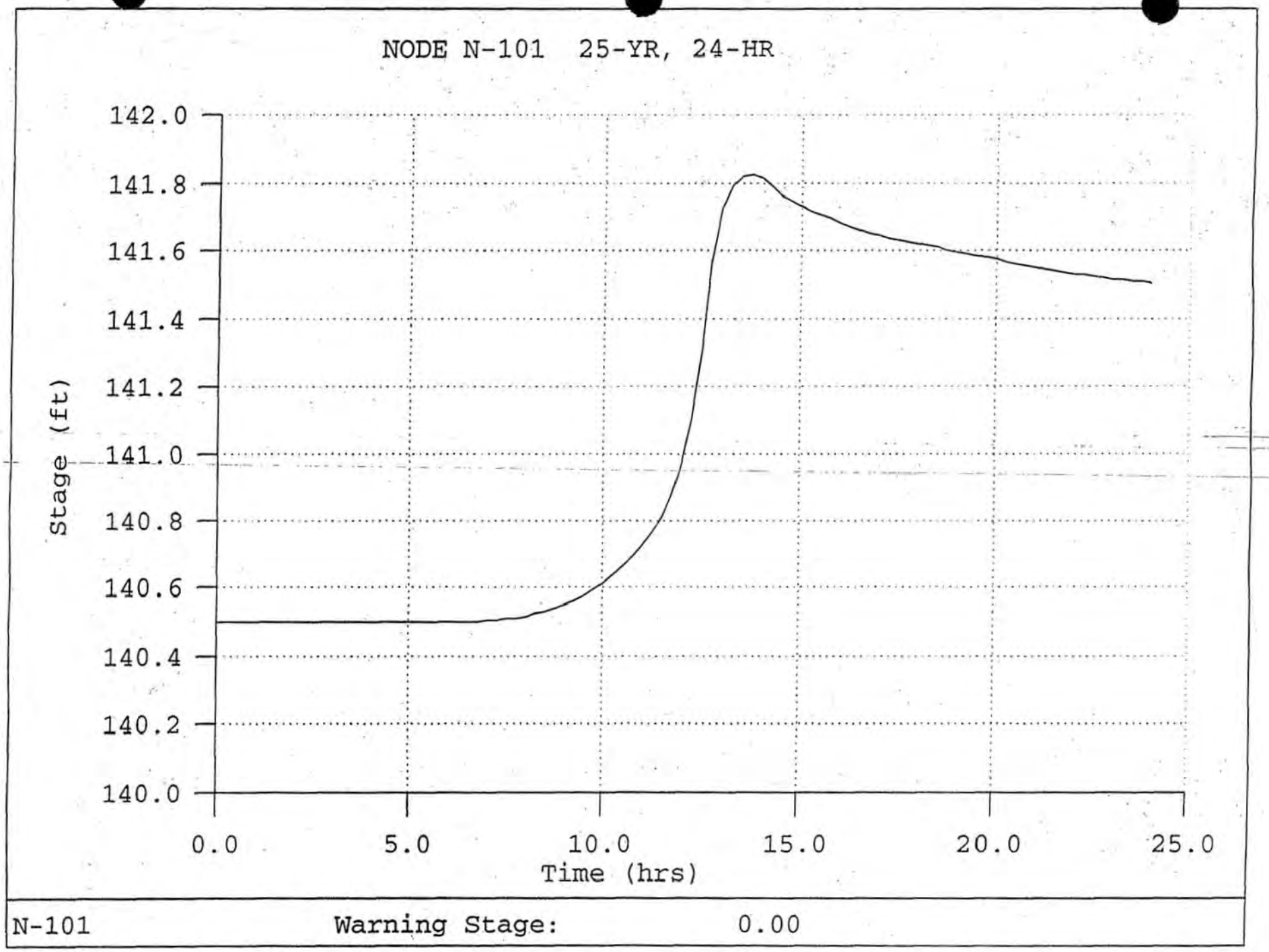
25-YR , 24-HR

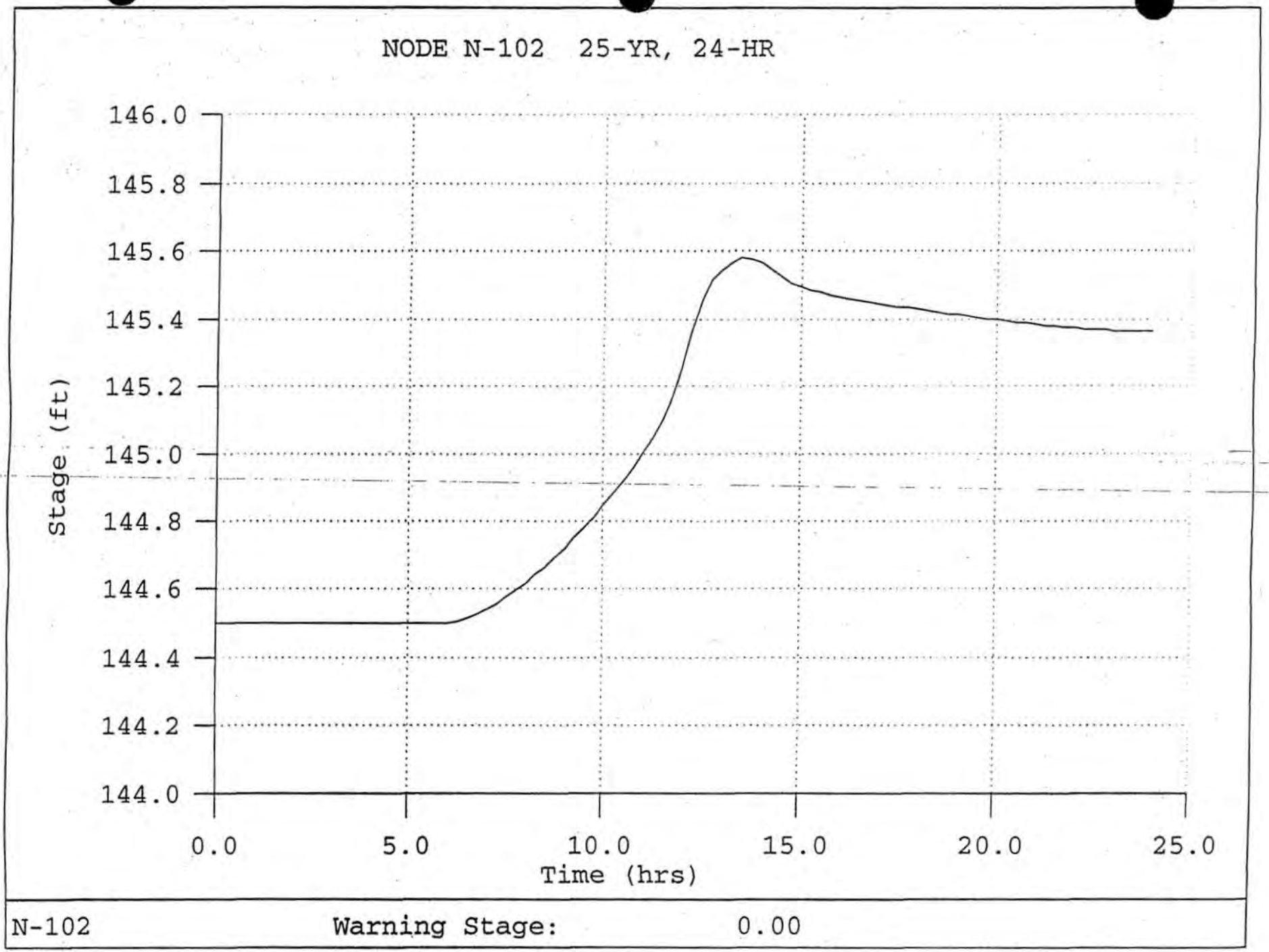
POST-DEVELOPMENT 25-YR, 24-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Maximum Conditions - SIM-1 **********

e(Time units - hours)

Node Name	Group Name	Max Time Conditions	Max Stage (ft)	Warning Stage (ft)	Max Delta Stage (ft)	Max Surface Area (sf)	Max Time Inflow	Max Inflow (cfs)	Max Time Outflow	Max Outflow (cfs)
N-101	POST	13.67	141.82	0.00	0.0045	33807.34	13.25	12.71	13.66	11.83
N-101A	POST	12.00	141.00	0.00	0.0004	0.00	13.66	11.83	0.00	0.00
N-102	POST	13.57	145.58	145.50	0.0021	16729.11	13.00	4.25	13.12	4.04
N-102A	POST	12.00	145.00	0.00	-0.5000	0.00	13.12	4.04	0.00	0.00


NODE N-101 25-YR, 24-HR
142.0
141.8
141.6
141.4
141.2
141.0
140.8
140.6
140.4
140.2
140.0
Stage (ft)
0.0
5.0
10.0
15.0
20.0
25.0
Time (hrs)
N-101
Warning Stage:
0.00


NODE N-102 25-YR, 24-HR
146.0
145.8
145.6
145.4
145.2
145.0
144.8
144.6
144.4
144.2
144.0
Stage (ft)
0.0
5.0
10.0
15.0
20.0
25.0
Time (hrs)
N-102
Warning Stage: 0.00

POST-DEVELOPMENT 25-YR, 24-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Time Series by Node - SIM-1 **********

Time (hrs)	Stage (ft)	Surface Ar.(ac)	Inflow Base Q (cfs)	Inflow Onsite (cfs)	Inflow Offsite (cfs)	Inflow Bndry Q (cfs)	Link Q (cfs)	Link Outflow (cfs)	Cumulative Volume In (ac.ft)	Cumulative Volume Out (ac.ft)
*** Group: POST		Node: N-101								
0.000	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.253	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.503	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.753	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.003	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.253	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.503	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.753	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.003	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.253	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.503	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.753	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.003	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.253	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.503	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.753	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
4.003	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
4.253	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
4.503	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
4.753	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
5.003	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
5.253	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
5.503	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
5.753	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0001	0.0000
6.003	140.50	0.69	0.00	0.01	0.00	0.00	0.00	0.00	0.0002	0.0000
6.253	140.50	0.69	0.00	0.02	0.00	0.00	0.00	0.00	0.0004	0.0000
6.503	140.50	0.69	0.00	0.03	0.00	0.00	0.00	0.00	0.0008	0.0000
6.753	140.50	0.69	0.00	0.04	0.00	0.00	0.00	0.00	0.0016	0.0000
7.003	140.50	0.69	0.00	0.06	0.00	0.00	0.00	0.00	0.0027	0.0000
7.253	140.51	0.69	0.00	0.09	0.00	0.00	0.00	0.00	0.0043	0.0000
7.503	140.51	0.69	0.00	0.12	0.00	0.00	0.00	0.00	0.0065	0.0000
7.753	140.51	0.69	0.00	0.15	0.00	0.00	0.00	0.00	0.0093	0.0000
8.003	140.52	0.69	0.00	0.19	0.00	0.00	0.00	0.00	0.0128	0.0000
8.253	140.52	0.69	0.00	0.23	0.00	0.00	0.00	0.00	0.0171	0.0000
8.503	140.53	0.69	0.00	0.28	0.00	0.00	0.00	0.00	0.0224	0.0000
8.753	140.54	0.69	0.00	0.33	0.00	0.00	0.00	0.00	0.0286	0.0000
9.003	140.55	0.69	0.00	0.39	0.00	0.00	0.00	0.00	0.0360	0.0000
9.253	140.56	0.69	0.00	0.45	0.00	0.00	0.00	0.00	0.0446	0.0000
9.503	140.58	0.70	0.00	0.52	0.00	0.00	0.00	0.00	0.0547	0.0000
9.753	140.60	0.70	0.00	0.60	0.00	0.00	0.00	0.00	0.0664	0.0000
10.003	140.62	0.70	0.00	0.69	0.00	0.00	0.00	0.00	0.0798	0.0000
10.253	140.64	0.70	0.00	0.80	0.00	0.00	0.00	0.00	0.0952	0.0000
10.503	140.66	0.70	0.00	0.91	0.00	0.00	0.00	0.00	0.1128	0.0000
10.753	140.69	0.70	0.00	1.06	0.00	0.00	0.00	0.00	0.1332	0.0000
11.003	140.72	0.70	0.00	1.23	0.00	0.00	0.00	0.00	0.1568	0.0000
11.253	140.76	0.71	0.00	1.43	0.00	0.00	0.00	0.00	0.1843	0.0000

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POST-DEVELOPMENT 25-YR, 24-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Time Series by Node - SIM-1 **********

Time (hrs)	Stage (ft)	Surface Ar.(ac)	Inflow Base Q (cfs)	Inflow Onsite (cfs)	Inflow Offsite (cfs)	Inflow Bndry Q (cfs)	Inflow Link Q (cfs)	Link Outflow (cfs)	Cumulative Volume In (ac.ft)	Cumulative Volume Out (ac.ft)
11.503	140.81	0.71	0.00	1.73	0.00	0.00	0.00	0.00	0.2169	0.0000
11.753	140.87	0.71	0.00	2.42	0.00	0.00	0.00	0.00	0.2596	0.0000
12.003	140.96	0.72	0.00	3.89	0.00	0.00	0.00	0.00	0.3248	0.0000
12.253	141.10	0.73	0.00	6.06	0.00	0.00	0.00	0.00	0.4277	0.0000
12.503	141.31	0.74	0.00	8.82	0.00	0.00	0.00	0.00	0.5815	0.0000
12.753	141.57	0.76	0.00	11.30	0.00	0.00	0.00	3.09	0.7893	0.0319
13.003	141.73	0.77	0.00	12.52	0.00	0.00	0.00	8.54	1.0353	0.1520
13.253	141.79	0.77	0.00	12.70	0.00	0.00	0.00	11.15	1.2959	0.3553
13.503	141.82	0.78	0.00	12.30	0.00	0.00	0.00	11.75	1.5541	0.5918
13.753	141.82	0.78	0.00	11.59	0.00	0.00	0.00	11.80	1.8009	0.8351
14.003	141.81	0.78	0.00	10.79	0.00	0.00	0.00	11.52	2.0322	1.0760
14.253	141.79	0.77	0.00	9.99	0.00	0.00	0.00	10.99	2.2468	1.3085
14.503	141.76	0.77	0.00	9.33	0.00	0.00	0.00	10.07	2.4465	1.5261
14.753	141.75	0.77	0.00	8.77	0.00	0.00	0.00	9.35	2.6334	1.7267
15.003	141.73	0.77	0.00	8.24	0.00	0.00	0.00	8.76	2.8091	1.9139
15.253	141.72	0.77	0.00	7.75	0.00	0.00	0.00	8.23	2.9743	2.0895
15.503	141.71	0.77	0.00	7.29	0.00	0.00	0.00	7.75	3.1297	2.2546
15.753	141.69	0.77	0.00	6.87	0.00	0.00	0.00	7.30	3.2760	2.4101
16.003	141.68	0.77	0.00	6.47	0.00	0.00	0.00	6.88	3.4139	2.5566
16.253	141.67	0.77	0.00	6.08	0.00	0.00	0.00	6.49	3.5435	2.6947
16.503	141.66	0.77	0.00	5.74	0.00	0.00	0.00	6.12	3.6657	2.8249
16.753	141.65	0.76	0.00	5.47	0.00	0.00	0.00	5.79	3.7816	2.9479
17.003	141.64	0.76	0.00	5.25	0.00	0.00	0.00	5.52	3.8924	3.0648
17.253	141.64	0.76	0.00	5.05	0.00	0.00	0.00	5.29	3.9988	3.1765
17.503	141.63	0.76	0.00	4.86	0.00	0.00	0.00	5.08	4.1012	3.2836
17.753	141.62	0.76	0.00	4.68	0.00	0.00	0.00	4.89	4.1997	3.3866
18.003	141.62	0.76	0.00	4.49	0.00	0.00	0.00	4.70	4.2944	3.4857
18.253	141.61	0.76	0.00	4.31	0.00	0.00	0.00	4.52	4.3853	3.5810
18.503	141.61	0.76	0.00	4.13	0.00	0.00	0.00	4.34	4.4725	3.6726
18.753	141.60	0.76	0.00	3.95	0.00	0.00	0.00	4.16	4.5560	3.7604
19.003	141.60	0.76	0.00	3.77	0.00	0.00	0.00	3.99	4.6358	3.8446
19.253	141.59	0.76	0.00	3.60	0.00	0.00	0.00	3.81	4.7120	3.9251
19.503	141.58	0.76	0.00	3.42	0.00	0.00	0.00	3.64	4.7845	4.0020
19.753	141.58	0.76	0.00	3.25	0.00	0.00	0.00	3.46	4.8534	4.0754
20.003	141.57	0.76	0.00	3.08	0.00	0.00	0.00	3.29	4.9187	4.1452
20.253	141.57	0.76	0.00	2.91	0.00	0.00	0.00	3.13	4.9806	4.2115
20.503	141.56	0.76	0.00	2.75	0.00	0.00	0.00	2.96	5.0391	4.2745
20.753	141.56	0.76	0.00	2.61	0.00	0.00	0.00	2.81	5.0945	4.3341
21.003	141.55	0.76	0.00	2.48	0.00	0.00	0.00	2.67	5.1470	4.3907
21.253	141.55	0.76	0.00	2.36	0.00	0.00	0.00	2.54	5.1970	4.4445
21.503	141.54	0.76	0.00	2.24	0.00	0.00	0.00	2.41	5.2445	4.4956
21.753	141.54	0.76	0.00	2.13	0.00	0.00	0.00	2.29	5.2896	4.5442
22.003	141.53	0.76	0.00	2.03	0.00	0.00	0.00	2.18	5.3325	4.5904
22.253	141.53	0.76	0.00	1.92	0.00	0.00	0.00	2.08	5.3733	4.6345
22.503	141.52	0.76	0.00	1.82	0.00	0.00	0.00	1.97	5.4120	4.6763
22.753	141.52	0.76	0.00	1.72	0.00	0.00	0.00	1.87	5.4486	4.7161
23.003	141.51	0.76	0.00	1.65	0.00	0.00	0.00	1.78	5.4834	4.7539

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POST-DEVELOPMENT 25-YR, 24-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Time Series by Node - SIM-1 **********

Time (hrs)	Stage (ft)	Surface Ar.(ac)	Inflow Base Q (cfs)	Inflow Onsite (cfs)	Inflow Offsite (cfs)	Inflow Bndry Q (cfs)	Inflow Link Q (cfs)	Link Outflow (cfs)	Cumulative Volume In (ac.ft)	Cumulative Volume Out (ac.ft)
23.253	141.51	0.76	0.00	1.60	0.00	0.00	0.00	1.71	5.5170	4.7899
23.503	141.51	0.76	0.00	1.56	0.00	0.00	0.00	1.65	5.5497	4.8246
23.753	141.51	0.76	0.00	1.51	0.00	0.00	0.00	1.59	5.5813	4.8581
24.001	141.50	0.76	0.00	1.47	0.00	0.00	0.00	1.55	5.6119	4.8902
*** Group: POST		Node: N-101A								
0.000	139.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.253	139.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.503	139.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.753	139.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.003	139.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.253	139.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.503	139.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.753	139.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.003	139.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.253	139.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.503	140.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.753	140.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.003	140.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.253	140.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.503	140.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.753	140.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
4.003	140.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
4.253	140.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
4.503	140.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
4.753	140.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
5.003	140.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
5.253	140.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
5.503	140.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
5.753	140.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
6.003	140.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
6.253	140.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
6.503	140.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
6.753	140.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
7.003	140.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
7.253	140.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
7.503	140.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
7.753	140.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
8.003	140.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
8.253	140.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
8.503	140.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
8.753	140.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
9.003	140.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
9.253	140.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
9.503	140.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
9.753	140.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
10.003	140.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000

POST-DEVELOPMENT 25-YR, 24-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Time Series by Node - SIM-1 **********

Time (hrs)	Stage (ft)	Surface Ar.(ac)	Inflow Base Q (cfs)	Inflow Onsite (cfs)	Inflow Offsite (cfs)	Inflow Bndry Q (cfs)	Inflow Link Q (cfs)	Link Outflow (cfs)	Cumulative Volume In (ac.ft)	Cumulative Volume Out (ac.ft)
10.253	140.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
10.503	140.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
10.753	140.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
11.003	140.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
11.253	140.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
11.503	140.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
11.753	140.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
12.003	141.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
12.253	140.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
12.503	140.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
12.753	140.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
13.003	140.92	0.00	0.00	0.00	0.00	0.00	3.09	0.00	0.0319	0.0000
13.253	140.90	0.00	0.00	0.00	0.00	0.00	8.54	0.00	0.1520	0.0000
13.503	140.87	0.00	0.00	0.00	0.00	0.00	11.15	0.00	0.3553	0.0000
13.753	140.85	0.00	0.00	0.00	0.00	0.00	11.75	0.00	0.5918	0.0000
14.003	140.83	0.00	0.00	0.00	0.00	0.00	11.80	0.00	0.8351	0.0000
14.253	140.81	0.00	0.00	0.00	0.00	0.00	11.52	0.00	1.0760	0.0000
14.503	140.79	0.00	0.00	0.00	0.00	0.00	10.99	0.00	1.3085	0.0000
14.753	140.77	0.00	0.00	0.00	0.00	0.00	10.07	0.00	1.5261	0.0000
15.003	140.75	0.00	0.00	0.00	0.00	0.00	9.35	0.00	1.7267	0.0000
15.253	140.73	0.00	0.00	0.00	0.00	0.00	8.76	0.00	1.9139	0.0000
15.503	140.71	0.00	0.00	0.00	0.00	0.00	8.23	0.00	2.0895	0.0000
15.753	140.69	0.00	0.00	0.00	0.00	0.00	7.75	0.00	2.2546	0.0000
16.003	140.67	0.00	0.00	0.00	0.00	0.00	7.30	0.00	2.4101	0.0000
16.253	140.65	0.00	0.00	0.00	0.00	0.00	6.88	0.00	2.5566	0.0000
16.503	140.62	0.00	0.00	0.00	0.00	0.00	6.49	0.00	2.6947	0.0000
16.753	140.60	0.00	0.00	0.00	0.00	0.00	6.12	0.00	2.8249	0.0000
17.003	140.58	0.00	0.00	0.00	0.00	0.00	5.79	0.00	2.9479	0.0000
17.253	140.56	0.00	0.00	0.00	0.00	0.00	5.52	0.00	3.0648	0.0000
17.503	140.54	0.00	0.00	0.00	0.00	0.00	5.29	0.00	3.1765	0.0000
17.753	140.52	0.00	0.00	0.00	0.00	0.00	5.08	0.00	3.2836	0.0000
18.003	140.50	0.00	0.00	0.00	0.00	0.00	4.89	0.00	3.3866	0.0000
18.253	140.48	0.00	0.00	0.00	0.00	0.00	4.70	0.00	3.4857	0.0000
18.503	140.46	0.00	0.00	0.00	0.00	0.00	4.52	0.00	3.5810	0.0000
18.753	140.44	0.00	0.00	0.00	0.00	0.00	4.34	0.00	3.6726	0.0000
19.003	140.42	0.00	0.00	0.00	0.00	0.00	4.16	0.00	3.7604	0.0000
19.253	140.40	0.00	0.00	0.00	0.00	0.00	3.99	0.00	3.8446	0.0000
19.503	140.37	0.00	0.00	0.00	0.00	0.00	3.81	0.00	3.9251	0.0000
19.753	140.35	0.00	0.00	0.00	0.00	0.00	3.64	0.00	4.0020	0.0000
20.003	140.33	0.00	0.00	0.00	0.00	0.00	3.46	0.00	4.0754	0.0000
20.253	140.31	0.00	0.00	0.00	0.00	0.00	3.29	0.00	4.1452	0.0000
20.503	140.29	0.00	0.00	0.00	0.00	0.00	3.13	0.00	4.2115	0.0000
20.753	140.27	0.00	0.00	0.00	0.00	0.00	2.96	0.00	4.2745	0.0000
21.003	140.25	0.00	0.00	0.00	0.00	0.00	2.81	0.00	4.3341	0.0000
21.253	140.23	0.00	0.00	0.00	0.00	0.00	2.67	0.00	4.3907	0.0000
21.503	140.21	0.00	0.00	0.00	0.00	0.00	2.54	0.00	4.4445	0.0000
21.753	140.19	0.00	0.00	0.00	0.00	0.00	2.41	0.00	4.4956	0.0000
							2.29		4.5442	

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POST-DEVELOPMENT 25-YR, 24-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Time Series by Node - SIM-1 **********

Time (hrs)	Stage (ft)	Surface Ar.(ac)	Inflow Base Q (cfs)	Inflow Onsite (cfs)	Inflow Offsite (cfs)	Inflow Bndry Q (cfs)	Inflow Link Q (cfs)	Link Outflow (cfs)	Cumulative Volume In (ac.ft)	Cumulative Volume Out (ac.ft)
22.003	140.17	0.00	0.00	0.00	0.00	0.00	2.18	0.00	4.5904	0.0000
22.253	140.15	0.00	0.00	0.00	0.00	0.00	2.08	0.00	4.6345	0.0000
22.503	140.12	0.00	0.00	0.00	0.00	0.00	1.97	0.00	4.6763	0.0000
22.753	140.10	0.00	0.00	0.00	0.00	0.00	1.87	0.00	4.7161	0.0000
23.003	140.08	0.00	0.00	0.00	0.00	0.00	1.78	0.00	4.7539	0.0000
23.253	140.06	0.00	0.00	0.00	0.00	0.00	1.71	0.00	4.7899	0.0000
23.503	140.04	0.00	0.00	0.00	0.00	0.00	1.65	0.00	4.8246	0.0000
23.753	140.02	0.00	0.00	0.00	0.00	0.00	1.59	0.00	4.8581	0.0000
24.001	140.00	0.00	0.00	0.00	0.00	0.00	1.55	0.00	4.8902	0.0000
*** Group: POST		Node: N-102								
0.000	144.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.253	144.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.503	144.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.753	144.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.003	144.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.253	144.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.503	144.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.753	144.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.003	144.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.253	144.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.503	144.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.753	144.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.003	144.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.253	144.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.503	144.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.753	144.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
4.003	144.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
4.253	144.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
4.503	144.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
4.753	144.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
5.003	144.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
5.253	144.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
5.503	144.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
5.753	144.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
6.003	144.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
6.253	144.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
6.503	144.52	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
6.753	144.53	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.0001	0.0000
7.003	144.54	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.0001	0.0000
7.253	144.56	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.0003	0.0000
7.503	144.58	0.03	0.00	0.03	0.00	0.00	0.00	0.00	0.0006	0.0000
7.753	144.60	0.03	0.00	0.03	0.00	0.00	0.00	0.00	0.0011	0.0000
8.003	144.62	0.04	0.00	0.05	0.00	0.00	0.00	0.00	0.0017	0.0000
8.253	144.64	0.05	0.00	0.06	0.00	0.00	0.00	0.00	0.0025	0.0000
8.503	144.67	0.06	0.00	0.07	0.00	0.00	0.00	0.00	0.0036	0.0000
8.753	144.69	0.07	0.00	0.09	0.00	0.00	0.00	0.00	0.0049	0.0000
									0.0065	0.0000

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POST-DEVELOPMENT 25-YR, 24-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Time Series by Node - SIM-1 **********

Time (hrs)	Stage (ft)	Surface Ar.(ac)	Inflow Base Q (cfs)	Inflow Onsite (cfs)	Inflow Offsite (cfs)	Inflow Bndry Q (cfs)	Inflow Link Q (cfs)	Link Outflow (cfs)	Cumulative Volume In (ac.ft)	Cumulative Volume Out (ac.ft)
9.003	144.72	0.08	0.00	0.11	0.00	0.00	0.00	0.00	0.0085	0.0000
9.253	144.75	0.09	0.00	0.13	0.00	0.00	0.00	0.00	0.0109	0.0000
9.503	144.78	0.10	0.00	0.15	0.00	0.00	0.00	0.00	0.0137	0.0000
9.753	144.81	0.11	0.00	0.17	0.00	0.00	0.00	0.00	0.0171	0.0000
10.003	144.84	0.12	0.00	0.20	0.00	0.00	0.00	0.00	0.0210	0.0000
10.253	144.88	0.13	0.00	0.24	0.00	0.00	0.00	0.00	0.0255	0.0000
10.503	144.92	0.15	0.00	0.28	0.00	0.00	0.00	0.00	0.0308	0.0000
10.753	144.96	0.16	0.00	0.32	0.00	0.00	0.00	0.00	0.0370	0.0000
11.003	145.00	0.18	0.00	0.38	0.00	0.00	0.00	0.00	0.0443	0.0000
11.253	145.05	0.19	0.00	0.45	0.00	0.00	0.00	0.00	0.0529	0.0000
11.503	145.10	0.21	0.00	0.56	0.00	0.00	0.00	0.00	0.0633	0.0000
11.753	145.16	0.23	0.00	0.80	0.00	0.00	0.00	0.00	0.0774	0.0000
12.003	145.25	0.27	0.00	1.35	0.00	0.00	0.00	0.00	0.0997	0.0000
12.253	145.37	0.31	0.00	2.19	0.00	0.00	0.00	0.55	0.1362	0.0057
12.503	145.46	0.34	0.00	3.19	0.00	0.00	0.00	2.00	0.1917	0.0320
12.753	145.51	0.36	0.00	3.96	0.00	0.00	0.00	3.17	0.2656	0.0854
13.003	145.54	0.37	0.00	4.25	0.00	0.00	0.00	3.88	0.3504	0.1583
13.253	145.57	0.38	0.00	4.21	0.00	0.00	0.00	3.79	0.4378	0.2375
13.503	145.58	0.38	0.00	4.00	0.00	0.00	0.00	3.91	0.5226	0.3171
13.753	145.58	0.38	0.00	3.71	0.00	0.00	0.00	3.89	0.6022	0.3977
14.003	145.56	0.38	0.00	3.41	0.00	0.00	0.00	3.75	0.6758	0.4766
14.253	145.54	0.37	0.00	3.17	0.00	0.00	0.00	3.54	0.7438	0.5519
14.503	145.52	0.36	0.00	2.96	0.00	0.00	0.00	3.31	0.8072	0.6227
14.753	145.51	0.36	0.00	2.77	0.00	0.00	0.00	2.99	0.8664	0.6877
15.003	145.49	0.35	0.00	2.59	0.00	0.00	0.00	2.75	0.9217	0.7470
15.253	145.49	0.35	0.00	2.42	0.00	0.00	0.00	2.57	0.9735	0.8020
15.503	145.48	0.35	0.00	2.27	0.00	0.00	0.00	2.40	1.0220	0.8534
15.753	145.47	0.35	0.00	2.12	0.00	0.00	0.00	2.25	1.0674	0.9014
16.003	145.46	0.34	0.00	1.99	0.00	0.00	0.00	2.11	1.1099	0.9464
16.253	145.46	0.34	0.00	1.88	0.00	0.00	0.00	1.98	1.1499	0.9886
16.503	145.45	0.34	0.00	1.80	0.00	0.00	0.00	1.88	1.1880	1.0286
16.753	145.45	0.34	0.00	1.72	0.00	0.00	0.00	1.80	1.2244	1.0665
17.003	145.44	0.34	0.00	1.65	0.00	0.00	0.00	1.72	1.2593	1.1028
17.253	145.44	0.33	0.00	1.58	0.00	0.00	0.00	1.65	1.2927	1.1376
17.503	145.43	0.33	0.00	1.52	0.00	0.00	0.00	1.58	1.3247	1.1709
17.753	145.43	0.33	0.00	1.45	0.00	0.00	0.00	1.51	1.3553	1.2028
18.003	145.43	0.33	0.00	1.38	0.00	0.00	0.00	1.44	1.3846	1.2334
18.253	145.42	0.33	0.00	1.32	0.00	0.00	0.00	1.38	1.4125	1.2625
18.503	145.42	0.33	0.00	1.25	0.00	0.00	0.00	1.31	1.4390	1.2903
18.753	145.41	0.33	0.00	1.18	0.00	0.00	0.00	1.25	1.4642	1.3168
19.003	145.41	0.32	0.00	1.12	0.00	0.00	0.00	1.18	1.4880	1.3419
19.253	145.41	0.32	0.00	1.06	0.00	0.00	0.00	1.12	1.5105	1.3657
19.503	145.40	0.32	0.00	0.99	0.00	0.00	0.00	1.06	1.5316	1.3881
19.753	145.40	0.32	0.00	0.93	0.00	0.00	0.00	0.99	1.5515	1.4093
20.003	145.40	0.32	0.00	0.89	0.00	0.00	0.00	0.94	1.5703	1.4293
20.253	145.39	0.32	0.00	0.84	0.00	0.00	0.00	0.89	1.5882	1.4482
20.503	145.39	0.32	0.00	0.80	0.00	0.00	0.00	0.85	1.6052	1.4661

POST-DEVELOPMENT 25-YR, 24-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Time Series by Node - SIM-1 **********

Time (hrs)	Stage (ft)	Surface Ar.(ac)	Inflow Base Q (cfs)	Inflow Onsite (cfs)	Inflow Offsite (cfs)	Inflow Bndry Q (cfs)	Inflow Link Q (cfs)	Link Outflow (cfs)	Cumulative Volume In (ac.ft)	Cumulative Volume Out (ac.ft)
20.753	145.39	0.31	0.00	0.76	0.00	0.00	0.00	0.80	1.6212	1.4832
21.003	145.38	0.31	0.00	0.71	0.00	0.00	0.00	0.76	1.6364	1.4993
21.253	145.38	0.31	0.00	0.67	0.00	0.00	0.00	0.72	1.6507	1.5146
21.503	145.38	0.31	0.00	0.63	0.00	0.00	0.00	0.68	1.6641	1.5290
21.753	145.37	0.31	0.00	0.59	0.00	0.00	0.00	0.63	1.6767	1.5425
22.003	145.37	0.31	0.00	0.56	0.00	0.00	0.00	0.60	1.6886	1.5553
22.253	145.37	0.31	0.00	0.55	0.00	0.00	0.00	0.57	1.7000	1.5674
22.503	145.37	0.31	0.00	0.53	0.00	0.00	0.00	0.55	1.7111	1.5790
22.753	145.37	0.31	0.00	0.52	0.00	0.00	0.00	0.54	1.7220	1.5903
23.003	145.36	0.31	0.00	0.51	0.00	0.00	0.00	0.52	1.7326	1.6012
23.253	145.36	0.31	0.00	0.50	0.00	0.00	0.00	0.51	1.7430	1.6119
23.503	145.36	0.31	0.00	0.48	0.00	0.00	0.00	0.50	1.7531	1.6224
23.753	145.36	0.31	0.00	0.47	0.00	0.00	0.00	0.49	1.7630	1.6325
24.001	145.36	0.31	0.00	0.46	0.00	0.00	0.00	0.47	1.7725	1.6424
*** Group: POST		Node: N-102A								
0.000	144.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.253	144.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.503	144.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.753	144.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.003	144.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.253	144.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.503	144.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.753	144.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.003	144.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.253	144.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.503	144.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.753	144.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.003	144.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.253	144.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.503	144.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.753	144.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
4.003	144.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
4.253	144.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
4.503	144.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
4.753	144.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
5.003	144.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
5.253	144.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
5.503	144.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
5.753	144.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
6.003	144.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
6.253	144.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
6.503	144.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
6.753	144.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
7.003	144.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
7.253	144.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
7.503	144.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000

POST-DEVELOPMENT 25-YR, 24-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Time Series by Node - SIM-1 **********

Time (hrs)	Stage (ft)	Surface Ar.(ac)	Inflow Base Q (cfs)	Inflow Onsite (cfs)	Inflow Offsite (cfs)	Inflow Bndry Q (cfs)	Inflow Link Q (cfs)	Link Outflow (cfs)	Cumulative Volume In (ac.ft)	Cumulative Volume Out (ac.ft)
7.753	144.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
8.003	144.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
8.253	144.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
8.503	144.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
8.753	144.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
9.003	144.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
9.253	144.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
9.503	144.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
9.753	144.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
10.003	144.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
10.253	144.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
10.503	144.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
10.753	144.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
11.003	144.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
11.253	144.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
11.503	144.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
11.753	144.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
12.003	145.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
12.253	144.98	0.00	0.00	0.00	0.00	0.00	0.55	0.00	0.0057	0.0000
12.503	144.97	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.0320	0.0000
12.753	144.95	0.00	0.00	0.00	0.00	0.00	3.17	0.00	0.0854	0.0000
13.003	144.94	0.00	0.00	0.00	0.00	0.00	3.88	0.00	0.1583	0.0000
13.253	144.92	0.00	0.00	0.00	0.00	0.00	3.79	0.00	0.2375	0.0000
13.503	144.91	0.00	0.00	0.00	0.00	0.00	3.91	0.00	0.3171	0.0000
13.753	144.89	0.00	0.00	0.00	0.00	0.00	3.89	0.00	0.3977	0.0000
14.003	144.87	0.00	0.00	0.00	0.00	0.00	3.75	0.00	0.4766	0.0000
14.253	144.86	0.00	0.00	0.00	0.00	0.00	3.54	0.00	0.5519	0.0000
14.503	144.84	0.00	0.00	0.00	0.00	0.00	3.31	0.00	0.6227	0.0000
14.753	144.83	0.00	0.00	0.00	0.00	0.00	2.99	0.00	0.6877	0.0000
15.003	144.81	0.00	0.00	0.00	0.00	0.00	2.75	0.00	0.7470	0.0000
15.253	144.80	0.00	0.00	0.00	0.00	0.00	2.57	0.00	0.8020	0.0000
15.503	144.78	0.00	0.00	0.00	0.00	0.00	2.40	0.00	0.8534	0.0000
15.753	144.77	0.00	0.00	0.00	0.00	0.00	2.25	0.00	0.9014	0.0000
16.003	144.75	0.00	0.00	0.00	0.00	0.00	2.11	0.00	0.9464	0.0000
16.253	144.73	0.00	0.00	0.00	0.00	0.00	1.98	0.00	0.9886	0.0000
16.503	144.72	0.00	0.00	0.00	0.00	0.00	1.88	0.00	1.0286	0.0000
16.753	144.70	0.00	0.00	0.00	0.00	0.00	1.80	0.00	1.0665	0.0000
17.003	144.69	0.00	0.00	0.00	0.00	0.00	1.72	0.00	1.1028	0.0000
17.253	144.67	0.00	0.00	0.00	0.00	0.00	1.65	0.00	1.1376	0.0000
17.503	144.66	0.00	0.00	0.00	0.00	0.00	1.58	0.00	1.1709	0.0000
17.753	144.64	0.00	0.00	0.00	0.00	0.00	1.51	0.00	1.2028	0.0000
18.003	144.62	0.00	0.00	0.00	0.00	0.00	1.44	0.00	1.2334	0.0000
18.253	144.61	0.00	0.00	0.00	0.00	0.00	1.38	0.00	1.2625	0.0000
18.503	144.59	0.00	0.00	0.00	0.00	0.00	1.31	0.00	1.2903	0.0000
18.753	144.58	0.00	0.00	0.00	0.00	0.00	1.25	0.00	1.3168	0.0000
19.003	144.56	0.00	0.00	0.00	0.00	0.00	1.18	0.00	1.3419	0.0000
19.253	144.55	0.00	0.00	0.00	0.00	0.00	1.12	0.00	1.3657	0.0000

POST-DEVELOPMENT 25-YR, 24-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Time Series by Node - SIM-1 **********

Time (hrs)	Stage (ft)	Surface Ar.(ac)	Inflow Base Q (cfs)	Inflow Onsite (cfs)	Inflow Offsite (cfs)	Inflow Bndry Q (cfs)	Inflow Link Q (cfs)	Link Outflow (cfs)	Cumulative Volume In (ac.ft)	Cumulative Volume Out (ac.ft)
19.503	144.53	0.00	0.00	0.00	0.00	0.00	1.06	0.00	1.3881	0.0000
19.753	144.52	0.00	0.00	0.00	0.00	0.00	0.99	0.00	1.4093	0.0000
20.003	144.50	0.00	0.00	0.00	0.00	0.00	0.94	0.00	1.4293	0.0000
20.253	144.48	0.00	0.00	0.00	0.00	0.00	0.89	0.00	1.4482	0.0000
20.503	144.47	0.00	0.00	0.00	0.00	0.00	0.85	0.00	1.4661	0.0000
20.753	144.45	0.00	0.00	0.00	0.00	0.00	0.80	0.00	1.4832	0.0000
21.003	144.44	0.00	0.00	0.00	0.00	0.00	0.76	0.00	1.4993	0.0000
21.253	144.42	0.00	0.00	0.00	0.00	0.00	0.72	0.00	1.5146	0.0000
21.503	144.41	0.00	0.00	0.00	0.00	0.00	0.68	0.00	1.5290	0.0000
21.753	144.39	0.00	0.00	0.00	0.00	0.00	0.63	0.00	1.5425	0.0000
22.003	144.37	0.00	0.00	0.00	0.00	0.00	0.60	0.00	1.5553	0.0000
22.253	144.36	0.00	0.00	0.00	0.00	0.00	0.57	0.00	1.5674	0.0000
22.503	144.34	0.00	0.00	0.00	0.00	0.00	0.55	0.00	1.5790	0.0000
22.753	144.33	0.00	0.00	0.00	0.00	0.00	0.54	0.00	1.5903	0.0000
23.003	144.31	0.00	0.00	0.00	0.00	0.00	0.52	0.00	1.6012	0.0000
23.253	144.30	0.00	0.00	0.00	0.00	0.00	0.51	0.00	1.6119	0.0000
23.503	144.28	0.00	0.00	0.00	0.00	0.00	0.50	0.00	1.6224	0.0000
23.753	144.27	0.00	0.00	0.00	0.00	0.00	0.49	0.00	1.6325	0.0000
24.001	144.25	0.00	0.00	0.00	0.00	0.00	0.47	0.00	1.6424	0.0000

APPENDIX D

POST-DEVELOPMENT CONDITION

(FDOT 100-YEAR THRU 2-YEAR)

BASINS SUMMARY

Project Title: OSPREY ENERGY CENTER

Project Location: POLK COUNTY, FLORIDA

STORM EVENT	RAINFALL DISTRIBUTION (FDOT IDF ZONE 8)	RAINFALL DEPTH (INCHES)	PRE-DEVELOPMENT PEAK DISCHARGE (CFS)	POST-DEVELOPMENT PEAK DISCHARGE (CFS)	PEAK STAGE ELEVATION (FEET)
100-yr, 1-hr	FDOT (1hr)	4.6	11.15	9.22	141.74
100-yr, 2-hr	FDOT (2hr)	5.6	12.37	12.11	141.85
100-yr, 4-hr	FDOT (4hr)	6.8	15.42	14.67 (1) / 12.69 (2)	142.01 (1) / 141.87 (2)
100-yr, 8-hr (3)	FDOT (8hr)	8.0	15.38	15.02 (1) / 13.11 (2)	142.03 (1) / 141.89 (2)
100-yr, 24-hr	FDOT (24hr)	10.56	8.22	9.40	141.75
100-yr, 72-hr	FDOT (72hr)	13.0	7.83	7.20	141.69
100-yr, 168-hr	FDOT (168hr)	16.0	6.40	6.37	141.67
100-yr, 240-hr	FDOT (240hr)	18.0	8.34	8.25	141.73
50-yr, 8-hr	FDOT (8hr)	7.36	13.25	11.33	141.86
25-yr, 8-hr	FDOT (8hr)	6.56	10.68	10.62	141.78
10-yr, 8-hr	FDOT (8hr)	5.6	7.78	7.60	141.71
5-yr, 8-hr	FDOT (8hr)	4.88	5.81	5.46	141.66
3-yr, 8-hr	FDOT (8hr)	4.4	4.64	4.37	141.62
2-yr, 8-hr	FDOT (8hr)	3.84	3.39	3.05	141.57
25-yr,24-hr (N-101)	FLOMD	7.25	14.89	11.83	141.82
25-yr,24-hr (N-102)	FLOMD	7.25	16.74	4.04	145.58

NOTES:

(1) No infiltration is used

(2) Infiltration is used

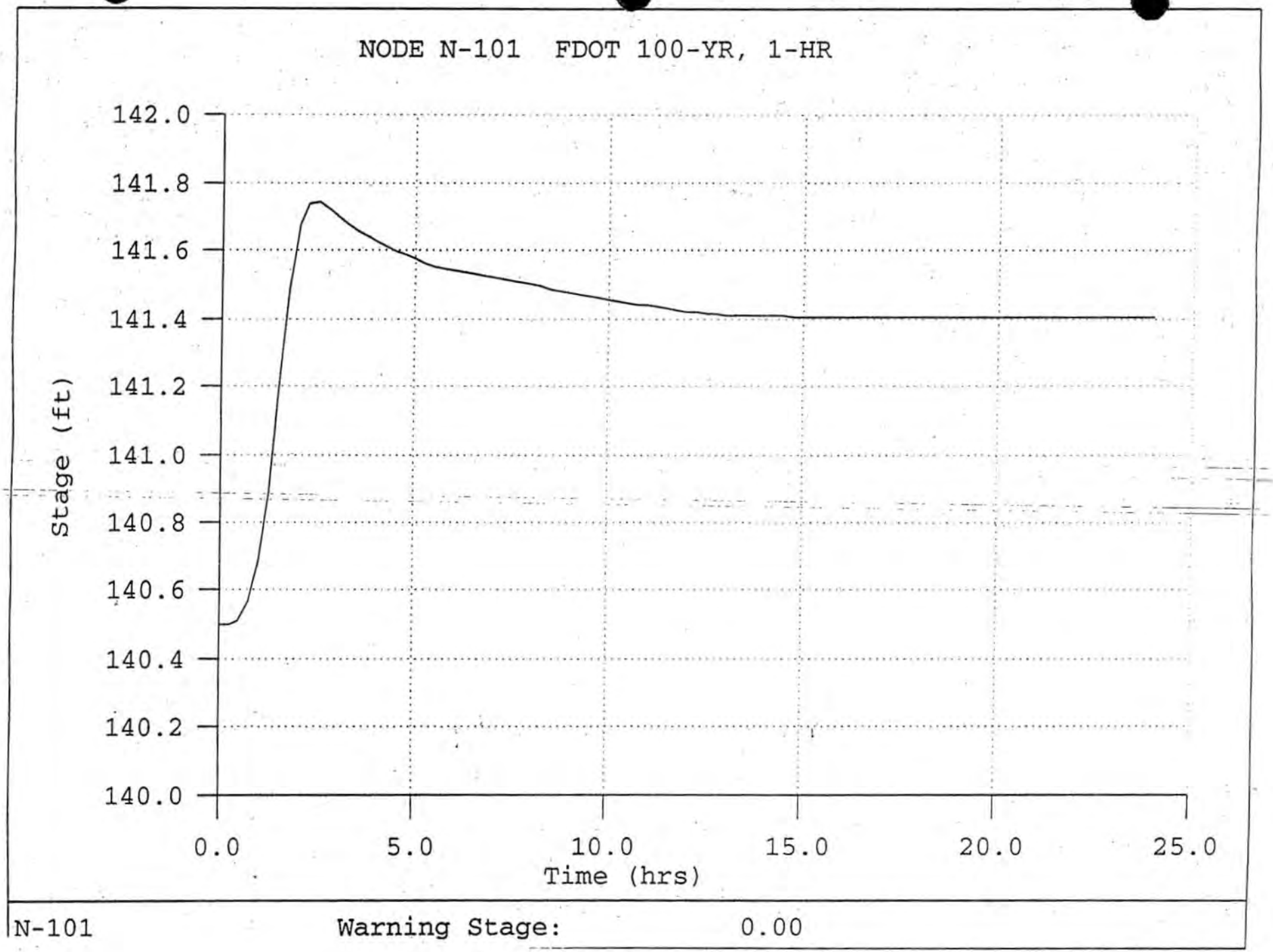
(3) Critical storm event

OSPREY ENERGY CENTER

POST-DEVELOPMENT OUTPUT

(NODE N-101)

FDOT 100-YR, 1-HR


NODE N-101 FDOT 100-YR, 1-HR
142.0
141.8
141.6
141.4
141.2
141.0
140.8
140.6
140.4
140.2
140.0
Stage (ft)
0.0
5.0
10.0
15.0
20.0
25.0
Time (hrs)
N-101
Warning Stage: 0.00

OSPREY ENERGY CENTER

POST-DEVELOPMENT OUTPUT
(NODE N-101)

FDOT 100-YR, 2-HR

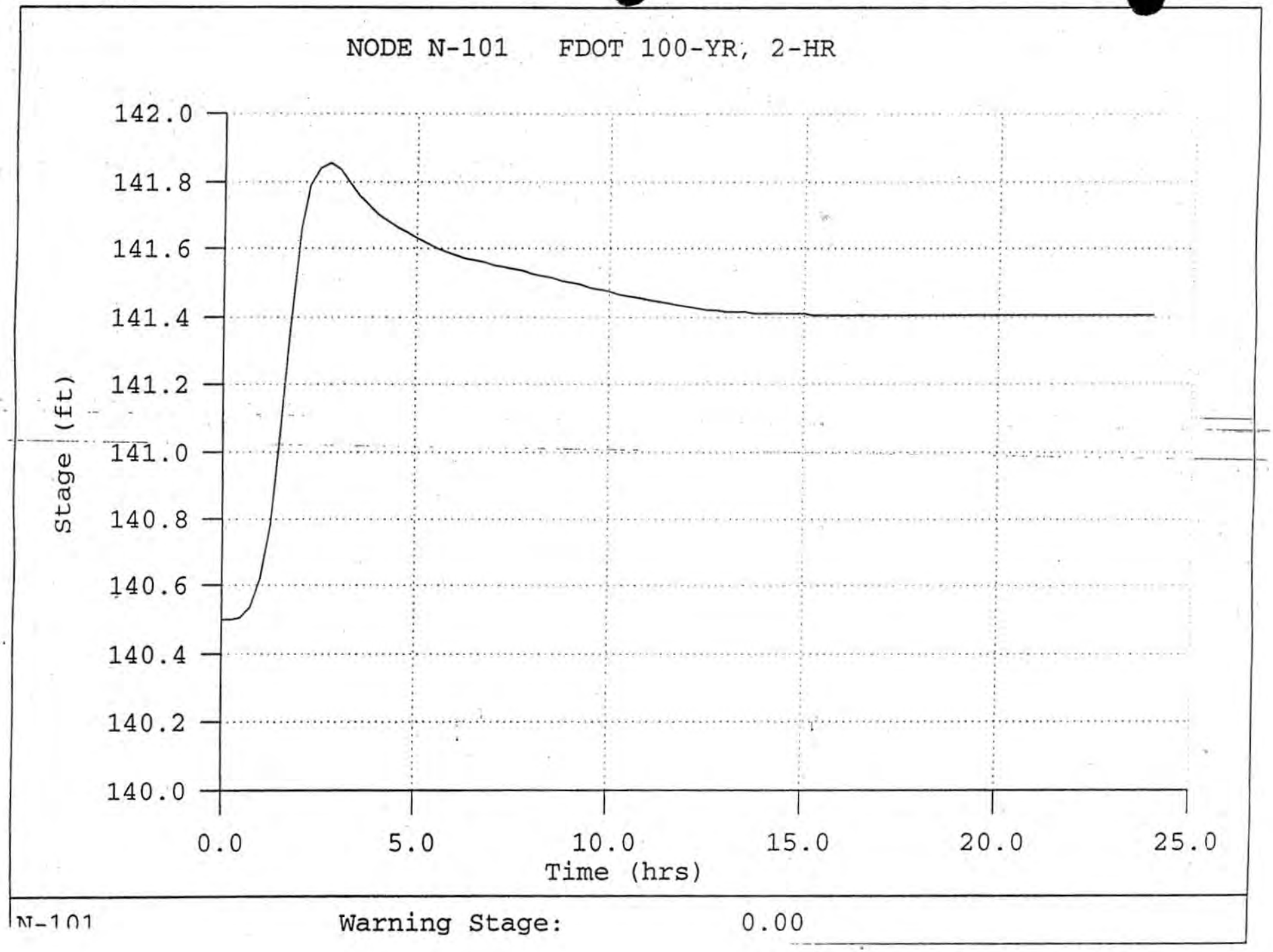
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POST-DEVELOPMENT - FDOT 100-YR, 2-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Maximum Conditions - SIM-1 **********

e(Time units - hours)

Node Name	Group Name	Max Time Conditions	Max Stage (ft)	Warning Stage (ft)	Max Delta Stage (ft)	Max Surface Area (sf)	Max Time Inflow	Max Inflow (cfs)	Max Time Outflow	Max Outflow (cfs)
N-101	POST	2.72	141.85	0.00	0.0059	33882.70	2.25	13.66	2.74	12.11
N-101A	POST	12.00	141.00	0.00	0.0004	0.00	2.74	12.11	0.00	0.00


NODE N-101 FDOT 100-YR, 2-HR
142.0
141.8
141.6
141.4
141.2
141.0
140.8
140.6
140.4
140.2
140.0
Stage (ft)
0.0
5.0
10.0
15.0
20.0
25.0
Time (hrs)
N-101
Warning Stage:
0.00

OSPREY ENERGY CENTER

POST-DEVELOPMENT OUTPUT
(NODE N-101)

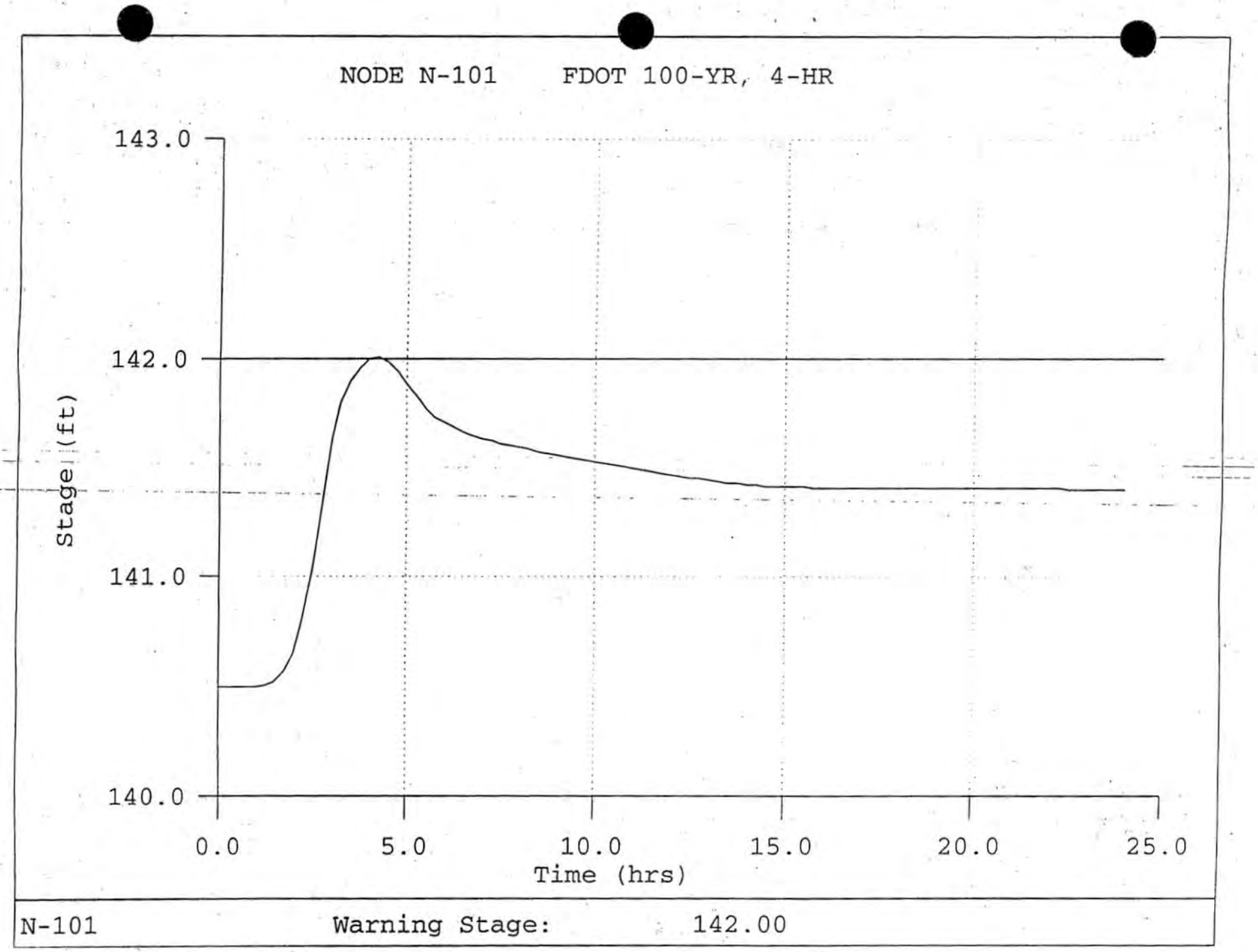
FDOT 100-YR, 4-HR

POST-DEVELOPMENT - FDOT 100-YR, 4-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Maximum Conditions - SIM-1 **********

e(Time units - hours)

Node Name	Group Name	Max Time Conditions	Max Stage (ft)	Warning Stage (ft)	Max Delta Stage (ft)	Max Surface Area (sf)	Max Time Inflow	Max Inflow (cfs)	Max Time Outflow	Max Outflow (cfs)
N-101	POST	4.17	142.01	142.00	0.0057	34317.77	3.50	16.13	4.18	14.67
N-101A	POST	12.00	141.00	0.00	0.0004	0.00	4.18	14.67	0.00	0.00


NODE N-101 FDOT 100-YR, 4-HR
143.0
142.0
141.0
140.0
Stage (ft)
0.0
5.0
10.0
15.0
20.0
25.0
Time (hrs)
N-101
Warning Stage: 142.00

POST-DEVELOPMENT - FDOT 100-YR, 4-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Time Series by Node - SIM-1 **********

Time (hrs)	Stage (ft)	Surface Ar.(ac)	Inflow Base Q (cfs)	Inflow Onsite (cfs)	Inflow Offsite (cfs)	Inflow Bndry Q (cfs)	Inflow Link Q (cfs)	Link Outflow (cfs)	Cumulative Volume In (ac.ft)	Cumulative Volume Out (ac.ft)
*** Group: POST		Node: N-101								
0.000	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.253	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.503	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.753	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.003	140.50	0.69	0.00	0.06	0.00	0.00	0.00	0.00	0.0007	0.0000
1.253	140.51	0.69	0.00	0.29	0.00	0.00	0.00	0.00	0.0043	0.0000
1.503	140.52	0.69	0.00	0.86	0.00	0.00	0.00	0.00	0.0161	0.0000
1.753	140.57	0.69	0.00	2.02	0.00	0.00	0.00	0.00	0.0458	0.0000
2.003	140.65	0.70	0.00	3.89	0.00	0.00	0.00	0.00	0.1069	0.0000
2.253	140.80	0.71	0.00	6.35	0.00	0.00	0.00	0.00	0.2127	0.0000
2.503	141.03	0.72	0.00	9.15	0.00	0.00	0.00	0.00	0.3728	0.0000
2.753	141.32	0.74	0.00	11.81	0.00	0.00	0.00	0.00	0.5894	0.0000
3.003	141.63	0.76	0.00	13.99	0.00	0.00	0.00	5.08	0.8560	0.0524
3.253	141.80	0.77	0.00	15.46	0.00	0.00	0.00	11.06	1.1602	0.2191
3.503	141.90	0.78	0.00	16.13	0.00	0.00	0.00	12.97	1.4865	0.4673
3.753	141.96	0.79	0.00	16.06	0.00	0.00	0.00	14.12	1.8190	0.7471
4.003	142.00	0.79	0.00	15.38	0.00	0.00	0.00	14.58	2.1437	1.0436
4.253	142.00	0.79	0.00	14.32	0.00	0.00	0.00	14.66	2.4506	1.3456
4.503	141.98	0.79	0.00	13.10	0.00	0.00	0.00	14.41	2.7339	1.6458
4.753	141.94	0.78	0.00	11.82	0.00	0.00	0.00	13.69	2.9914	1.9361
5.003	141.89	0.78	0.00	10.59	0.00	0.00	0.00	12.75	3.2230	2.2093
5.253	141.83	0.78	0.00	9.48	0.00	0.00	0.00	11.69	3.4303	2.4617
5.503	141.77	0.77	0.00	8.50	0.00	0.00	0.00	10.34	3.6160	2.6893
5.753	141.73	0.77	0.00	7.63	0.00	0.00	0.00	8.80	3.7826	2.8870
6.003	141.71	0.77	0.00	6.87	0.00	0.00	0.00	7.75	3.9324	3.0580
6.253	141.68	0.77	0.00	6.20	0.00	0.00	0.00	6.94	4.0673	3.2098
6.503	141.67	0.77	0.00	5.62	0.00	0.00	0.00	6.27	4.1894	3.3463
6.753	141.65	0.76	0.00	5.13	0.00	0.00	0.00	5.70	4.3005	3.4700
7.003	141.63	0.76	0.00	4.71	0.00	0.00	0.00	5.22	4.4022	3.5827
7.253	141.62	0.76	0.00	4.36	0.00	0.00	0.00	4.80	4.4960	3.6862
7.503	141.61	0.76	0.00	4.06	0.00	0.00	0.00	4.44	4.5829	3.7817
7.753	141.60	0.76	0.00	3.79	0.00	0.00	0.00	4.13	4.6639	3.8703
8.003	141.59	0.76	0.00	3.54	0.00	0.00	0.00	3.86	4.7397	3.9529
8.253	141.58	0.76	0.00	3.31	0.00	0.00	0.00	3.61	4.8105	4.0300
8.503	141.58	0.76	0.00	3.09	0.00	0.00	0.00	3.38	4.8766	4.1023
8.753	141.57	0.76	0.00	2.87	0.00	0.00	0.00	3.16	4.9383	4.1698
9.003	141.56	0.76	0.00	2.66	0.00	0.00	0.00	2.94	4.9954	4.2328
9.253	141.55	0.76	0.00	2.44	0.00	0.00	0.00	2.73	5.0480	4.2913
9.503	141.54	0.76	0.00	2.22	0.00	0.00	0.00	2.52	5.0962	4.3455
9.753	141.54	0.76	0.00	2.01	0.00	0.00	0.00	2.31	5.1399	4.3954
10.003	141.53	0.76	0.00	1.80	0.00	0.00	0.00	2.10	5.1792	4.4409
10.253	141.52	0.76	0.00	1.59	0.00	0.00	0.00	1.90	5.2142	4.4822
10.503	141.51	0.76	0.00	1.40	0.00	0.00	0.00	1.70	5.2451	4.5194
10.753	141.50	0.76	0.00	1.23	0.00	0.00	0.00	1.52	5.2723	4.5528
11.003	141.50	0.75	0.00	1.07	0.00	0.00	0.00	1.35	5.2961	4.5825
11.253	141.49	0.75	0.00	0.93	0.00	0.00	0.00	1.20	5.3168	4.6088

POST-DEVELOPMENT - FDOT 100-YR, 4-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Time Series by Node - SIM-1 **********

Time (hrs)	Stage (ft)	Surface Ar.(ac)	Inflow Base Q (cfs)	Inflow Onsite (cfs)	Inflow Offsite (cfs)	Inflow Bndry Q (cfs)	Inflow Link Q (cfs)	Link Outflow (cfs)	Cumulative Volume In (ac.ft)	Cumulative Volume Out (ac.ft)
11.503	141.48	0.75	0.00	0.80	0.00	0.00	0.00	1.05	5.3346	4.6320
11.753	141.47	0.75	0.00	0.68	0.00	0.00	0.00	0.92	5.3498	4.6524
12.003	141.47	0.75	0.00	0.56	0.00	0.00	0.00	0.80	5.3626	4.6702
12.253	141.46	0.75	0.00	0.44	0.00	0.00	0.00	0.68	5.3729	4.6855
12.503	141.45	0.75	0.00	0.34	0.00	0.00	0.00	0.58	5.3809	4.6985
12.753	141.45	0.75	0.00	0.24	0.00	0.00	0.00	0.47	5.3869	4.7094
13.003	141.44	0.75	0.00	0.17	0.00	0.00	0.00	0.38	5.3911	4.7183
13.253	141.44	0.75	0.00	0.11	0.00	0.00	0.00	0.31	5.3939	4.7254
13.503	141.43	0.75	0.00	0.06	0.00	0.00	0.00	0.24	5.3957	4.7311
13.753	141.43	0.75	0.00	0.03	0.00	0.00	0.00	0.19	5.3966	4.7355
14.003	141.42	0.75	0.00	0.02	0.00	0.00	0.00	0.15	5.3972	4.7390
14.253	141.42	0.75	0.00	0.01	0.00	0.00	0.00	0.12	5.3974	4.7417
14.503	141.42	0.75	0.00	0.00	0.00	0.00	0.00	0.09	5.3975	4.7439
14.753	141.41	0.75	0.00	0.00	0.00	0.00	0.00	0.07	5.3975	4.7456
15.003	141.41	0.75	0.00	-0.00	0.00	0.00	0.00	0.06	5.3975	4.7469
15.253	141.41	0.75	0.00	0.00	0.00	0.00	0.00	0.05	5.3975	4.7480
15.503	141.41	0.75	0.00	0.00	0.00	0.00	0.00	0.04	5.3975	4.7489
15.753	141.41	0.75	0.00	0.00	0.00	0.00	0.00	0.03	5.3975	4.7497
16.003	141.41	0.75	0.00	0.00	0.00	0.00	0.00	0.03	5.3975	4.7503
16.253	141.41	0.75	0.00	0.00	0.00	0.00	0.00	0.02	5.3975	4.7509
16.503	141.41	0.75	0.00	0.00	0.00	0.00	0.00	0.02	5.3975	4.7513
16.753	141.41	0.75	0.00	0.00	0.00	0.00	0.00	0.02	5.3975	4.7517
17.003	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.02	5.3975	4.7521
17.253	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.01	5.3975	4.7524
17.503	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.01	5.3975	4.7526
17.753	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.01	5.3975	4.7529
18.003	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.01	5.3975	4.7531
18.253	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.01	5.3975	4.7533
18.503	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.01	5.3975	4.7535
18.753	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.01	5.3975	4.7536
19.003	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.01	5.3975	4.7537
19.253	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.01	5.3975	4.7539
19.503	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.01	5.3975	4.7540
19.753	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.00	5.3975	4.7541
20.003	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.00	5.3975	4.7542
20.253	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.00	5.3975	4.7543
20.503	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.00	5.3975	4.7543
20.753	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.00	5.3975	4.7544
21.003	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.00	5.3975	4.7545
21.253	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.00	5.3975	4.7545
21.503	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.00	5.3975	4.7546
21.753	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.00	5.3975	4.7547
22.003	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.00	5.3975	4.7547
22.253	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.00	5.3975	4.7548
22.503	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.00	5.3975	4.7548
22.753	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.00	5.3975	4.7548
23.003	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.00	5.3975	4.7549

POST-DEVELOPMENT - FDOT 100-YR, 4-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Time Series by Node - SIM-1 **********

Time (hrs)	Stage (ft)	Surface Ar.(ac)	Inflow Base Q (cfs)	Inflow Onsite (cfs)	Inflow Offsite (cfs)	Inflow Bndry Q (cfs)	Inflow Link Q (cfs)	Link Outflow (cfs)	Cumulative Volume In (ac.ft)	Cumulative Volume Out (ac.ft)
23.253	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.00	5.3975	4.7549
23.503	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.00	5.3975	4.7550
23.753	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.00	5.3975	4.7550
24.001	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.00	5.3975	4.7550
*** Group: POST		Node: N-101A								
0.000	139.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.253	139.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.503	139.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.753	139.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.003	139.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.253	139.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.503	139.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.753	139.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.003	139.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.253	139.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.503	140.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.753	140.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.003	140.06	0.00	0.00	0.00	0.00	0.00	5.08	0.00	0.0524	0.0000
3.253	140.09	0.00	0.00	0.00	0.00	0.00	11.06	0.00	0.2191	0.0000
3.503	140.11	0.00	0.00	0.00	0.00	0.00	12.97	0.00	0.4673	0.0000
3.753	140.14	0.00	0.00	0.00	0.00	0.00	14.12	0.00	0.7471	0.0000
4.003	140.17	0.00	0.00	0.00	0.00	0.00	14.58	0.00	1.0436	0.0000
4.253	140.19	0.00	0.00	0.00	0.00	0.00	14.66	0.00	1.3456	0.0000
4.503	140.22	0.00	0.00	0.00	0.00	0.00	14.41	0.00	1.6458	0.0000
4.753	140.25	0.00	0.00	0.00	0.00	0.00	13.69	0.00	1.9361	0.0000
5.003	140.27	0.00	0.00	0.00	0.00	0.00	12.75	0.00	2.2093	0.0000
5.253	140.30	0.00	0.00	0.00	0.00	0.00	11.69	0.00	2.4617	0.0000
5.503	140.32	0.00	0.00	0.00	0.00	0.00	10.34	0.00	2.6893	0.0000
5.753	140.35	0.00	0.00	0.00	0.00	0.00	8.80	0.00	2.8870	0.0000
6.003	140.38	0.00	0.00	0.00	0.00	0.00	7.75	0.00	3.0580	0.0000
6.253	140.40	0.00	0.00	0.00	0.00	0.00	6.94	0.00	3.2098	0.0000
6.503	140.43	0.00	0.00	0.00	0.00	0.00	6.27	0.00	3.3463	0.0000
6.753	140.45	0.00	0.00	0.00	0.00	0.00	5.70	0.00	3.4700	0.0000
7.003	140.48	0.00	0.00	0.00	0.00	0.00	5.22	0.00	3.5827	0.0000
7.253	140.51	0.00	0.00	0.00	0.00	0.00	4.80	0.00	3.6862	0.0000
7.503	140.53	0.00	0.00	0.00	0.00	0.00	4.44	0.00	3.7817	0.0000
7.753	140.56	0.00	0.00	0.00	0.00	0.00	4.13	0.00	3.8703	0.0000
8.003	140.58	0.00	0.00	0.00	0.00	0.00	3.86	0.00	3.9529	0.0000
8.253	140.61	0.00	0.00	0.00	0.00	0.00	3.61	0.00	4.0300	0.0000
8.503	140.64	0.00	0.00	0.00	0.00	0.00	3.38	0.00	4.1023	0.0000
8.753	140.66	0.00	0.00	0.00	0.00	0.00	3.16	0.00	4.1698	0.0000
9.003	140.69	0.00	0.00	0.00	0.00	0.00	2.94	0.00	4.2328	0.0000
9.253	140.71	0.00	0.00	0.00	0.00	0.00	2.73	0.00	4.2913	0.0000
9.503	140.74	0.00	0.00	0.00	0.00	0.00	2.52	0.00	4.3455	0.0000
9.753	140.77	0.00	0.00	0.00	0.00	0.00	2.31	0.00	4.3954	0.0000
10.003	140.79	0.00	0.00	0.00	0.00	0.00	2.10	0.00	4.4409	0.0000

POST-DEVELOPMENT - FDOT 100-YR, 4-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Time Series by Node - SIM-1 **********

Time (hrs)	Stage (ft)	Surface Ar.(ac)	Inflow Base Q (cfs)	Inflow Onsite (cfs)	Inflow Offsite (cfs)	Inflow Bndry Q (cfs)	Inflow Link Q (cfs)	Link Outflow (cfs)	Cumulative Volume In (ac.ft)	Cumulative Volume Out (ac.ft)
10.253	140.82	0.00	0.00	0.00	0.00	0.00	1.90	0.00	4.4822	0.0000
10.503	140.84	0.00	0.00	0.00	0.00	0.00	1.70	0.00	4.5194	0.0000
10.753	140.87	0.00	0.00	0.00	0.00	0.00	1.52	0.00	4.5528	0.0000
11.003	140.90	0.00	0.00	0.00	0.00	0.00	1.35	0.00	4.5825	0.0000
11.253	140.92	0.00	0.00	0.00	0.00	0.00	1.20	0.00	4.6088	0.0000
11.503	140.95	0.00	0.00	0.00	0.00	0.00	1.05	0.00	4.6320	0.0000
11.753	140.97	0.00	0.00	0.00	0.00	0.00	0.92	0.00	4.6524	0.0000
12.003	141.00	0.00	0.00	0.00	0.00	0.00	0.80	0.00	4.6702	0.0000
12.253	140.98	0.00	0.00	0.00	0.00	0.00	0.68	0.00	4.6855	0.0000
12.503	140.96	0.00	0.00	0.00	0.00	0.00	0.58	0.00	4.6985	0.0000
12.753	140.94	0.00	0.00	0.00	0.00	0.00	0.47	0.00	4.7094	0.0000
13.003	140.92	0.00	0.00	0.00	0.00	0.00	0.38	0.00	4.7183	0.0000
13.253	140.90	0.00	0.00	0.00	0.00	0.00	0.31	0.00	4.7254	0.0000
13.503	140.87	0.00	0.00	0.00	0.00	0.00	0.24	0.00	4.7311	0.0000
13.753	140.85	0.00	0.00	0.00	0.00	0.00	0.19	0.00	4.7355	0.0000
14.003	140.83	0.00	0.00	0.00	0.00	0.00	0.15	0.00	4.7390	0.0000
14.253	140.81	0.00	0.00	0.00	0.00	0.00	0.12	0.00	4.7417	0.0000
14.503	140.79	0.00	0.00	0.00	0.00	0.00	0.09	0.00	4.7439	0.0000
14.753	140.77	0.00	0.00	0.00	0.00	0.00	0.07	0.00	4.7456	0.0000
15.003	140.75	0.00	0.00	0.00	0.00	0.00	0.06	0.00	4.7469	0.0000
15.253	140.73	0.00	0.00	0.00	0.00	0.00	0.05	0.00	4.7480	0.0000
15.503	140.71	0.00	0.00	0.00	0.00	0.00	0.04	0.00	4.7489	0.0000
15.753	140.69	0.00	0.00	0.00	0.00	0.00	0.03	0.00	4.7497	0.0000
16.003	140.67	0.00	0.00	0.00	0.00	0.00	0.03	0.00	4.7503	0.0000
16.253	140.65	0.00	0.00	0.00	0.00	0.00	0.02	0.00	4.7509	0.0000
16.503	140.62	0.00	0.00	0.00	0.00	0.00	0.02	0.00	4.7513	0.0000
16.753	140.60	0.00	0.00	0.00	0.00	0.00	0.02	0.00	4.7517	0.0000
17.003	140.58	0.00	0.00	0.00	0.00	0.00	0.02	0.00	4.7521	0.0000
17.253	140.56	0.00	0.00	0.00	0.00	0.00	0.01	0.00	4.7524	0.0000
17.503	140.54	0.00	0.00	0.00	0.00	0.00	0.01	0.00	4.7526	0.0000
17.753	140.52	0.00	0.00	0.00	0.00	0.00	0.01	0.00	4.7529	0.0000
18.003	140.50	0.00	0.00	0.00	0.00	0.00	0.01	0.00	4.7531	0.0000
18.253	140.48	0.00	0.00	0.00	0.00	0.00	0.01	0.00	4.7533	0.0000
18.503	140.46	0.00	0.00	0.00	0.00	0.00	0.01	0.00	4.7535	0.0000
18.753	140.44	0.00	0.00	0.00	0.00	0.00	0.01	0.00	4.7536	0.0000
19.003	140.42	0.00	0.00	0.00	0.00	0.00	0.01	0.00	4.7537	0.0000
19.253	140.40	0.00	0.00	0.00	0.00	0.00	0.01	0.00	4.7539	0.0000
19.503	140.37	0.00	0.00	0.00	0.00	0.00	0.01	0.00	4.7540	0.0000
19.753	140.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.7541	0.0000
20.003	140.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.7542	0.0000
20.253	140.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.7543	0.0000
20.503	140.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.7543	0.0000
20.753	140.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.7544	0.0000
21.003	140.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.7545	0.0000
21.253	140.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.7545	0.0000
21.503	140.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.7546	0.0000
21.753	140.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.7547	0.0000

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POST-DEVELOPMENT - FDOT 100-YR, 4-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Time Series by Node - SIM-1 **********

Time (hrs)	Stage (ft)	Surface Ar.(ac)	Inflow Base Q (cfs)	Inflow Onsite (cfs)	Inflow Offsite (cfs)	Inflow Bndry Q (cfs)	Inflow Link Q (cfs)	Link Outflow (cfs)	Cumulative Volume In (ac.ft)	Cumulative Volume Out (ac.ft)
22.003	140.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.7547	0.0000
22.253	140.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.7548	0.0000
22.503	140.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.7548	0.0000
22.753	140.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.7548	0.0000
23.003	140.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.7549	0.0000
23.253	140.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.7549	0.0000
23.503	140.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.7550	0.0000
23.753	140.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.7550	0.0000
24.001	140.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.7550	0.0000

OSPREY ENERGY CENTER

POST-DEVELOPMENT OUTPUT
(NODE N-101)

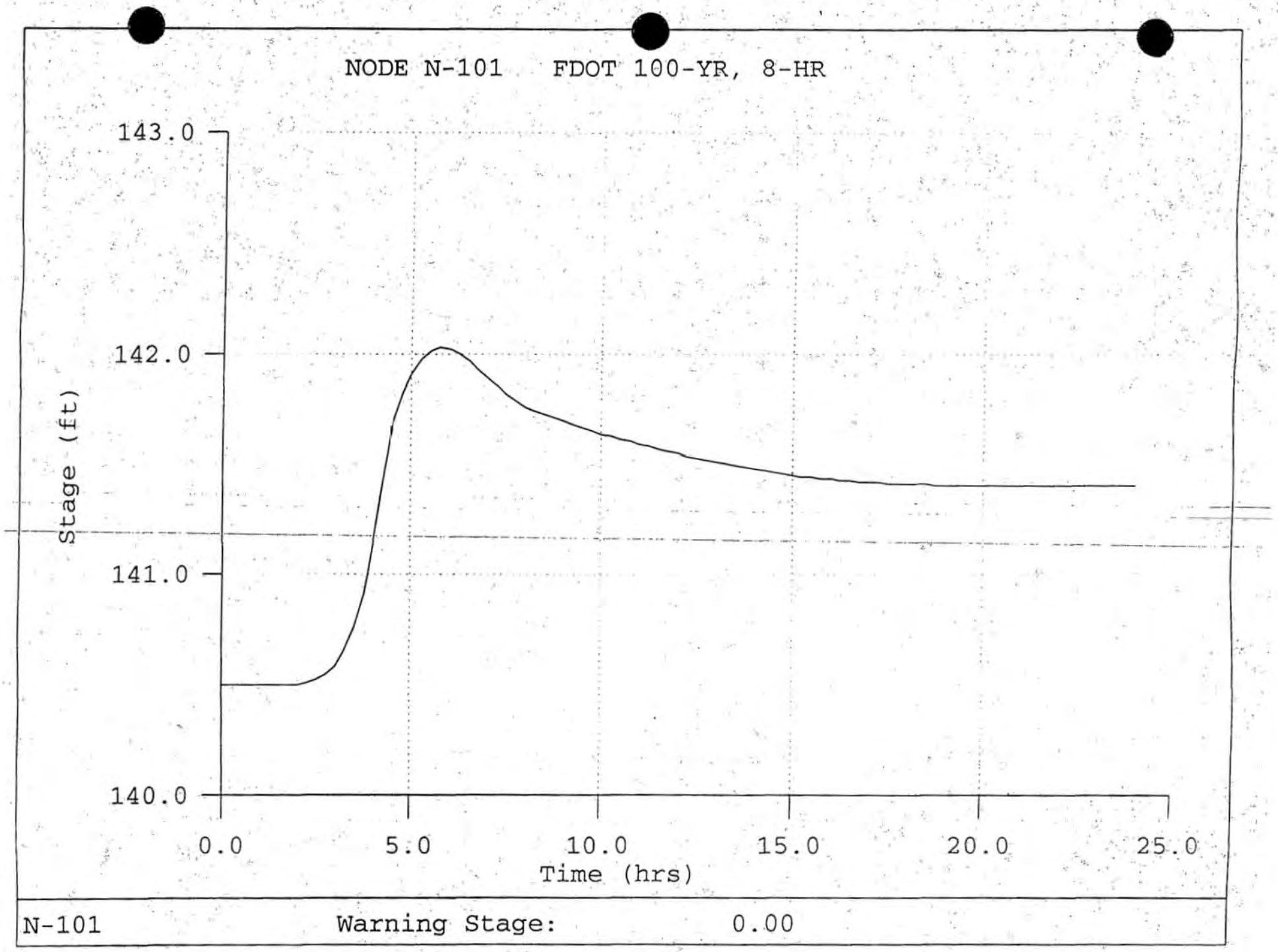
FDOT 100-YR, 8-HR

POST-DEVELOPMENT - FDOT 100-YR, 8-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Maximum Conditions - SIM-1 **********

e(Time units - hours)

Node Name	Group Name	Max Time Conditions	Max Stage (ft)	Warning Stage (ft)	Max Delta Stage (ft)	Max Surface Area (sf)	Max Time Inflow	Max Inflow (cfs)	Max Time Outflow	Max Outflo (cfs)
N-101	POST	5.82	142.03	142.00	0.0053	34381.90	5.25	16.17	5.83	15.02
N-101A	POST	12.00	141.00	0.00	0.0004	0.00	5.83	15.02	0.00	0.00


NODE N-101 FDOT 100-YR, 8-HR
143.0
142.0
141.0
140.0
Stage (ft)
0.0
5.0
10.0
15.0
20.0
25.0
Time (hrs)
N-101
Warning Stage: 0.00

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POST-DEVELOPMENT - FDOT 100-YR, 8-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Time Series by Node - SIM-1 **********

Time (hrs)	Stage (ft)	Surface Ar.(ac)	Inflow Base Q (cfs)	Inflow Onsite (cfs)	Inflow Offsite (cfs)	Inflow Bndry Q (cfs)	Inflow Link Q (cfs)	Link Outflow (cfs)	Cumulative Volume In (ac.ft)	Cumulative Volume Out (ac.ft)
*** Group: POST		Node: N-101								
0.000	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.253	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.503	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.753	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.003	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.253	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.503	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.753	140.50	0.69	0.00	0.03	0.00	0.00	0.00	0.00	0.0003	0.0000
2.003	140.50	0.69	0.00	0.10	0.00	0.00	0.00	0.00	0.0016	0.0000
2.253	140.51	0.69	0.00	0.27	0.00	0.00	0.00	0.00	0.0054	0.0000
2.503	140.52	0.69	0.00	0.58	0.00	0.00	0.00	0.00	0.0142	0.0000
2.753	140.54	0.69	0.00	1.06	0.00	0.00	0.00	0.00	0.0312	0.0000
3.003	140.59	0.70	0.00	1.75	0.00	0.00	0.00	0.00	0.0603	0.0000
3.253	140.65	0.70	0.00	2.80	0.00	0.00	0.00	0.00	0.1073	0.0000
3.503	140.76	0.71	0.00	4.30	0.00	0.00	0.00	0.00	0.1806	0.0000
3.753	140.91	0.72	0.00	6.43	0.00	0.00	0.00	0.00	0.2915	0.0000
4.003	141.14	0.73	0.00	9.08	0.00	0.00	0.00	0.00	0.4517	0.0000
4.253	141.43	0.75	0.00	11.75	0.00	0.00	0.00	0.19	0.6669	0.0020
4.503	141.69	0.77	0.00	13.99	0.00	0.00	0.00	6.99	0.9329	0.0761
4.753	141.82	0.78	0.00	15.47	0.00	0.00	0.00	11.54	1.2372	0.2675
5.003	141.91	0.78	0.00	16.11	0.00	0.00	0.00	13.18	1.5634	0.5229
5.253	141.97	0.79	0.00	16.17	0.00	0.00	0.00	14.24	1.8969	0.8062
5.503	142.01	0.79	0.00	15.85	0.00	0.00	0.00	14.81	2.2277	1.1063
5.753	142.03	0.79	0.00	15.25	0.00	0.00	0.00	15.01	2.5489	1.4144
6.003	142.02	0.79	0.00	14.44	0.00	0.00	0.00	14.97	2.8556	1.7241
6.253	142.00	0.79	0.00	13.59	0.00	0.00	0.00	14.67	3.1452	2.0304
6.503	141.97	0.79	0.00	12.80	0.00	0.00	0.00	14.15	3.4178	2.3280
6.753	141.93	0.78	0.00	12.07	0.00	0.00	0.00	13.54	3.6747	2.6140
7.003	141.89	0.78	0.00	11.39	0.00	0.00	0.00	12.88	3.9169	2.8869
7.253	141.85	0.78	0.00	10.76	0.00	0.00	0.00	12.21	4.1457	3.1461
7.503	141.82	0.78	0.00	10.17	0.00	0.00	0.00	11.45	4.3619	3.3905
7.753	141.78	0.77	0.00	9.59	0.00	0.00	0.00	10.79	4.5660	3.6202
8.003	141.76	0.77	0.00	9.00	0.00	0.00	0.00	9.79	4.7581	3.8327
8.253	141.74	0.77	0.00	8.41	0.00	0.00	0.00	9.03	4.9380	4.0272
8.503	141.72	0.77	0.00	7.83	0.00	0.00	0.00	8.40	5.1058	4.2073
8.753	141.71	0.77	0.00	7.23	0.00	0.00	0.00	7.81	5.2614	4.3748
9.003	141.69	0.77	0.00	6.64	0.00	0.00	0.00	7.22	5.4047	4.5300
9.253	141.68	0.77	0.00	6.09	0.00	0.00	0.00	6.66	5.5362	4.6733
9.503	141.66	0.77	0.00	5.60	0.00	0.00	0.00	6.13	5.6569	4.8054
9.753	141.65	0.76	0.00	5.15	0.00	0.00	0.00	5.65	5.7680	4.9270
10.003	141.63	0.76	0.00	4.74	0.00	0.00	0.00	5.21	5.8701	5.0392
10.253	141.62	0.76	0.00	4.36	0.00	0.00	0.00	4.80	5.9641	5.1426
10.503	141.61	0.76	0.00	4.01	0.00	0.00	0.00	4.43	6.0506	5.2380
10.753	141.60	0.76	0.00	3.67	0.00	0.00	0.00	4.08	6.1300	5.3259
11.003	141.59	0.76	0.00	3.35	0.00	0.00	0.00	3.75	6.2026	5.4068
11.253	141.58	0.76	0.00	3.05	0.00	0.00	0.00	3.44	6.2688	5.4811

POST-DEVELOPMENT - FDOT 100-YR, 8-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Time Series by Node - SIM-1 **********

Time (hrs)	Stage (ft)	Surface Ar.(ac)	Inflow Base Q (cfs)	Inflow Onsite (cfs)	Inflow Offsite (cfs)	Inflow Bndry Q (cfs)	Inflow Link Q (cfs)	Link Outflow (cfs)	Cumulative Volume In (ac.ft)	Cumulative Volume Out (ac.ft)
11.503	141.57	0.76	0.00	2.76	0.00	0.00	0.00	3.14	6.3289	5.5490
11.753	141.56	0.76	0.00	2.49	0.00	0.00	0.00	2.86	6.3831	5.6110
12.003	141.55	0.76	0.00	2.23	0.00	0.00	0.00	2.59	6.4320	5.6674
12.253	141.54	0.76	0.00	2.00	0.00	0.00	0.00	2.34	6.4757	5.7184
12.503	141.53	0.76	0.00	1.79	0.00	0.00	0.00	2.11	6.5148	5.7644
12.753	141.52	0.76	0.00	1.59	0.00	0.00	0.00	1.90	6.5497	5.8059
13.003	141.51	0.76	0.00	1.41	0.00	0.00	0.00	1.71	6.5808	5.8433
13.253	141.50	0.76	0.00	1.24	0.00	0.00	0.00	1.53	6.6081	5.8767
13.503	141.50	0.75	0.00	1.07	0.00	0.00	0.00	1.36	6.6319	5.9065
13.753	141.49	0.75	0.00	0.92	0.00	0.00	0.00	1.20	6.6525	5.9328
14.003	141.48	0.75	0.00	0.76	0.00	0.00	0.00	1.04	6.6698	5.9560
14.253	141.47	0.75	0.00	0.62	0.00	0.00	0.00	0.90	6.6841	5.9760
14.503	141.47	0.75	0.00	0.50	0.00	0.00	0.00	0.77	6.6958	5.9932
14.753	141.46	0.75	0.00	0.40	0.00	0.00	0.00	0.65	6.7051	6.0078
15.003	141.45	0.75	0.00	0.32	0.00	0.00	0.00	0.54	6.7126	6.0201
15.253	141.45	0.75	0.00	0.26	0.00	0.00	0.00	0.46	6.7187	6.0304
15.503	141.44	0.75	0.00	0.21	0.00	0.00	0.00	0.38	6.7235	6.0391
15.753	141.44	0.75	0.00	0.17	0.00	0.00	0.00	0.32	6.7274	6.0464
16.003	141.43	0.75	0.00	0.13	0.00	0.00	0.00	0.27	6.7305	6.0525
16.253	141.43	0.75	0.00	0.11	0.00	0.00	0.00	0.23	6.7330	6.0577
16.503	141.43	0.75	0.00	0.08	0.00	0.00	0.00	0.19	6.7349	6.0620
16.753	141.42	0.75	0.00	0.06	0.00	0.00	0.00	0.16	6.7365	6.0656
17.003	141.42	0.75	0.00	0.05	0.00	0.00	0.00	0.14	6.7376	6.0687
17.253	141.42	0.75	0.00	0.04	0.00	0.00	0.00	0.11	6.7385	6.0713
17.503	141.42	0.75	0.00	0.02	0.00	0.00	0.00	0.10	6.7391	6.0735
17.753	141.41	0.75	0.00	0.01	0.00	0.00	0.00	0.08	6.7395	6.0753
18.003	141.41	0.75	0.00	0.01	0.00	0.00	0.00	0.07	6.7397	6.0768
18.253	141.41	0.75	0.00	0.00	0.00	0.00	0.00	0.05	6.7399	6.0780
18.503	141.41	0.75	0.00	0.00	0.00	0.00	0.00	0.05	6.7399	6.0790
18.753	141.41	0.75	0.00	0.00	0.00	0.00	0.00	0.04	6.7399	6.0799
19.003	141.41	0.75	0.00	-0.00	0.00	0.00	0.00	0.03	6.7399	6.0806
19.253	141.41	0.75	0.00	0.00	0.00	0.00	0.00	0.03	6.7399	6.0812
19.503	141.41	0.75	0.00	0.00	0.00	0.00	0.00	0.02	6.7399	6.0817
19.753	141.41	0.75	0.00	0.00	0.00	0.00	0.00	0.02	6.7399	6.0822
20.003	141.41	0.75	0.00	0.00	0.00	0.00	0.00	0.02	6.7399	6.0826
20.253	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.02	6.7399	6.0829
20.503	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.01	6.7399	6.0832
20.753	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.01	6.7399	6.0835
21.003	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.01	6.7399	6.0837
21.253	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.01	6.7399	6.0839
21.503	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.01	6.7399	6.0841
21.753	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.01	6.7399	6.0842
22.003	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.01	6.7399	6.0844
22.253	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.01	6.7399	6.0845
22.503	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.01	6.7399	6.0846
22.753	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.01	6.7399	6.0848
23.003	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.00	6.7399	6.0849

POST-DEVELOPMENT - FDOT 100-YR, 8-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Time Series by Node - SIN-1 **********

Time (hrs)	Stage (ft)	Surface Ar.(ac)	Inflow Base Q (cfs)	Inflow Onsite (cfs)	Inflow Offsite (cfs)	Inflow Bndry Q (cfs)	Inflow Link Q (cfs)	Link Outflow (cfs)	Cumulative Volume In (ac.ft)	Cumulative Volume Out (ac.ft)
23.253	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.00	6.7399	6.0850
23.503	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.00	6.7399	6.0850
23.753	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.00	6.7399	6.0851
24.001	141.40	0.75	0.00	0.00	0.00	0.00	0.00	0.00	6.7399	6.0852
*** Group: POST		Node: N-101A								
0.000	139.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.253	139.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.503	139.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.753	139.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.003	139.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.253	139.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.503	139.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.753	139.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.003	139.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.253	139.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.503	140.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.753	140.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.003	140.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.253	140.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.503	140.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.753	140.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
4.003	140.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
4.253	140.19	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.0020	0.0000
4.503	140.22	0.00	0.00	0.00	0.00	0.00	6.99	0.00	0.0761	0.0000
4.753	140.25	0.00	0.00	0.00	0.00	0.00	11.54	0.00	0.2675	0.0000
5.003	140.27	0.00	0.00	0.00	0.00	0.00	13.18	0.00	0.5229	0.0000
5.253	140.30	0.00	0.00	0.00	0.00	0.00	14.24	0.00	0.8062	0.0000
5.503	140.32	0.00	0.00	0.00	0.00	0.00	14.81	0.00	1.1063	0.0000
5.753	140.35	0.00	0.00	0.00	0.00	0.00	15.01	0.00	1.4144	0.0000
6.003	140.38	0.00	0.00	0.00	0.00	0.00	14.97	0.00	1.7241	0.0000
6.253	140.40	0.00	0.00	0.00	0.00	0.00	14.67	0.00	2.0304	0.0000
6.503	140.43	0.00	0.00	0.00	0.00	0.00	14.15	0.00	2.3280	0.0000
6.753	140.45	0.00	0.00	0.00	0.00	0.00	13.54	0.00	2.6140	0.0000
7.003	140.48	0.00	0.00	0.00	0.00	0.00	12.88	0.00	2.8869	0.0000
7.253	140.51	0.00	0.00	0.00	0.00	0.00	12.21	0.00	3.1461	0.0000
7.503	140.53	0.00	0.00	0.00	0.00	0.00	11.45	0.00	3.3905	0.0000
7.753	140.56	0.00	0.00	0.00	0.00	0.00	10.79	0.00	3.6202	0.0000
8.003	140.58	0.00	0.00	0.00	0.00	0.00	9.79	0.00	3.8327	0.0000
8.253	140.61	0.00	0.00	0.00	0.00	0.00	9.03	0.00	4.0272	0.0000
8.503	140.64	0.00	0.00	0.00	0.00	0.00	8.40	0.00	4.2073	0.0000
8.753	140.66	0.00	0.00	0.00	0.00	0.00	7.81	0.00	4.3748	0.0000
9.003	140.69	0.00	0.00	0.00	0.00	0.00	7.22	0.00	4.5300	0.0000
9.253	140.71	0.00	0.00	0.00	0.00	0.00	6.66	0.00	4.6733	0.0000
9.503	140.74	0.00	0.00	0.00	0.00	0.00	6.13	0.00	4.8054	0.0000
9.753	140.77	0.00	0.00	0.00	0.00	0.00	5.65	0.00	4.9270	0.0000
10.003	140.79	0.00	0.00	0.00	0.00	0.00	5.21	0.00	5.0392	0.0000

POST-DEVELOPMENT - FDOT 100-YR, 8-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Time Series by Node - SIM-1 **********

Time (hrs)	Stage (ft)	Surface Ar.(ac)	Inflow Base Q (cfs)	Inflow Onsite (cfs)	Inflow Offsite (cfs)	Inflow Bndry Q (cfs)	Inflow Link Q (cfs)	Link Outflow (cfs)	Cumulative Volume In (ac.ft)	Cumulative Volume Out (ac.ft)
10.253	140.82	0.00	0.00	0.00	0.00	0.00	4.80	0.00	5.1426	0.0000
10.503	140.84	0.00	0.00	0.00	0.00	0.00	4.43	0.00	5.2380	0.0000
10.753	140.87	0.00	0.00	0.00	0.00	0.00	4.08	0.00	5.3259	0.0000
11.003	140.90	0.00	0.00	0.00	0.00	0.00	3.75	0.00	5.4068	0.0000
11.253	140.92	0.00	0.00	0.00	0.00	0.00	3.44	0.00	5.4811	0.0000
11.503	140.95	0.00	0.00	0.00	0.00	0.00	3.14	0.00	5.5490	0.0000
11.753	140.97	0.00	0.00	0.00	0.00	0.00	2.86	0.00	5.6110	0.0000
12.003	141.00	0.00	0.00	0.00	0.00	0.00	2.59	0.00	5.6674	0.0000
12.253	140.98	0.00	0.00	0.00	0.00	0.00	2.34	0.00	5.7184	0.0000
12.503	140.96	0.00	0.00	0.00	0.00	0.00	2.11	0.00	5.7644	0.0000
12.753	140.94	0.00	0.00	0.00	0.00	0.00	1.90	0.00	5.8059	0.0000
13.003	140.92	0.00	0.00	0.00	0.00	0.00	1.71	0.00	5.8433	0.0000
13.253	140.90	0.00	0.00	0.00	0.00	0.00	1.53	0.00	5.8767	0.0000
13.503	140.87	0.00	0.00	0.00	0.00	0.00	1.36	0.00	5.9065	0.0000
13.753	140.85	0.00	0.00	0.00	0.00	0.00	1.20	0.00	5.9328	0.0000
14.003	140.83	0.00	0.00	0.00	0.00	0.00	1.04	0.00	5.9560	0.0000
14.253	140.81	0.00	0.00	0.00	0.00	0.00	0.90	0.00	5.9760	0.0000
14.503	140.79	0.00	0.00	0.00	0.00	0.00	0.77	0.00	5.9932	0.0000
14.753	140.77	0.00	0.00	0.00	0.00	0.00	0.65	0.00	6.0078	0.0000
15.003	140.75	0.00	0.00	0.00	0.00	0.00	0.54	0.00	6.0201	0.0000
15.253	140.73	0.00	0.00	0.00	0.00	0.00	0.46	0.00	6.0304	0.0000
15.503	140.71	0.00	0.00	0.00	0.00	0.00	0.38	0.00	6.0391	0.0000
15.753	140.69	0.00	0.00	0.00	0.00	0.00	0.32	0.00	6.0464	0.0000
16.003	140.67	0.00	0.00	0.00	0.00	0.00	0.27	0.00	6.0525	0.0000
16.253	140.65	0.00	0.00	0.00	0.00	0.00	0.23	0.00	6.0577	0.0000
16.503	140.62	0.00	0.00	0.00	0.00	0.00	0.19	0.00	6.0620	0.0000
16.753	140.60	0.00	0.00	0.00	0.00	0.00	0.16	0.00	6.0656	0.0000
17.003	140.58	0.00	0.00	0.00	0.00	0.00	0.14	0.00	6.0687	0.0000
17.253	140.56	0.00	0.00	0.00	0.00	0.00	0.11	0.00	6.0713	0.0000
17.503	140.54	0.00	0.00	0.00	0.00	0.00	0.10	0.00	6.0735	0.0000
17.753	140.52	0.00	0.00	0.00	0.00	0.00	0.08	0.00	6.0753	0.0000
18.003	140.50	0.00	0.00	0.00	0.00	0.00	0.07	0.00	6.0768	0.0000
18.253	140.48	0.00	0.00	0.00	0.00	0.00	0.05	0.00	6.0780	0.0000
18.503	140.46	0.00	0.00	0.00	0.00	0.00	0.05	0.00	6.0790	0.0000
18.753	140.44	0.00	0.00	0.00	0.00	0.00	0.04	0.00	6.0799	0.0000
19.003	140.42	0.00	0.00	0.00	0.00	0.00	0.03	0.00	6.0806	0.0000
19.253	140.40	0.00	0.00	0.00	0.00	0.00	0.03	0.00	6.0812	0.0000
19.503	140.37	0.00	0.00	0.00	0.00	0.00	0.02	0.00	6.0817	0.0000
19.753	140.35	0.00	0.00	0.00	0.00	0.00	0.02	0.00	6.0822	0.0000
20.003	140.33	0.00	0.00	0.00	0.00	0.00	0.02	0.00	6.0826	0.0000
20.253	140.31	0.00	0.00	0.00	0.00	0.00	0.02	0.00	6.0829	0.0000
20.503	140.29	0.00	0.00	0.00	0.00	0.00	0.01	0.00	6.0832	0.0000
20.753	140.27	0.00	0.00	0.00	0.00	0.00	0.01	0.00	6.0835	0.0000
21.003	140.25	0.00	0.00	0.00	0.00	0.00	0.01	0.00	6.0837	0.0000
21.253	140.23	0.00	0.00	0.00	0.00	0.00	0.01	0.00	6.0839	0.0000
21.503	140.21	0.00	0.00	0.00	0.00	0.00	0.01	0.00	6.0841	0.0000
21.753	140.19	0.00	0.00	0.00	0.00	0.00	0.01	0.00	6.0842	0.0000

POST-DEVELOPMENT - FDOT 100-YR, 8-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Time Series by Node - SIM-1 **********

Time (hrs)	Stage (ft)	Surface Ar.(ac)	Inflow Base Q (cfs)	Inflow Onsite (cfs)	Inflow Offsite (cfs)	Inflow Bndry Q (cfs)	Inflow Link Q (cfs)	Link Outflow (cfs)	Cumulative Volume In (ac.ft)	Cumulative Volume Out (ac.ft)
22.003	140.17	0.00	0.00	0.00	0.00	0.00	0.01	0.00	6.0844	0.0000
22.253	140.15	0.00	0.00	0.00	0.00	0.00	0.01	0.00	6.0845	0.0000
22.503	140.12	0.00	0.00	0.00	0.00	0.00	0.01	0.00	6.0846	0.0000
22.753	140.10	0.00	0.00	0.00	0.00	0.00	0.01	0.00	6.0848	0.0000
23.003	140.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.0849	0.0000
23.253	140.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.0850	0.0000
23.503	140.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.0850	0.0000
23.753	140.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.0851	0.0000
24.001	140.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.0852	0.0000

OSPREY ENERGY CENTER

POST-DEVELOPMENT OUTPUT
(NODE N-101)

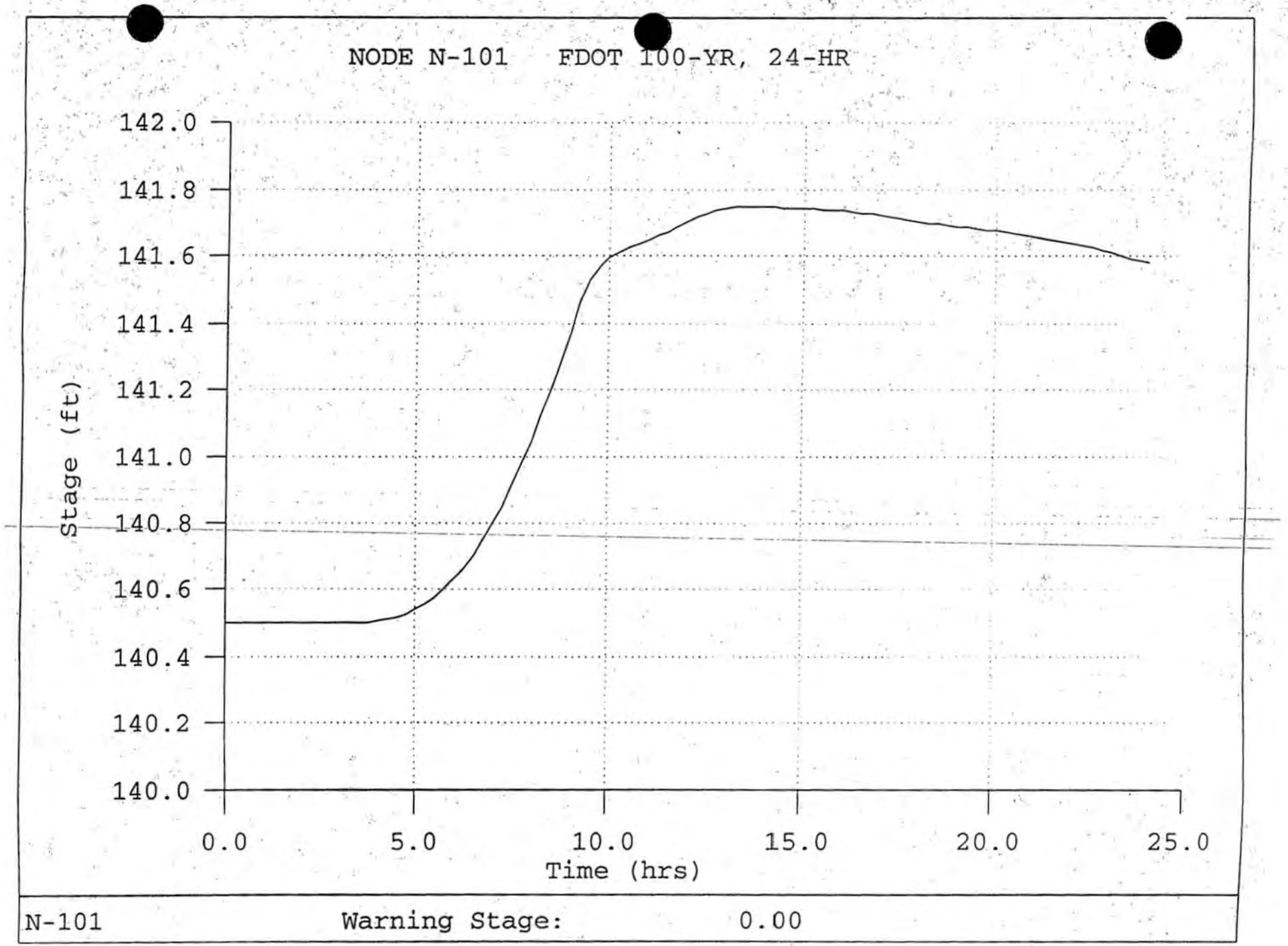
FDOT 100-YR, 24-HR

POST-DEVELOPMENT - FDOT 100-YR, 24-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Maximum Conditions - SIM-1 **********

@(Time units - hours)

Node Name	Group Name	Max Time Conditions	Max Stage (ft)	Warning Stage (ft)	Max Delta Stage (ft)	Max Surface Area (sf)	Max Time Inflow	Max Inflow (cfs)	Max Time Outflow	Max Outflow (cfs)
N-101	POST	13.62	141.75	0.00	0.0016	33588.69	13.25	9.42	13.62	9.40
N-101A	POST	12.00	141.00	0.00	0.0004	0.00	13.62	9.40	0.00	0.00


NODE N-101 FDOT 100-YR, 24-HR
142.0
141.8
141.6
141.4
141.2
141.0
140.8
140.6
140.4
140.2
140.0
Stage (ft)
0.0
5.0
10.0
15.0
20.0
25.0
Time (hrs)
N-101
Warning Stage: 0.00

POST-DEVELOPMENT - FDOT 100-YR, 24-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Time Series by Node - SIM-1 **********

Time (hrs)	Stage (ft)	Surface Ar.(ac)	Inflow Base Q (cfs)	Inflow Onsite (cfs)	Inflow Offsite (cfs)	Inflow Bndry Q (cfs)	Inflow Link Q (cfs)	Link Outflow (cfs)	Cumulative Volume In (ac.ft)	Cumulative Volume Out (ac.ft)
*** Group: POST		Node: N-101								
0.000	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.253	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.503	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.753	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.003	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.253	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.503	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.753	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.003	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.253	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.503	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.753	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.003	140.50	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.253	140.50	0.69	0.00	0.01	0.00	0.00	0.00	0.00	0.0002	0.0000
3.503	140.50	0.69	0.00	0.03	0.00	0.00	0.00	0.00	0.0007	0.0000
3.753	140.50	0.69	0.00	0.07	0.00	0.00	0.00	0.00	0.0018	0.0000
4.003	140.51	0.69	0.00	0.13	0.00	0.00	0.00	0.00	0.0039	0.0000
4.253	140.51	0.69	0.00	0.20	0.00	0.00	0.00	0.00	0.0073	0.0000
4.503	140.52	0.69	0.00	0.29	0.00	0.00	0.00	0.00	0.0124	0.0000
4.753	140.53	0.69	0.00	0.38	0.00	0.00	0.00	0.00	0.0193	0.0000
5.003	140.54	0.69	0.00	0.49	0.00	0.00	0.00	0.00	0.0284	0.0000
5.253	140.56	0.69	0.00	0.61	0.00	0.00	0.00	0.00	0.0397	0.0000
5.503	140.58	0.70	0.00	0.74	0.00	0.00	0.00	0.00	0.0536	0.0000
5.753	140.60	0.70	0.00	0.89	0.00	0.00	0.00	0.00	0.0705	0.0000
6.003	140.63	0.70	0.00	1.06	0.00	0.00	0.00	0.00	0.0907	0.0000
6.253	140.66	0.70	0.00	1.24	0.00	0.00	0.00	0.00	0.1145	0.0000
6.503	140.70	0.70	0.00	1.43	0.00	0.00	0.00	0.00	0.1421	0.0000
6.753	140.75	0.71	0.00	1.61	0.00	0.00	0.00	0.00	0.1736	0.0000
7.003	140.80	0.71	0.00	1.79	0.00	0.00	0.00	0.00	0.2087	0.0000
7.253	140.85	0.71	0.00	1.97	0.00	0.00	0.00	0.00	0.2476	0.0000
7.503	140.91	0.72	0.00	2.14	0.00	0.00	0.00	0.00	0.2900	0.0000
7.753	140.98	0.72	0.00	2.31	0.00	0.00	0.00	0.00	0.3360	0.0000
8.003	141.04	0.73	0.00	2.47	0.00	0.00	0.00	0.00	0.3853	0.0000
8.253	141.12	0.73	0.00	2.66	0.00	0.00	0.00	0.00	0.4383	0.0000
8.503	141.20	0.74	0.00	2.87	0.00	0.00	0.00	0.00	0.4954	0.0000
8.753	141.28	0.74	0.00	3.13	0.00	0.00	0.00	0.00	0.5574	0.0000
9.003	141.37	0.75	0.00	3.44	0.00	0.00	0.00	0.00	0.6252	0.0000
9.253	141.46	0.75	0.00	3.76	0.00	0.00	0.00	0.74	0.6996	0.0076
9.503	141.53	0.76	0.00	4.08	0.00	0.00	0.00	2.18	0.7806	0.0378
9.753	141.57	0.76	0.00	4.38	0.00	0.00	0.00	3.26	0.8681	0.0939
10.003	141.60	0.76	0.00	4.67	0.00	0.00	0.00	3.97	0.9616	0.1686
10.253	141.61	0.76	0.00	4.97	0.00	0.00	0.00	4.47	1.0613	0.2558
10.503	141.62	0.76	0.00	5.29	0.00	0.00	0.00	4.87	1.1673	0.3523
10.753	141.64	0.76	0.00	5.66	0.00	0.00	0.00	5.24	1.2804	0.4567
11.003	141.65	0.76	0.00	6.08	0.00	0.00	0.00	5.64	1.4017	0.5692
11.253	141.66	0.77	0.00	6.54	0.00	0.00	0.00	6.07	1.5321	0.6901

POST-DEVELOPMENT - FDOT 100-YR, 24-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Time Series by Node - SIM-1 **********

Time (hrs)	Stage (ft)	Surface Ar.(ac)	Inflow Base Q (cfs)	Inflow Onsite (cfs)	Inflow Offsite (cfs)	Inflow Bndry Q (cfs)	Inflow Link Q (cfs)	Link Outflow (cfs)	Cumulative Volume In (ac.ft)	Cumulative Volume Out (ac.ft)
11.503	141.67	0.77	0.00	7.03	0.00	0.00	0.00	6.54	1.6723	0.8204
11.753	141.69	0.77	0.00	7.55	0.00	0.00	0.00	7.03	1.8228	0.9605
12.003	141.70	0.77	0.00	8.11	0.00	0.00	0.00	7.57	1.9846	1.1114
12.253	141.71	0.77	0.00	8.60	0.00	0.00	0.00	8.10	2.1572	1.2733
12.503	141.73	0.77	0.00	9.00	0.00	0.00	0.00	8.58	2.3391	1.4456
12.753	141.74	0.77	0.00	9.26	0.00	0.00	0.00	8.96	2.5278	1.6268
13.003	141.74	0.77	0.00	9.38	0.00	0.00	0.00	9.21	2.7203	1.8145
13.253	141.75	0.77	0.00	9.42	0.00	0.00	0.00	9.34	2.9146	2.0060
13.503	141.75	0.77	0.00	9.42	0.00	0.00	0.00	9.39	3.1092	2.1995
13.753	141.75	0.77	0.00	9.37	0.00	0.00	0.00	9.39	3.3033	2.3936
14.003	141.75	0.77	0.00	9.31	0.00	0.00	0.00	9.36	3.4964	2.5873
14.253	141.75	0.77	0.00	9.24	0.00	0.00	0.00	9.30	3.6880	2.7800
14.503	141.74	0.77	0.00	9.19	0.00	0.00	0.00	9.24	3.8784	2.9715
14.753	141.74	0.77	0.00	9.14	0.00	0.00	0.00	9.19	4.0677	3.1618
15.003	141.74	0.77	0.00	9.10	0.00	0.00	0.00	9.14	4.2561	3.3511
15.253	141.74	0.77	0.00	9.05	0.00	0.00	0.00	9.09	4.4436	3.5395
15.503	141.74	0.77	0.00	8.99	0.00	0.00	0.00	9.04	4.6300	3.7269
15.753	141.74	0.77	0.00	8.90	0.00	0.00	0.00	8.97	4.8149	3.9130
16.003	141.73	0.77	0.00	8.79	0.00	0.00	0.00	8.88	4.9976	4.0975
16.253	141.73	0.77	0.00	8.65	0.00	0.00	0.00	8.77	5.1777	4.2798
16.503	141.73	0.77	0.00	8.50	0.00	0.00	0.00	8.63	5.3548	4.4595
16.753	141.72	0.77	0.00	8.33	0.00	0.00	0.00	8.48	5.5287	4.6362
17.003	141.72	0.77	0.00	8.14	0.00	0.00	0.00	8.31	5.6987	4.8097
17.253	141.72	0.77	0.00	7.95	0.00	0.00	0.00	8.13	5.8649	4.9794
17.503	141.71	0.77	0.00	7.77	0.00	0.00	0.00	7.94	6.0273	5.1454
17.753	141.71	0.77	0.00	7.61	0.00	0.00	0.00	7.77	6.1862	5.3078
18.003	141.70	0.77	0.00	7.46	0.00	0.00	0.00	7.61	6.3419	5.4667
18.253	141.70	0.77	0.00	7.33	0.00	0.00	0.00	7.47	6.4948	5.6225
18.503	141.69	0.77	0.00	7.21	0.00	0.00	0.00	7.34	6.6450	5.7755
18.753	141.69	0.77	0.00	7.10	0.00	0.00	0.00	7.21	6.7928	5.9258
19.003	141.69	0.77	0.00	6.99	0.00	0.00	0.00	7.10	6.9383	6.0737
19.253	141.69	0.77	0.00	6.88	0.00	0.00	0.00	6.99	7.0816	6.2192
19.503	141.68	0.77	0.00	6.75	0.00	0.00	0.00	6.87	7.2224	6.3625
19.753	141.68	0.77	0.00	6.59	0.00	0.00	0.00	6.74	7.3602	6.5031
20.003	141.67	0.77	0.00	6.41	0.00	0.00	0.00	6.58	7.4946	6.6407
20.253	141.67	0.77	0.00	6.23	0.00	0.00	0.00	6.41	7.6252	6.7749
20.503	141.66	0.77	0.00	6.05	0.00	0.00	0.00	6.23	7.7520	6.9056
20.753	141.66	0.77	0.00	5.89	0.00	0.00	0.00	6.07	7.8754	7.0326
21.003	141.66	0.77	0.00	5.74	0.00	0.00	0.00	5.91	7.9956	7.1563
21.253	141.65	0.76	0.00	5.59	0.00	0.00	0.00	5.76	8.1128	7.2768
21.503	141.65	0.76	0.00	5.44	0.00	0.00	0.00	5.60	8.2267	7.3941
21.753	141.64	0.76	0.00	5.25	0.00	0.00	0.00	5.44	8.3371	7.5082
22.003	141.64	0.76	0.00	5.04	0.00	0.00	0.00	5.26	8.4435	7.6187
22.253	141.63	0.76	0.00	4.81	0.00	0.00	0.00	5.05	8.5454	7.7252
22.503	141.62	0.76	0.00	4.58	0.00	0.00	0.00	4.83	8.6424	7.8273
22.753	141.62	0.76	0.00	4.33	0.00	0.00	0.00	4.60	8.7344	7.9248
23.003	141.61	0.76	0.00	4.06	0.00	0.00	0.00	4.36	8.8211	8.0173

POST-DEVELOPMENT - FDOT 100-YR, 24-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Time Series by Node - SIM-1 **********

Time (hrs)	Stage (ft)	Surface Ar.(ac)	Inflow Base Q (cfs)	Inflow Onsite (cfs)	Inflow Offsite (cfs)	Inflow Bndry Q (cfs)	Inflow Link Q (cfs)	Link Outflow (cfs)	Cumulative Volume In (ac.ft)	Cumulative Volume Out (ac.ft)
23.253	141.60	0.76	0.00	3.80	0.00	0.00	0.00	4.10	8.9023	8.1047
23.503	141.59	0.76	0.00	3.57	0.00	0.00	0.00	3.86	8.9785	8.1869
23.753	141.58	0.76	0.00	3.36	0.00	0.00	0.00	3.63	9.0500	8.2643
24.001	141.58	0.76	0.00	3.17	0.00	0.00	0.00	3.43	9.1170	8.3366
*** Group: POST		Node: N-101A								
0.000	139.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.253	139.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.503	139.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
0.753	139.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.003	139.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.253	139.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.503	139.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
1.753	139.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.003	139.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.253	139.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.503	140.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
2.753	140.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.003	140.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.253	140.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.503	140.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
3.753	140.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
4.003	140.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
4.253	140.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
4.503	140.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
4.753	140.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
5.003	140.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
5.253	140.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
5.503	140.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
5.753	140.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
6.003	140.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
6.253	140.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
6.503	140.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
6.753	140.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
7.003	140.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
7.253	140.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
7.503	140.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
7.753	140.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
8.003	140.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
8.253	140.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
8.503	140.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
8.753	140.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
9.003	140.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.0000
9.253	140.71	0.00	0.00	0.00	0.00	0.00	0.74	0.00	0.0076	0.0000
9.503	140.74	0.00	0.00	0.00	0.00	0.00	2.18	0.00	0.0378	0.0000
9.753	140.77	0.00	0.00	0.00	0.00	0.00	3.26	0.00	0.0939	0.0000
10.003	140.79	0.00	0.00	0.00	0.00	0.00	3.97	0.00	0.1686	0.0000

POST-DEVELOPMENT - FDOT 100-YR, 24-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Time Series by Node - SIM-1 **********

Time (hrs)	Stage (ft)	Surface Ar.(ac)	Inflow Base Q (cfs)	Inflow Onsite (cfs)	Inflow Offsite (cfs)	Inflow Bndry Q (cfs)	Inflow Link Q (cfs)	Link Outflow (cfs)	Cumulative Volume In (ac.ft)	Cumulative Volume Out (ac.ft)
10.253	140.82	0.00	0.00	0.00	0.00	0.00	4.47	0.00	0.2558	0.0000
10.503	140.84	0.00	0.00	0.00	0.00	0.00	4.87	0.00	0.3523	0.0000
10.753	140.87	0.00	0.00	0.00	0.00	0.00	5.24	0.00	0.4567	0.0000
11.003	140.90	0.00	0.00	0.00	0.00	0.00	5.64	0.00	0.5692	0.0000
11.253	140.92	0.00	0.00	0.00	0.00	0.00	6.07	0.00	0.6901	0.0000
11.503	140.95	0.00	0.00	0.00	0.00	0.00	6.54	0.00	0.8204	0.0000
11.753	140.97	0.00	0.00	0.00	0.00	0.00	7.03	0.00	0.9605	0.0000
12.003	141.00	0.00	0.00	0.00	0.00	0.00	7.57	0.00	1.1114	0.0000
12.253	140.98	0.00	0.00	0.00	0.00	0.00	8.10	0.00	1.2733	0.0000
12.503	140.96	0.00	0.00	0.00	0.00	0.00	8.58	0.00	1.4456	0.0000
12.753	140.94	0.00	0.00	0.00	0.00	0.00	8.96	0.00	1.6268	0.0000
13.003	140.92	0.00	0.00	0.00	0.00	0.00	9.21	0.00	1.8145	0.0000
13.253	140.90	0.00	0.00	0.00	0.00	0.00	9.34	0.00	2.0060	0.0000
13.503	140.87	0.00	0.00	0.00	0.00	0.00	9.39	0.00	2.1995	0.0000
13.753	140.85	0.00	0.00	0.00	0.00	0.00	9.39	0.00	2.3936	0.0000
14.003	140.83	0.00	0.00	0.00	0.00	0.00	9.36	0.00	2.5873	0.0000
14.253	140.81	0.00	0.00	0.00	0.00	0.00	9.30	0.00	2.7800	0.0000
14.503	140.79	0.00	0.00	0.00	0.00	0.00	9.24	0.00	2.9715	0.0000
14.753	140.77	0.00	0.00	0.00	0.00	0.00	9.19	0.00	3.1618	0.0000
15.003	140.75	0.00	0.00	0.00	0.00	0.00	9.14	0.00	3.3511	0.0000
15.253	140.73	0.00	0.00	0.00	0.00	0.00	9.09	0.00	3.5395	0.0000
15.503	140.71	0.00	0.00	0.00	0.00	0.00	9.04	0.00	3.7269	0.0000
15.753	140.69	0.00	0.00	0.00	0.00	0.00	8.97	0.00	3.9130	0.0000
16.003	140.67	0.00	0.00	0.00	0.00	0.00	8.88	0.00	4.0975	0.0000
16.253	140.65	0.00	0.00	0.00	0.00	0.00	8.77	0.00	4.2798	0.0000
16.503	140.62	0.00	0.00	0.00	0.00	0.00	8.63	0.00	4.4595	0.0000
16.753	140.60	0.00	0.00	0.00	0.00	0.00	8.48	0.00	4.6362	0.0000
17.003	140.58	0.00	0.00	0.00	0.00	0.00	8.31	0.00	4.8097	0.0000
17.253	140.56	0.00	0.00	0.00	0.00	0.00	8.13	0.00	4.9794	0.0000
17.503	140.54	0.00	0.00	0.00	0.00	0.00	7.94	0.00	5.1454	0.0000
17.753	140.52	0.00	0.00	0.00	0.00	0.00	7.77	0.00	5.3078	0.0000
18.003	140.50	0.00	0.00	0.00	0.00	0.00	7.61	0.00	5.4667	0.0000
18.253	140.48	0.00	0.00	0.00	0.00	0.00	7.47	0.00	5.6225	0.0000
18.503	140.46	0.00	0.00	0.00	0.00	0.00	7.34	0.00	5.7755	0.0000
18.753	140.44	0.00	0.00	0.00	0.00	0.00	7.21	0.00	5.9258	0.0000
19.003	140.42	0.00	0.00	0.00	0.00	0.00	7.10	0.00	6.0737	0.0000
19.253	140.40	0.00	0.00	0.00	0.00	0.00	6.99	0.00	6.2192	0.0000
19.503	140.37	0.00	0.00	0.00	0.00	0.00	6.87	0.00	6.3625	0.0000
19.753	140.35	0.00	0.00	0.00	0.00	0.00	6.74	0.00	6.5031	0.0000
20.003	140.33	0.00	0.00	0.00	0.00	0.00	6.58	0.00	6.6407	0.0000
20.253	140.31	0.00	0.00	0.00	0.00	0.00	6.41	0.00	6.7749	0.0000
20.503	140.29	0.00	0.00	0.00	0.00	0.00	6.23	0.00	6.9056	0.0000
20.753	140.27	0.00	0.00	0.00	0.00	0.00	6.07	0.00	7.0326	0.0000
21.003	140.25	0.00	0.00	0.00	0.00	0.00	5.91	0.00	7.1563	0.0000
21.253	140.23	0.00	0.00	0.00	0.00	0.00	5.76	0.00	7.2768	0.0000
21.503	140.21	0.00	0.00	0.00	0.00	0.00	5.60	0.00	7.3941	0.0000
21.753	140.19	0.00	0.00	0.00	0.00	0.00	5.44	0.00	7.5082	0.0000

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POST-DEVELOPMENT - FDOT 100-YR, 24-HR
OSPREY ENERGY CENTER
POLK COUNTY, FLORIDA

********** Node Time Series by Node - SIM-1 **********

Time (hrs)	Stage (ft)	Surface Ar.(ac)	Inflow Base Q (cfs)	Inflow Onsite (cfs)	Inflow Offsite (cfs)	Inflow Bndry Q (cfs)	Inflow Link Q (cfs)	Link Outflow (cfs)	Cumulative Volume In (ac.ft)	Cumulative Volume Out (ac.ft)
22.003	140.17	0.00	0.00	0.00	0.00	0.00	5.26	0.00	7.6187	0.0000
22.253	140.15	0.00	0.00	0.00	0.00	0.00	5.05	0.00	7.7252	0.0000
22.503	140.12	0.00	0.00	0.00	0.00	0.00	4.83	0.00	7.8273	0.0000
22.753	140.10	0.00	0.00	0.00	0.00	0.00	4.60	0.00	7.9248	0.0000
23.003	140.08	0.00	0.00	0.00	0.00	0.00	4.36	0.00	8.0173	0.0000
23.253	140.06	0.00	0.00	0.00	0.00	0.00	4.10	0.00	8.1047	0.0000
23.503	140.04	0.00	0.00	0.00	0.00	0.00	3.86	0.00	8.1869	0.0000
23.753	140.02	0.00	0.00	0.00	0.00	0.00	3.63	0.00	8.2643	0.0000
24.001	140.00	0.00	0.00	0.00	0.00	0.00	3.43	0.00	8.3366	0.0000

OSPREY ENERGY CENTER

POST-DEVELOPMENT OUTPUT
(NODE N-101)

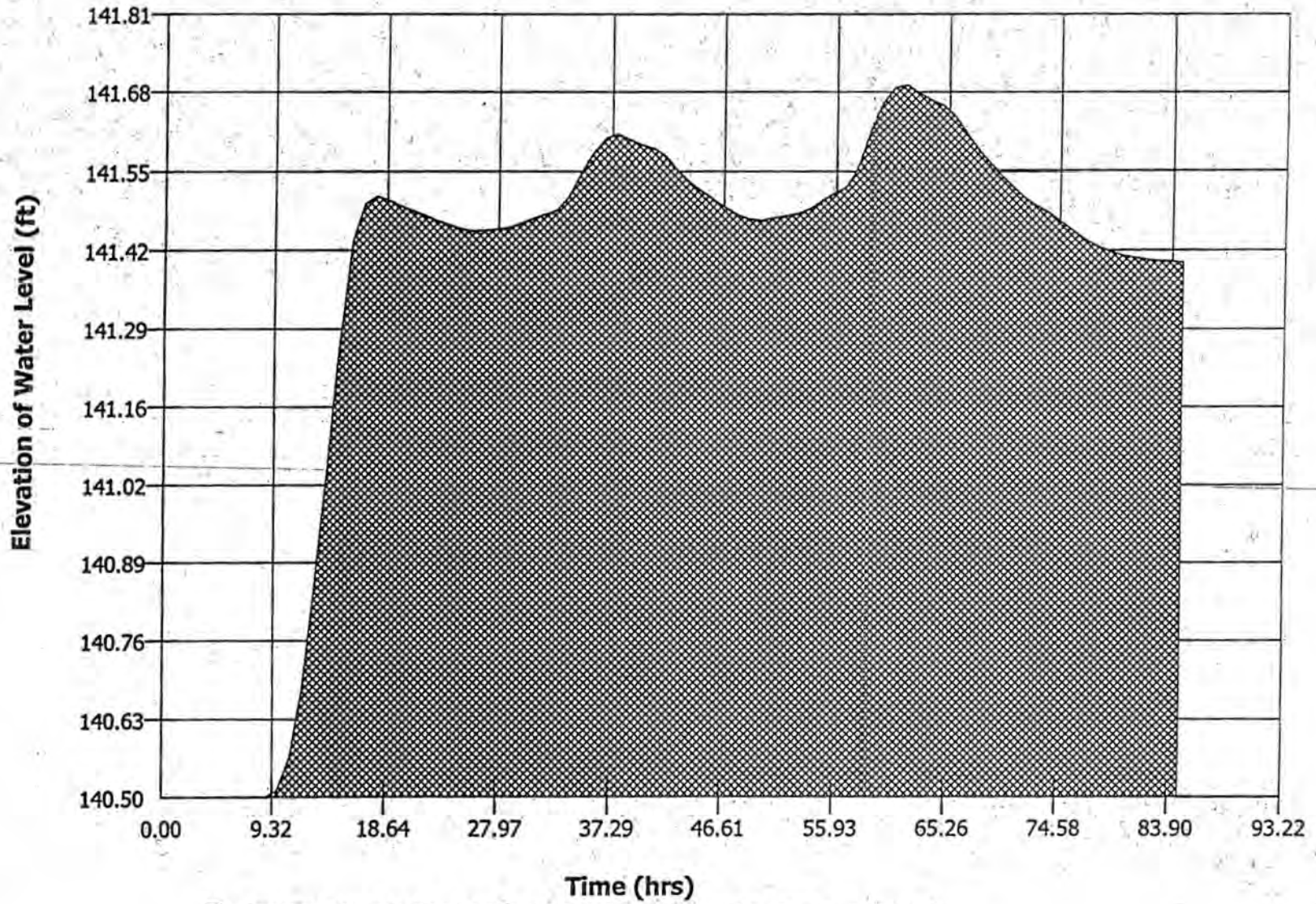
FDOT 100-YR, 72-HR

IMAGE QUALITY

AS YOU REVIEW THE NEXT FEW PAGES, PLEASE NOTE THAT THE ORIGINAL DOCUMENT WAS OF POOR QUALITY.

MODRET

INFILTRATION : OSPREY ENERGY CENTER



NODE N-101 FDOT 100-YR, 72-HR Max Water Elevation = 141.69 ft

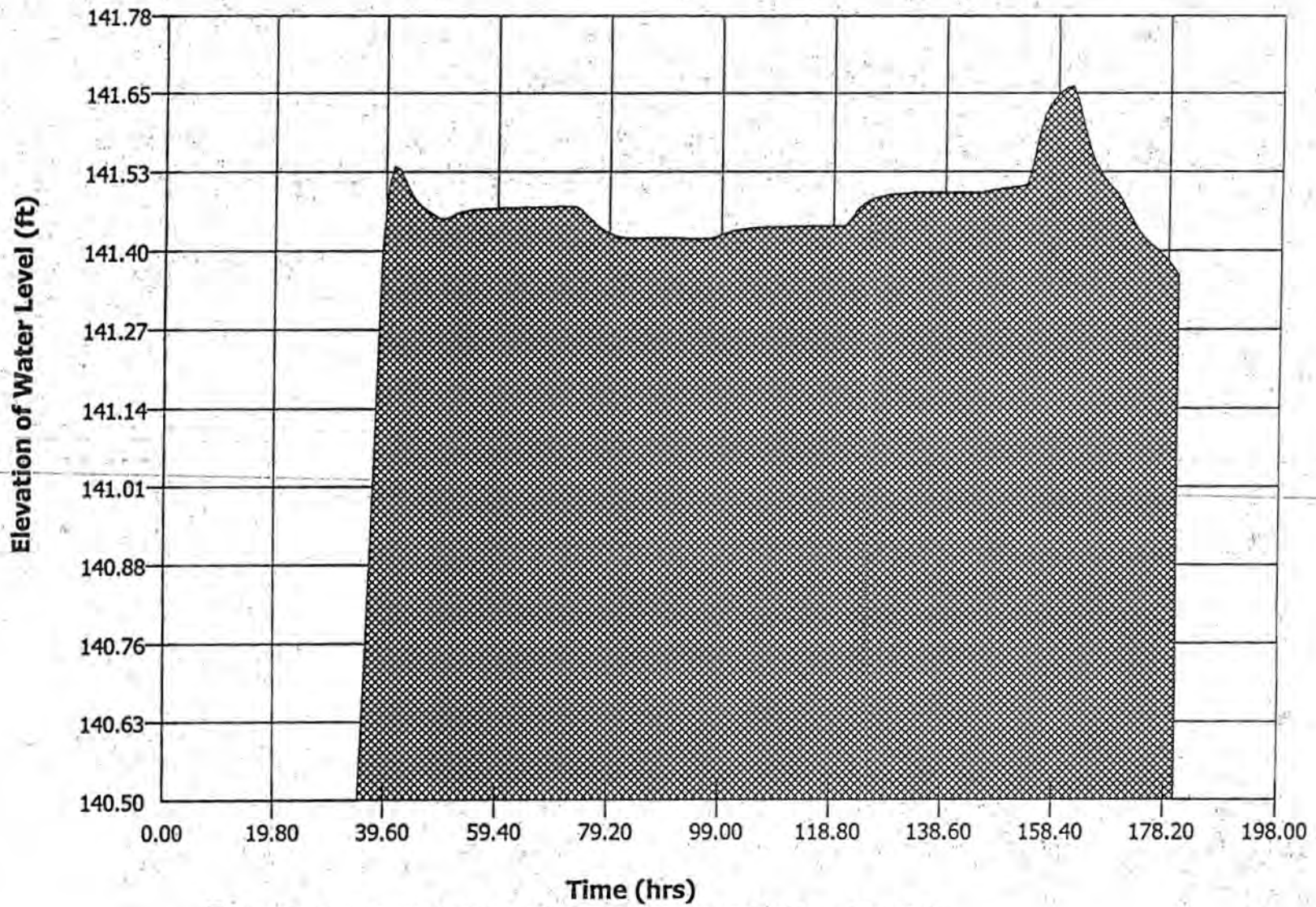
OSPREY ENERGY CENTER

POST-DEVELOPMENT OUTPUT
(NODE N-101)

FDOT 100-YR, 168-HR

MODRET

INFILTRATION : OSPREY ENERGY CENTER



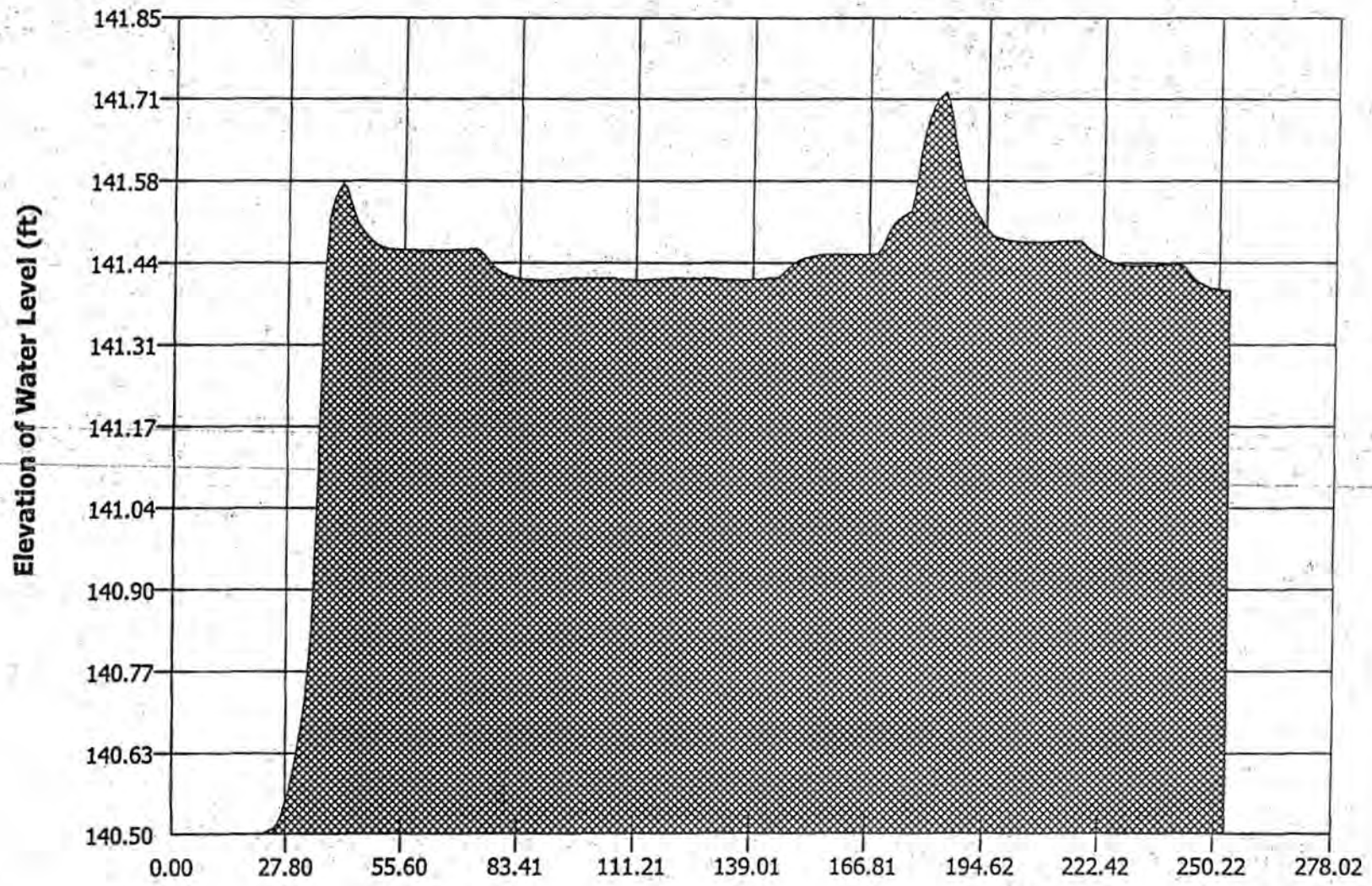
OSPREY ENERGY CENTER

POST-DEVELOPMENT OUTPUT
(NODE N-101)

FDOT 100-YR, 240-HR

MODRET

INFILTRATION : OSPREY ENERGY CENTER



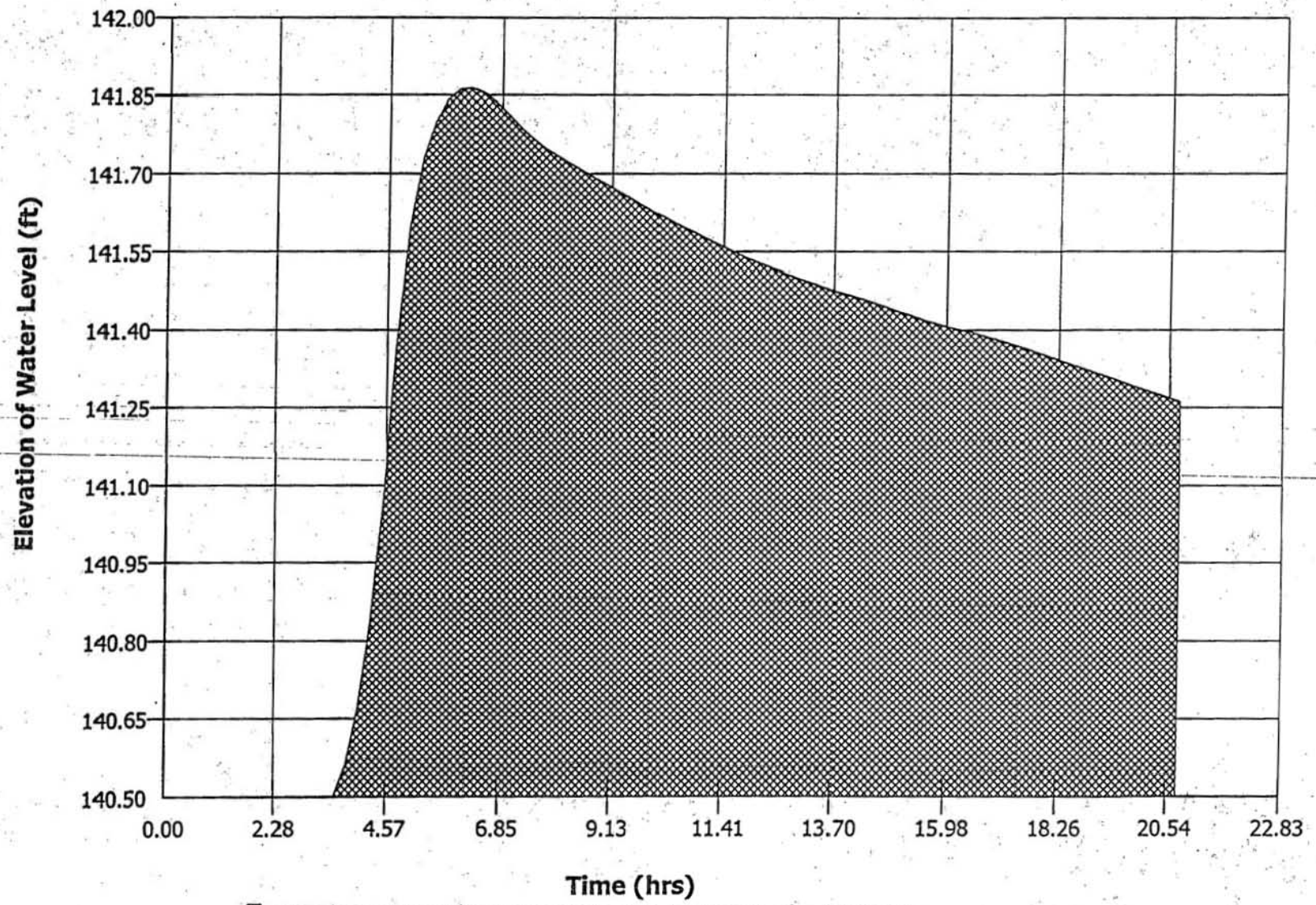
OSPREY ENERGY CENTER

POST-DEVELOPMENT OUTPUT
(NODE N-101)

FDOT (50-YR THRU 2-YR), 8-HR

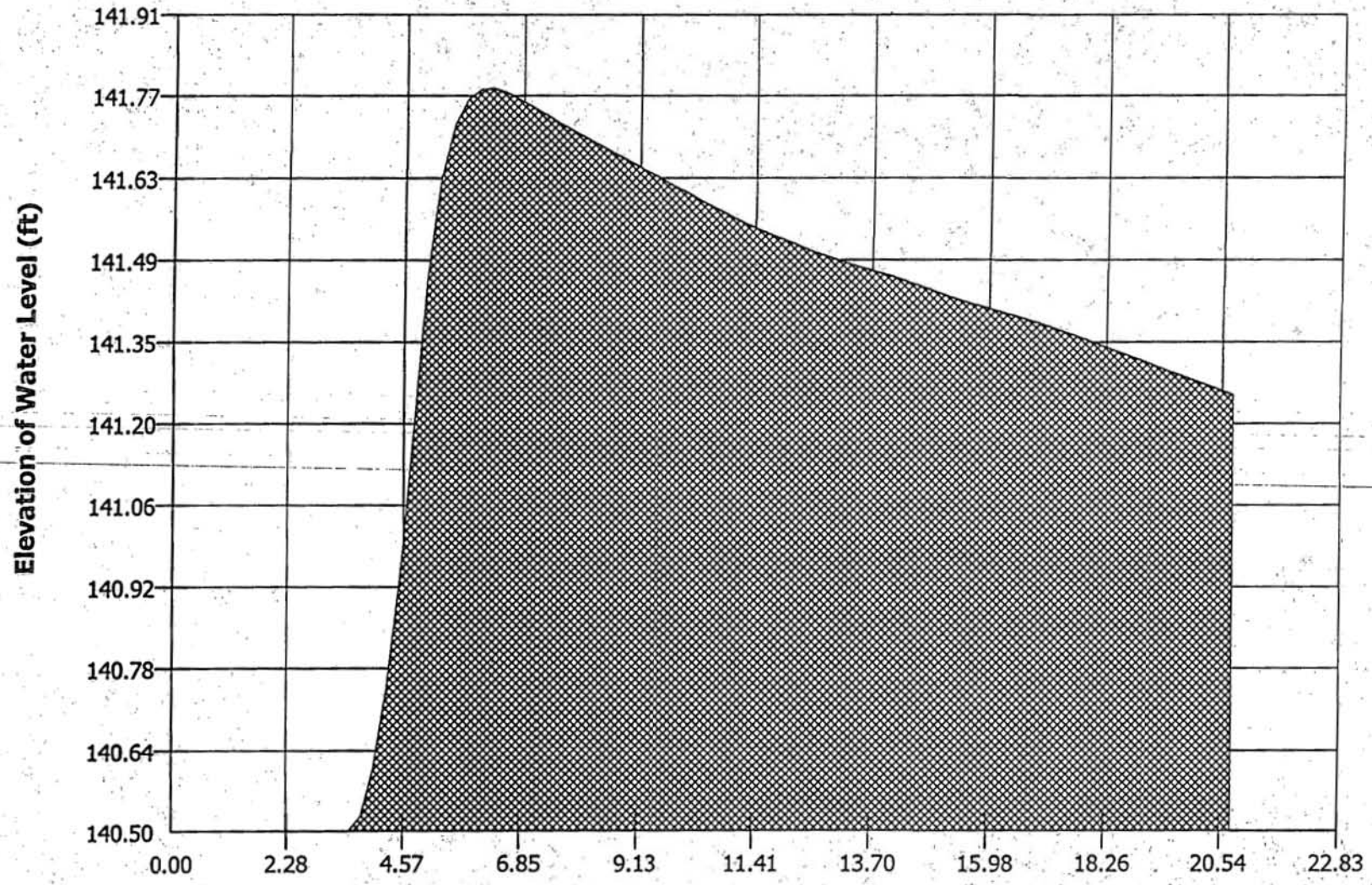
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INFILTRATION : OSPREY ENERGY CENTER



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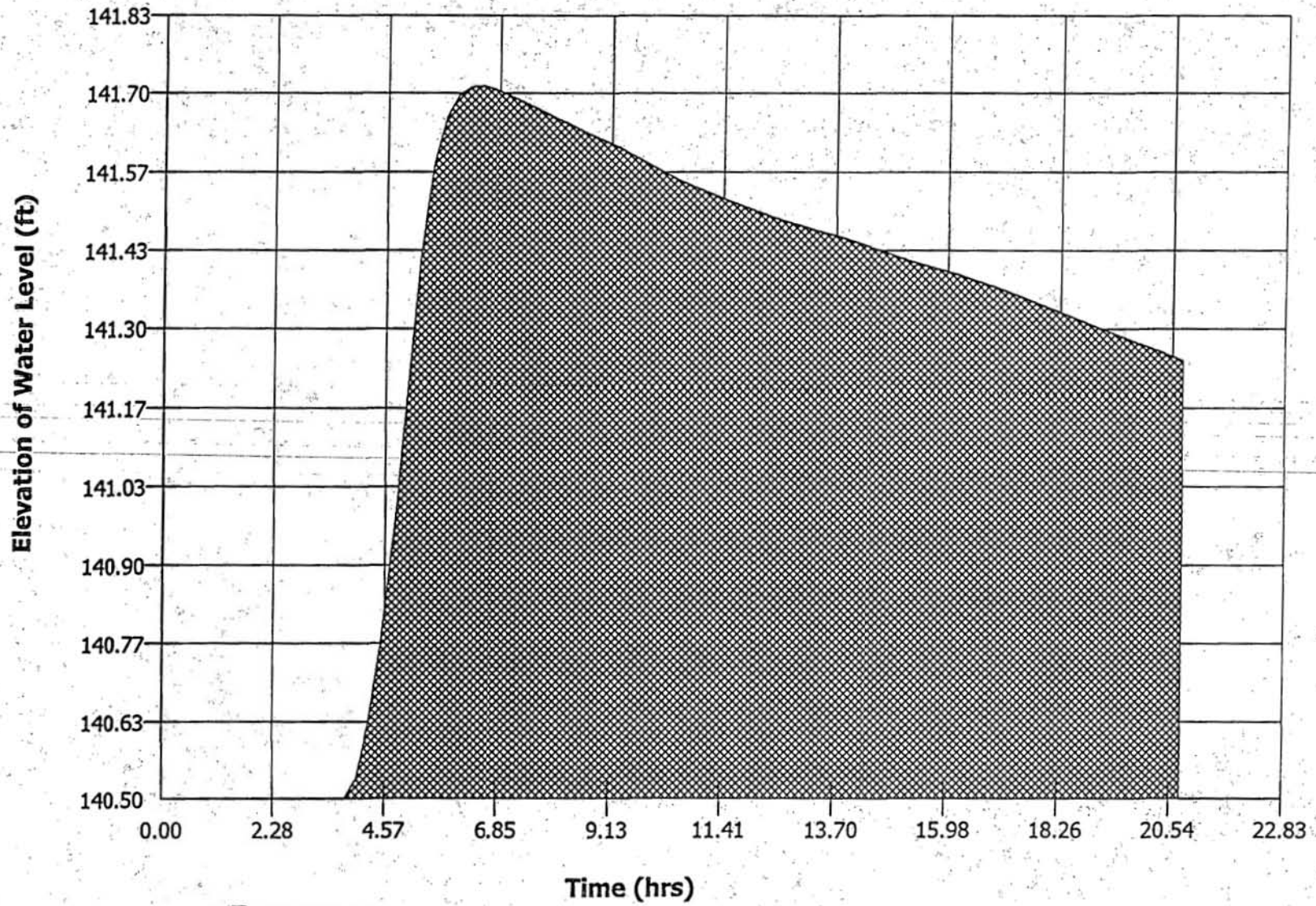
INFILTRATION : OSPREY ENERGY CENTER



NODE N-101 FDOT 25-YR, 8-HR Max Water Elevation = 141.78 ft

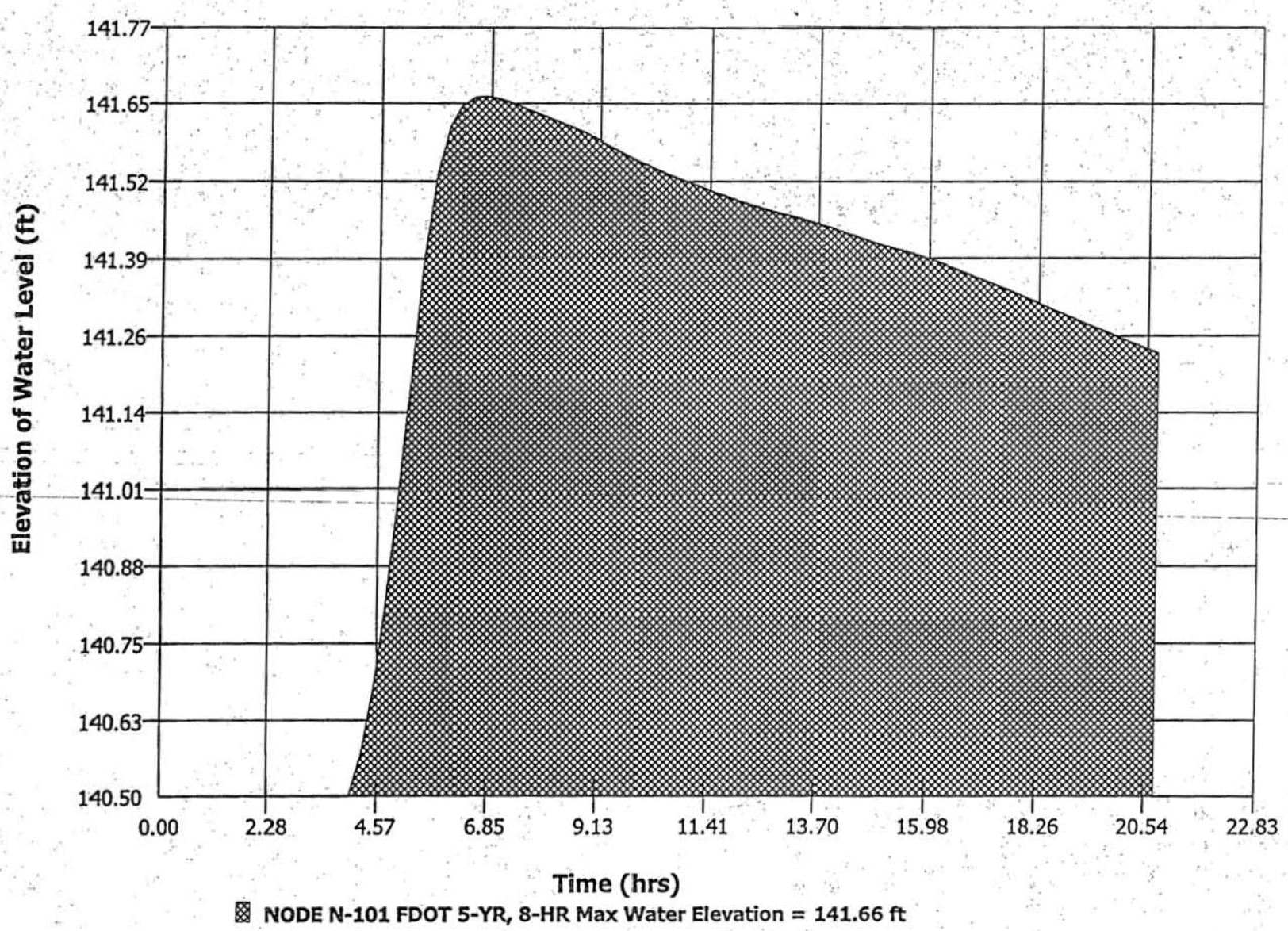
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INFILTRATION : OSPREY ENERGY CENTER



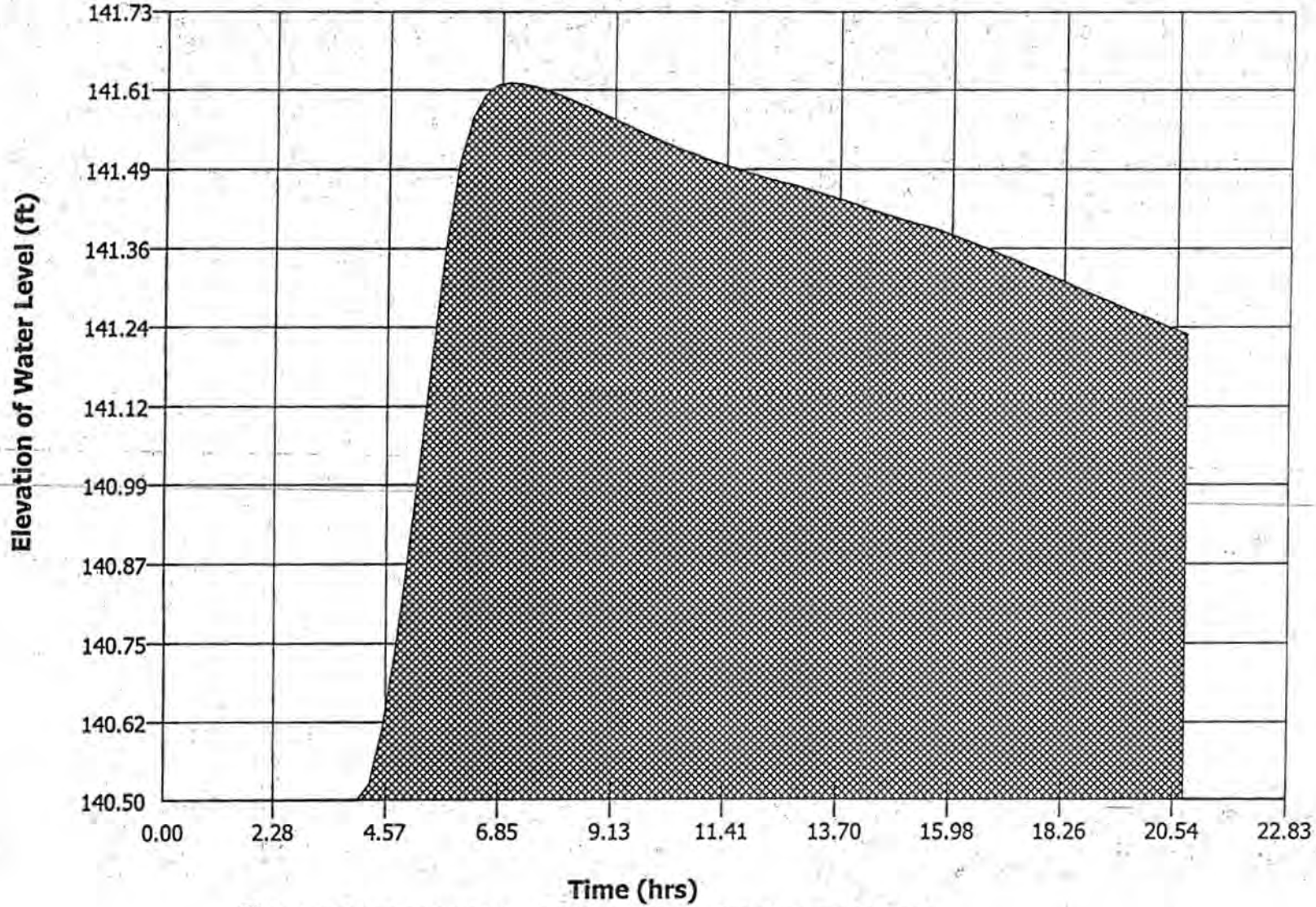
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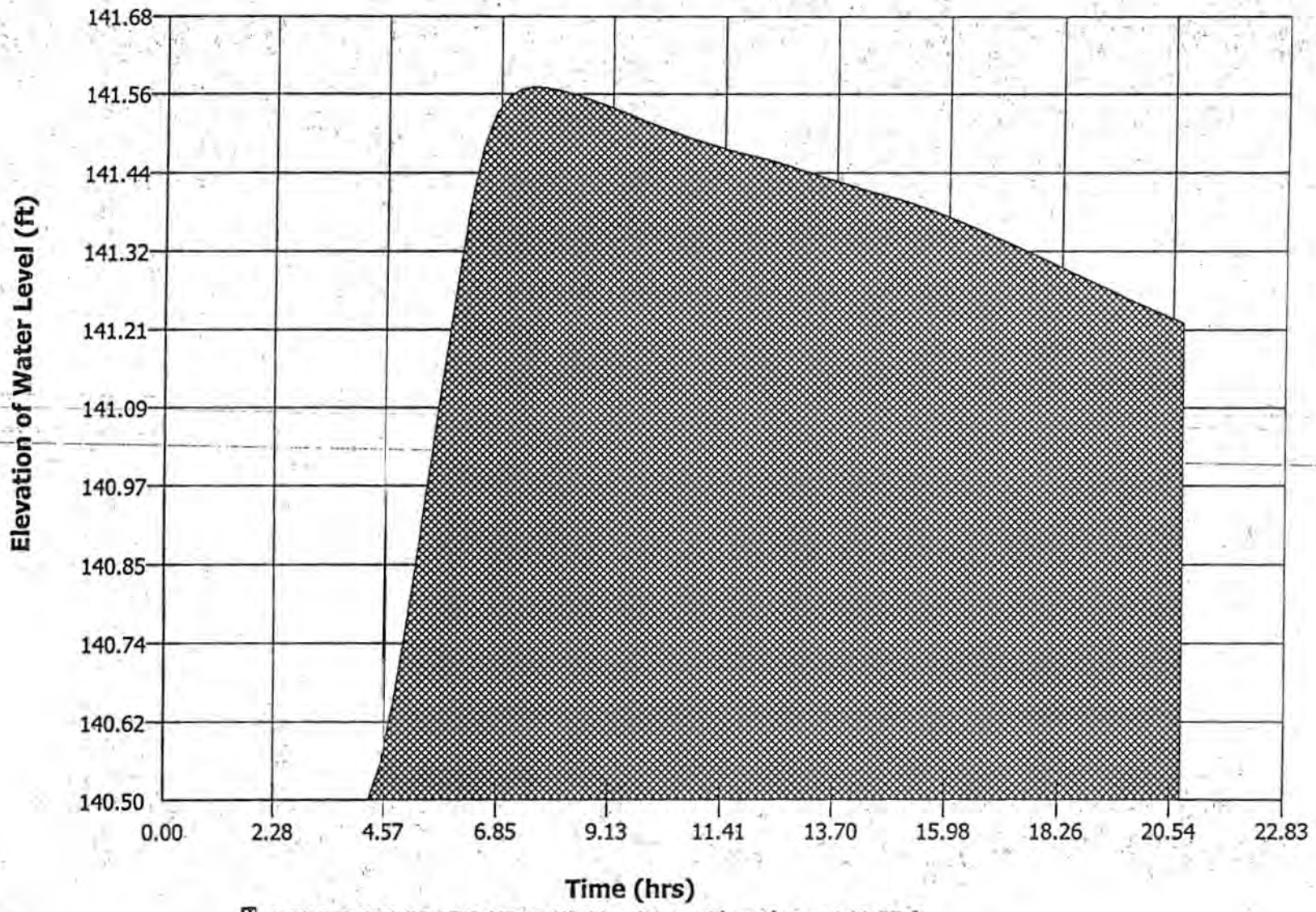
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INFILTRATION : OSPREY ENERGY CENTER



MODRET

INFILTRATION : OSPREY ENERGY CENTER



6 OVERSIZE DOCUMENT WAS REMOVED AND INSERTED INTO OCULUS SEPARATELY.

10.1.8 State Water Use Permit

INTRODUCTION

Calpine Construction Finance Company, L.P. (Calpine) plans to license, construct, own, and operate, a 527-megawatt (average ambient) combined-cycle electrical power plant in Auburndale, Florida. The Osprey Energy Center will be located on 19.46 acres of land (see **Attachment A** per Section IV-C of the IWUPA), approximately one mile west of the intersection of Havendale Boulevard and State Road 92. The Osprey Energy Center (Site) is located in Section 15, Township 28 South, and Range 25 East (Figure 10.1.8-1). The Site has no structures, public sewer system, or active water use at this time, but was formerly used as an orange grove.

The nearby land use is commercial (including a cemetery to the west, and a power plant to the east), and residential mixed with small businesses to the north and south. A list of adjacent landowners is supplied as **Attachment D**, per Section IV-5 of the Individual Water Use Permit Application (IWUPA, WUP-3 Form 46.20-003 (12/98). Aerial photographs are also supplied with this application which show surrounding land use, Site boundaries, proposed well sites, and adjacent roads (**Attachments B and C**, per Section IV-B of IWUPA). The City of Auburndale, Florida (City) has committed to provide the Osprey Energy Center potable water, trash disposal, and sanitary sewer service.

The Osprey Energy Center will connect to the electrical grid at the existing Tampa Electric Company Recker Substation located adjacent to, and east of the southeast boundary of the Site. The proposed Project will connect to a new pipeline lateral from the Gulfstream natural gas transmission pipeline.

The Project will consist of the power block and operations control center, and directly associated facilities including a switchyard, water treatment building, storage facilities, general services/warehouse building, and a gas metering station.

Cooling tower make-up water is required to replace water evaporation and drift during the cooling process, or water that is discharged during normal operations. To prevent accumulation of solids in the cooling water, cooling water discharge, or blowdown, is necessary. The Project's make-up water requirement is estimated to be approximately 3.55 million gallons per day (mgd) on an annual average daily basis, and approximately 4.79 mgd maximum-day demand. A portion of these demands will be met by using reclaimed water from the City of Auburndale (approximately 800,000 gallons per day initially). Detailed water balance diagrams are provided as **Attachments F-3A and F-3B**. This supply of reclaimed water will be from the City of Auburndale's Allred Wastewater Treatment Plant (WWTP), and the entire output capacity from this plant will be supplied to the Project. The availability of reclaimed water will grow over time to the WWTP's maximum capability of 1.4 mgd, and it is anticipated that the Osprey Energy Center will utilize all of this water.

Since non-power oriented water requirements will be provided by the City, the requested water supply allocation is for power and steam generation. This requested water supply is expected to come from three deep wells (approximately 700 feet below land surface) drilled into the Upper Floridan aquifer. Only two wells estimated to produce approximately 1,700 gallons per minute (gpm) each will be required to meet daily groundwater demand at any one time. The third proposed well will be designated as a standby well and will be utilized in the event that either of the primary wells requires maintenance. However, this third well will be operated intermittently to maintain well integrity and insure that it is fully operational at all times. The amount of groundwater needed will progressively decrease over time as more reclaimed water becomes available from the Allred WWTP. A hydrogeological assessment of the Site conditions is provided as **Attachment E-1.**

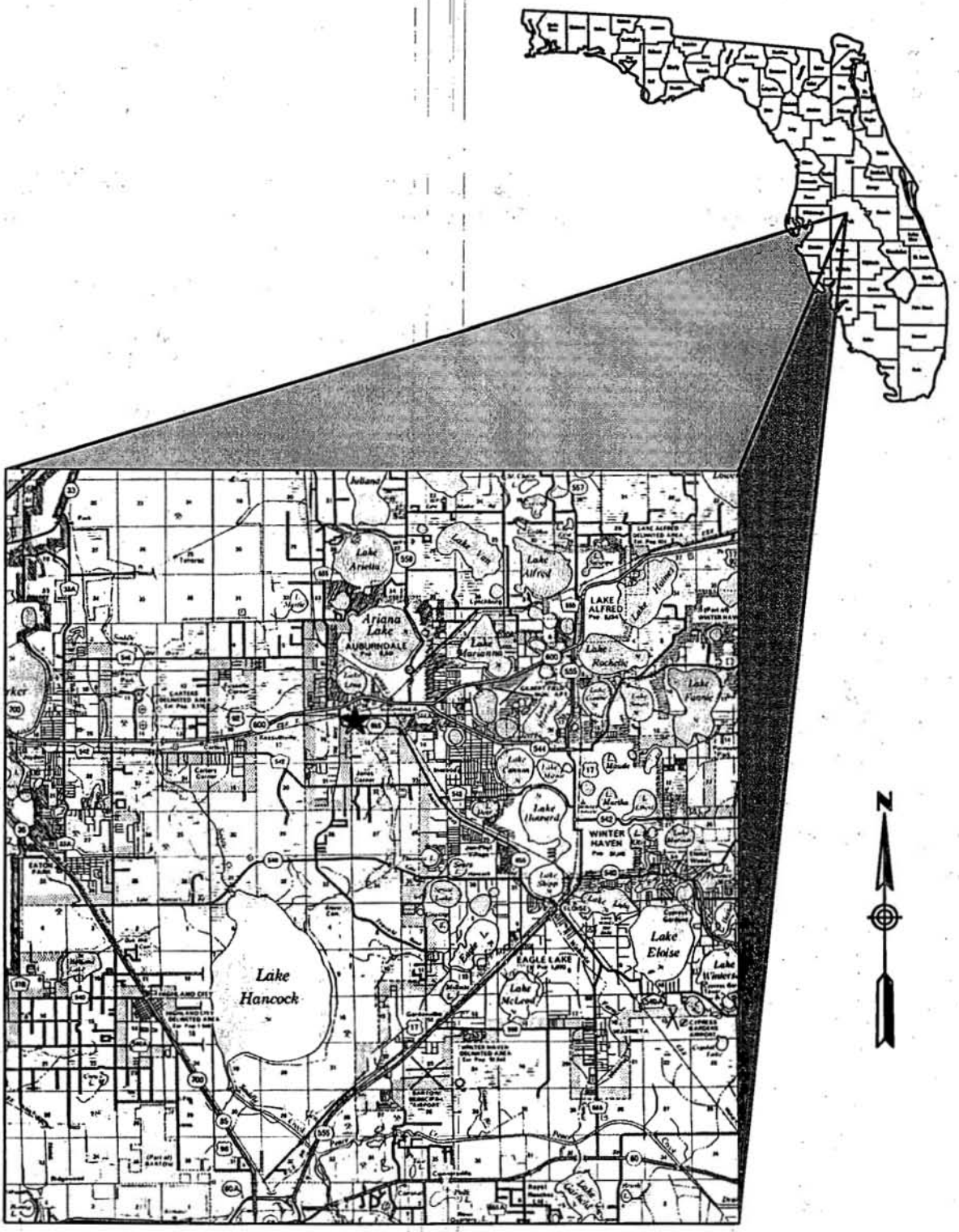
Several factors affect the Osprey Energy Center water use, including load, hours of operation, and water quality. Water conservation methods will be implemented in order to minimize water losses, maximize efficiency of the system, and take advantage of feasible uses of available reclaimed water. The requested annual average allocation is for

78-percent of the total Project water needs. However, the City will supply the Osprey Energy Center with approximately 22-percent of its average daily demand from reclaimed water. Although other sources have been considered, there are no technically or financially feasible alternatives except local groundwater, and the reclaimed water that will be provided by the City. This reclaimed water source will be recycled along with the groundwater supply from three (3) to five (5) times as a means of conserving water, depending on the reclaimed water quality. This and other conservation methods will be incorporated into the Osprey Energy Center design as a means of reducing water demand and providing source longevity. A Water Conservation Plan and an Alternative Water Supply Assessment are provided as **Attachments F-4 and G**, respectively.

Groundwater modeling results show that there is not expected to be any adverse impacts to any nearby legal user. No nearby wetlands or major water bodies exist within a proximity that they may be harmed by the groundwater withdrawals. A computer model assessment of the impacts from the proposed groundwater withdrawals and the resultant cones of depression are provided as **Attachment E-2**.

A surface water management plan will be implemented at the new Osprey Energy Center that will control stormwater on Site. The surface water management plan will incorporate stormwater ponds as a means of recharging runoff into the surficial aquifer system. A surface water management plan is provided as **Attachment F-1**.

In summary, the Osprey Energy Center will use both groundwater and available reclaimed water to meet its needs. The Osprey Energy Center will implement conservation measures as appropriate, and continue to seek additional alternative supplies. No adverse impacts are expected from this proposed water use.



★ Project Site

Golder Associates

Tampa, Florida

Project Site Area

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: NTS	Job No. 993-9570
CHK BY: CA	DATE: 02/04/00	FIGURE 10.1.8-1
REV BY: –	FILE No.: fig10_1_8-1.dwg	

INDIVIDUAL WATER USE PERMIT APPLICATION

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

2379 BROAD STREET • BROOKSVILLE, FL 34609-6899 • (352) 796-7211 or FLORIDA WATS 1 (800) 423-1476
(SEE LAST PAGE OF THIS FORM FOR YOUR LOCAL PERMITTING OFFICE)

USE FOR QUANTITIES OF 500,000 GALLONS PERDAY OR GREATER

THIS FORM MUST BE COMPLETED FOR ALL APPLICANTS REQUESTING ANNUAL AVERAGE QUANTITIES OF 500,000 GPD OR GREATER. OTHER APPLICANTS MUST COMPLETE THE APPLICATION FORM CORRESPONDING TO THE PROPOSED QUANTITY. THIS INFORMATION IS REQUESTED IN ACCORDANCE WITH RULES 40D-2.101 AND 40D-2.301, FLORIDA ADMINISTRATIVE CODE.

*AN ASTERISK INDENTIFIES ITEMS TO BE INDICATED ON SITE MAP; YOU MAY USE THE MAP REQUESTED IN ITEM IV, SECTION B OF THE WUP APPLICATION.

PLEASE SUBMIT THREE COPIES OF THIS APPLICATION ALONG WITH THREE COPIES OF THE APPROPRIATE SUPPLEMENTAL FORM (IF REQUIRED), DRAWINGS, CALCULATIONS, ETC.

I. GENERAL INFORMATION

1. Type of Application (Check One): ☑ New ☐ Renewal ☐ Modification
2. Water Use Permit Number (If application is for renewal or modification): _____

NOTE: "Applicant" is the name under which the permit will be issued (examples: Robert Jones; Baker Groves, Inc., Acme Industries, City of Sundale.) All correspondence will be addressed to the applicant unless an alternate contact is requested in Item 4.

3. APPLICANT

NAME	Calpine Construction Finance Company, L.P.	TELEPHONE (408)	995-5115
ADDRESS	50 West San Fernando Street	COUNTY	
CITY, STATE, ZIP	San Jose, California 95113		

Applicant is: ☐ Owner ☐ Lessee ☑ Other Property under purchase option agreement

4. CONTACT OR CONSULTANT - Address all correspondence to the person identified below? ☐ Yes ☐ No

NAME	Mr. Dale Jenkins, P.G.	COMPANY:	Golder Associates Inc.
ADDRESS	5405 West Cypress Street, Suite 215	TELEPHONE (813)	287-1717
CITY, STATE, ZIP	Tampa, FL 33607		

5. OWNER (IF OTHER THAN APPLICANT)

NAME	Don Hemphill		
ADDRESS	208 East Terrace Drive - P.O. Box 875	TELEPHONE (813)	752-3568
CITY, STATE, ZIP	Plant City , FL 33564		

II. PROPERTY CONTROL

1. Provide a legal description of the property served by this application. ☑ Attached
2. This property is: ☐ Owned by the applicant ☐ Leased by the applicant ☑ Applicant has other legal control
3. Leased property: Provide a copy of either (check type of document that is attached):
   ☐ Copy of lease ☐ Letter signed by the property owner describing the lease arrangement and the duration of the lease

NOTE: Permits will not be issued for a duration longer than the lease, unless the lease is renewable. If renewable, the applicant may be required by Permit Condition to provide a copy of the renewed lease at the appropriate time. The property owner and the lessee must sign this application in Section VII.

4. Other Legal Control: If the applicant has legal control over the property other than a lease agreement, please provide a description on an attached sheet. ☐ Attached ☐ N/A

III. CLASSIFICATION

SECTION A - *Quantity*

1. Annual average quantity applied for, in gallons per day (gpd). This quantity should reflect the amount needed six years and ten years hence, or for the remainder of permit duration, if the application is for a modification:

   6 years: 2,754,432 (gpd) 10 years: 2,754,432 (gpd) Other: NA (gpd)

2. Indicate the requested peak monthly pumpage quantity. See Section 3 of the *Basis of Review* for an explanation of this quantity.

   6 years: 3,988,679 (gpd) 10 years: 3,988,679 (gpd) Other: NA (gpd)

SECTION B - *Water Use*

3. Indicate all that apply. Information Supplements must be filled out for all uses. See Section 3 of the *Basis of Review* for explanations of the use classifications.

   ☐ Public Supply ☐ Recreation or Aesthetic ☐ Agriculture
   ☑ Industrial or Commercial ☐ Mining or Dewatering

4. Indicate the date on which the use of water was initiated or is proposed for initiation (month/day/year): 01/01/2003

5. Indicate the quantity and source of any reuse water used by the applicant:
   Annual Average Quantity 800,064 gpd; Peak Month Quantity 800,064 gpd; Source: Allred WWTP

IV. SITE/WITHDRAWAL INFORMATION

SECTION A - *Acreage*

1. Number of acres Owned: 19.46 ; Leased: _____ ; Serviced _____.

2. Describe the location of the property contained in this application by Section, Township, Range, 1/4 Section:
   Section 15, Township 28S, Range 25E, 1/4 Section NW.

SECTION B - *Location Maps*

3. Provide a recent aerial map showing: (a) a north arrow; (b) a scale designation - all maps should have a minimum scale of 1" = 2,000'; (c) landmarks such as roads and political boundaries; (d) property boundaries - include approximate lengths of boundaries in feet; (e) withdrawal point locations - label withdrawal points, indicate the distance from the withdrawal points to the nearest property boundaries in feet, *(If the withdrawal points are located on non-contiguous parcels, provide separate large-scale maps in addition to a large-scale map which includes all parcels); (f) the area serviced or irrigated, *(If the area serviced or irrigated is a distance from the withdrawal locations, provide separate map(s).

   * May require separate or additional maps.

4. Use a Map (not necessarily an aerial) or a sketch of the applicant's property and surrounding area to indicate:

   a. Approximate location of other wells not owned by the applicant including domestic wells, irrigation wells, public water supply wells, etc. within the distance set forth in Item 5, Table 1, below. Supplemental locations at a greater distance may be required.

   b. Location of monitoring wells, including reference numbers.

   c. Wetlands greater than 0.5 acre in size, covering the area within the distance set forth in Item 5, below. Substantial off-site drawdown impacts may require additional aerial coverage. Mining applicants requirements differ, and are provided on the Mining and Dewatering Supplemental Form, Form No. WUP-6.

SECTION C - *Adjacent Property Owners*

5. Submit a listing of the names and mailing addresses of property owners near the property contained in this application, based on the quantity to be withdrawn and the table provided below. You may choose a distance from either your property boundary or your withdrawal point. The District may require additional potentially affected property owners to be submitted.

Section C, Item 5 continued on Page 3

Section C, Item 5 continued from Page 2

TABLE 1 - FOR WELL OR MINE PIT WITHDRAWALS OF:

Average GPD on an Annual Basis	***OR***	Maximum GPD During Any Single Day	Provide Information on the Following:
500,000 gpd but less than 1,000,000 gpd		More than 5,000,000 but not more than 10,000,000 gpd	All property owners within 1,320' of the well, or within 200' of your property boundary
1,000,000 gpd or greater		More than 10,000,000	All property owners within 2,640' of the well, or within 400' of your property boundary

TABLE 2 - FOR SURFACE WATER WITHDRAWALS:

If your withdrawal is from a lake with a surface area of 80 acres or less, list below all riparian owners on the lake or impoundment.

If your withdrawal is from a lake larger than 80 acres, list below all riparian owners in either direction 660' from point where applicant's property intersects the shoreline.

If your withdrawal is from a stream and if the maximum daily average pumpage is less than 5,000,000 gpd, list below all riparian owners 660' upstream and 1,320' downstream from your property boundaries at the shoreline.

If your withdrawal is from a stream and if the maximum daily average pumpage is greater than or equal to 5,000,000 gpd, list below all riparian owners 1,320' upstream and 2,640' downstream from your property boundaries at the shoreline.

Name	Mailing Address
NA	

SECTION D - *Withdrawal Points*

6. **Groundwater Withdrawals.** Include all wells on property greater than 2 inches in diameter, whether active or inactive, and whether existing or proposed, in the table on the following page:

TABLE LEGEND:

SWFWMD I.D. No. - the withdrawal number assigned by the District, if existing.
Owner I.D. No. - the owner's I.D. number.
Construction Date - the approximate date that the withdrawal point became operable.
Average Withdrawal Rate - the total quantity of water to be withdrawn in one year divided by 365, in gpd.
Peak Monthly Withdrawal Rate - the maximum quantity to be withdrawn in a single month, in gpd.
Maximum Daily Withdrawal Rate - the maximum quantity to be withdrawn in any single day.
Standby - refers to status of wells that would not be used unless another well becomes inoperable.
Cap - the well is capped.
Meter - refers to whether a flow meter is installed: if several withdrawals are connected to the same meter. (ganged), indicate by placing a letter character (a,,b, etc.) instead of a check mark, linking those interconnected withdrawals by like characters. If an indirect flow measuring device (e.g. an elapsed time meter, etc.) is used, place an I (indirect) in the space provided.
Monitor - refers to water level or water quality monitors. Indicate the type of monitor by placing an L (Level), Q (Quality), or both in the space provided. The absence of checkmarks or letters indicates active status.
Mainline Diameter - refers to the outside diameter of the main discharge pipe.
Proposed - check if the withdrawal point is proposed rather than existing.

Section D, continued on Page 4

Section D, continued from Page 3

I.D. No. SWFWMD	I.D. No. Owner	Casing Diameter	Depth Cased	Total Depth	Constr. Date	Pump Capacity (gpm)	Withdrawal Rate: Average Annual	Withdrawal Rate: Peak Month	Proposed	Status (check): Mon.	Stdby.	Cap.	Meter	Mainline Diameter
	1	16 in.	150	700	08/02	1,700	1,377,216	1,994,339	x					
	2	16 in.	150	700	08/02	1,700	1,377,216	1,994,339	x					
	3*	16 in.	150	700	08/02	1,700	1,377,216	1,994,339	x		✔			

7. Indicate the future use of any capped source: _____

8. Indicate the parameters sampled for any monitor wells listed above: _____

9. **Surface Water Withdrawals** - See the Groundwater withdrawal section above for explanation of most terms. Source name is the name of a lake, stream or other waterbody.

I.D. No. SWFWMD	I.D. No. Owner	Source Name	Lake Acreage	Intake Diameter	Pump Capacity (gpm)	Withdrawal Rate: Average Annual	Withdrawal Rate: Peak Month	Proposed	Status (check): Active	Stdby.	Metered	Mainline Diameter

10. **Other Sources.** Describe any other sources of water, such as from utilities, treated waste water effluent, etc. List annual average and peak month quantities for each additional source: _____

Utilize all reclaimed water from Allred WWTP, which has current capacity of 800,064 gpd that will ultimately grow to 1,400,000 gpd

V. IMPACTS

Are you aware of any adverse impacts that your withdrawals have or may have on other water users, off-site land uses, the water resources, or environmental features? If so, provide a detailed explanation of the impact and your plans to deal with it.

None Anticipated ☑ Explanation Attached ☐

VI. HYDROGEOLOGY

Provide any information available on regional and site-specific hydrogeology, including aquifer characteristics, for all aquifers existing in the area of your withdrawals. Provide documentation and references in support of this information. If you do not have such information, hydrogeologic testing may be required either as additional information in support of your application, as a condition of the permit, or both. The District may use appropriate regional data in lieu of or in addition to submitted information to assess the impacts of your withdrawals. New hydrogeologic testing should follow the guidelines of Part C, *Permit Information Manual.*

*This third well will be designated as a standby well in the event that either of the primary wells requires maintenance. This third well will be operated intermittently in order to maintain its integrity and insure it is fully operational when needed.

VII. APPLICANT CERTIFICATION

I hereby certify that the information contained herein is true and accurate and that I have legal authority to undertake the activities described herein and execute this application.

Applicant Signature _____ Date _____

I hereby certify that the applicant has sufficient legal control of the property described in this application.

Property Owner (if other than applicant) _____ Date _____

APPLICANT CHECK LIST:

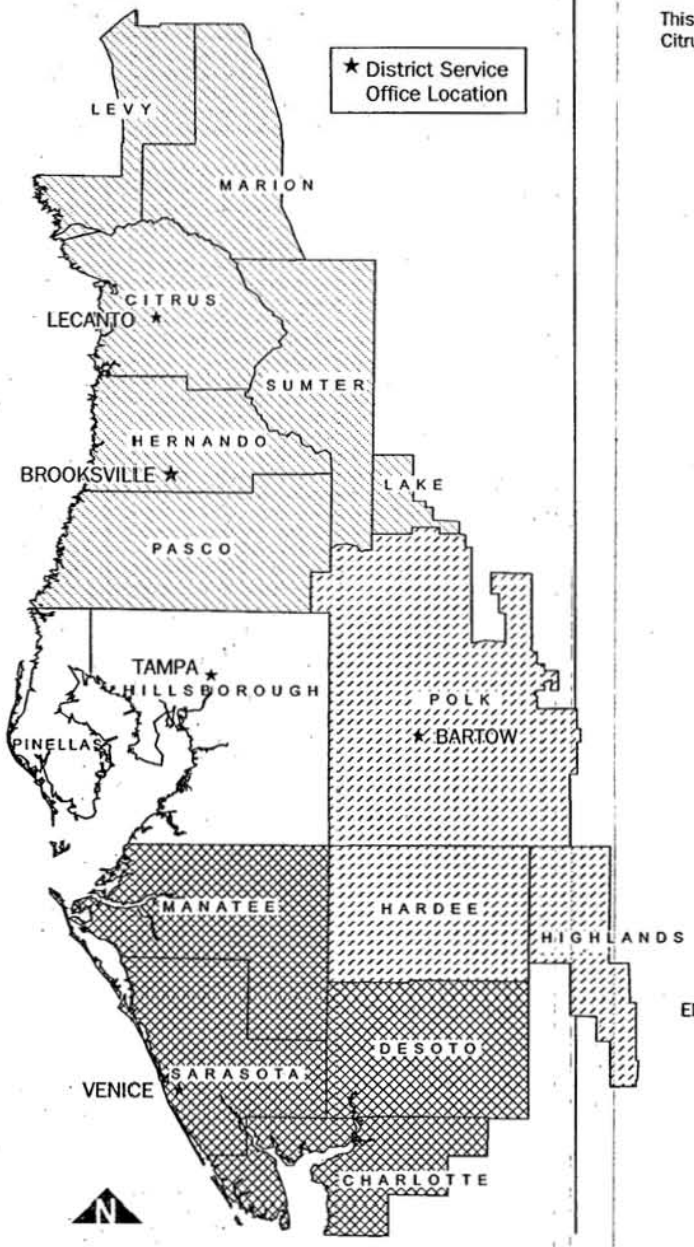
Attachments requested in support of this application:

		Attached	*N/A*
1.	(Section II-1) Copy of Legal Description	☑	☐
2.	(Section II-2) Copy of Current Lease	☐	☑
3.	(Section II-3) Description of Other Legal Property Control	☐	☑
4.	(Section IV-3) Aerial Map	☑	☐
5.	(Section IV-4) Site Map	☑	☐
6.	(Section IV-5) Adjacent Property Owners	☑	☐
7.	(Section VI) Hydrologic Information	☑	☐
8.	Appropriate Supplemental Form	☑	☐

Southwest Florida Water Management District

Regulation Service Regions

District permit applications for water use, environmental resources, and well construction may be submitted to any District Service Office. Permitting evaluation and field services for projects within the designated regions will be conducted by the appropriate service office. In Manatee and Sarasota Counties, well construction permits are issued locally.



Full Permitting Services Available:

BROOKSVILLE SERVICE OFFICE
2379 Broad Street
Brooksville, Florida 34609-6899
Phone (352) 796-7211
Toll Free 1-800-423-1476*
Suncom 628-4150
This office handles permits for Hernando, Pasco, Citrus, Lake, Levy, Marion, and Sumter counties.

TAMPA SERVICE OFFICE
7601 U.S. Hwy. 301 N.
Tampa, Florida 33637-6759
Phone (813) 985-7481
Toll Free 1-800-836-0797*
Suncom 578-2070
This office handles permits for Hillsborough and Pinellas counties.

BARTOW SERVICE OFFICE
170 Century Blvd.
Bartow, Florida 33830-7700
Phone (863) 534-1448
Toll Free 1-800-492-7862*
Suncom 572-6200
This office handles permits for Polk, Highlands, and Hardee counties.

VENICE SERVICE OFFICE
115 Corporation Way
Venice, Florida 34292-3524
Phone (941) 486-1212
Toll Free 1-800-320-3503*
Suncom 526-6900
This office handles permits for Sarasota, Manatee, Charlotte, and DeSoto counties.

Service Office Only:
LECANTO SERVICE OFFICE
3600 W. Sovereign Path – Suite 226
Lecanto, Florida 34461-8070
Phone (352) 527-8131
Suncom 667-3271

Well Construction Permits only:

MANATEE COUNTY
ENVIRONMENTAL MANAGEMENT DEPARTMENT
202 Sixth Avenue East P.O. Box 1000
Bradenton, FL 34206-1000
(941) 742-5980

SARASOTA COUNTY
HEALTH DEPARTMENT
1301 Cattlemen Road P.O. Box 2658
Sarasota, FL 34233-2658
(941) 378-6133

The District does not discriminate based on disability. Anyone requiring reasonable accommodation as provided for in the ADA should contact the Records and Data Department (352) 796-7211 or 1-800-423-1476 *; TDD only: 1-800-231-6103.*

*All 1-800 telephone numbers are for Florida only.

September 1999

LIST OF ATTACHMENTS

A) Legal Description (per Section II-1, IWUPA)

B) Aerial Map (per Section IV-3, IWUPA)

C) Site Map (per Section IV-4, IWUPA)

D) List of Adjacent Property Owners (per Section IV-5, IWUPA)

E) Hydrogeologic Information (per Section VI, IWUPA)

- E-1 Hydrogeologic Description of the Site Area
- E-2 Osprey Energy Center Groundwater Model

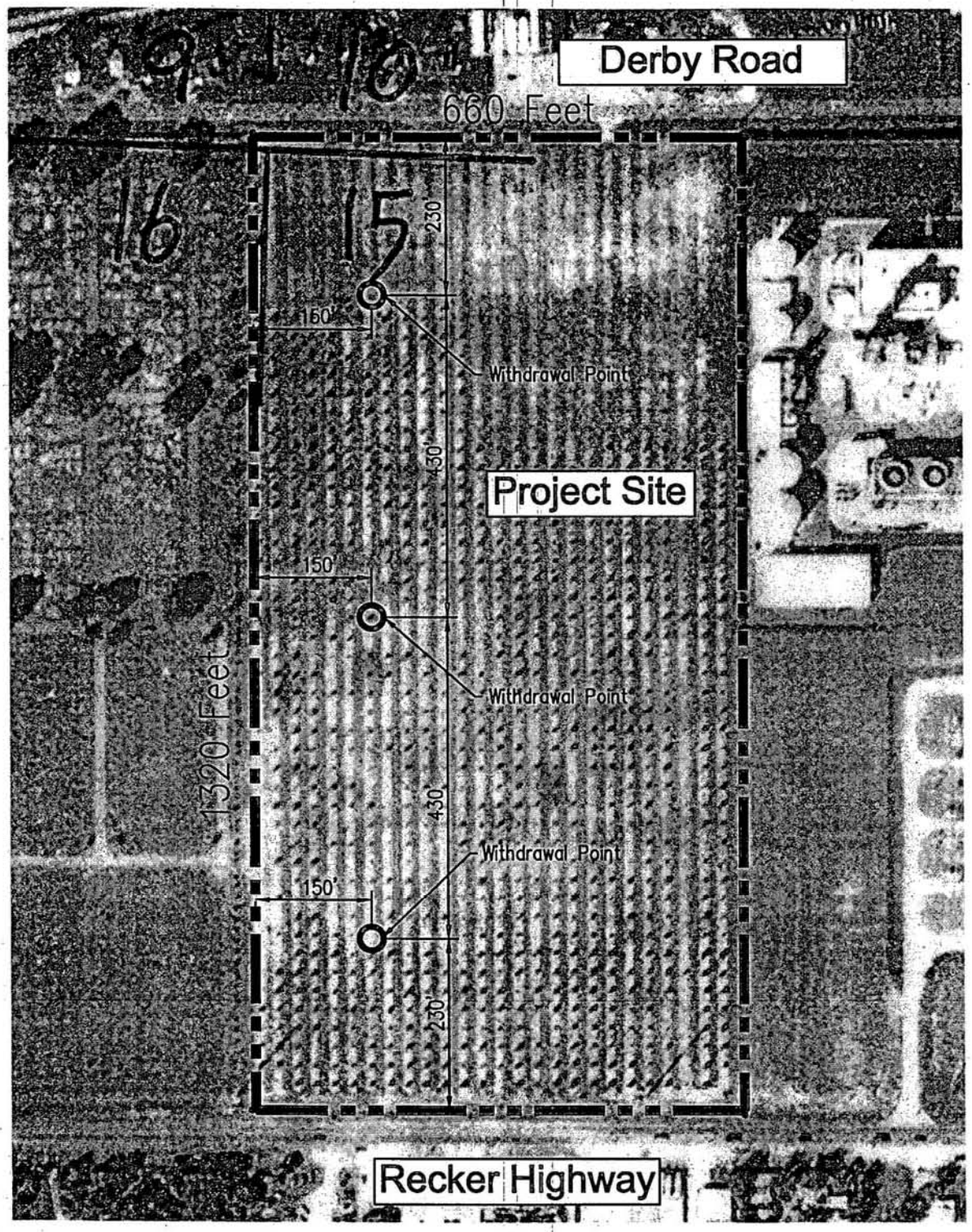
F) Water Use Permit Application Supplemental Form (WUPASF), WUP-5 Form 46.20-005

- F-1 Surface Water Management System (Supplemental Form Section II-C, WUPASF)
- F-2 Discharge Ponds (Supplemental Form Section II-D, WUPASF)
- F-3A Water Balance Diagram for Average Daily Use (per Section III-A, WUPASF)
- F-3B Water Balance Diagram for Maximum Daily Use (per Section III-A, WUPASF)
- F-4 Water Conservation Plan (Supplemental Form Section V, WUPASF)

G) Water Supply Alternatives Analysis

ATTACHMENT A – LEGAL DESCRIPTION

The proposed site is located in the west ½ of the northwest ¼ of the northwest ¼ of Section 15, Township 28 South, Range 25 East, Polk County, Florida less road right-of-way.



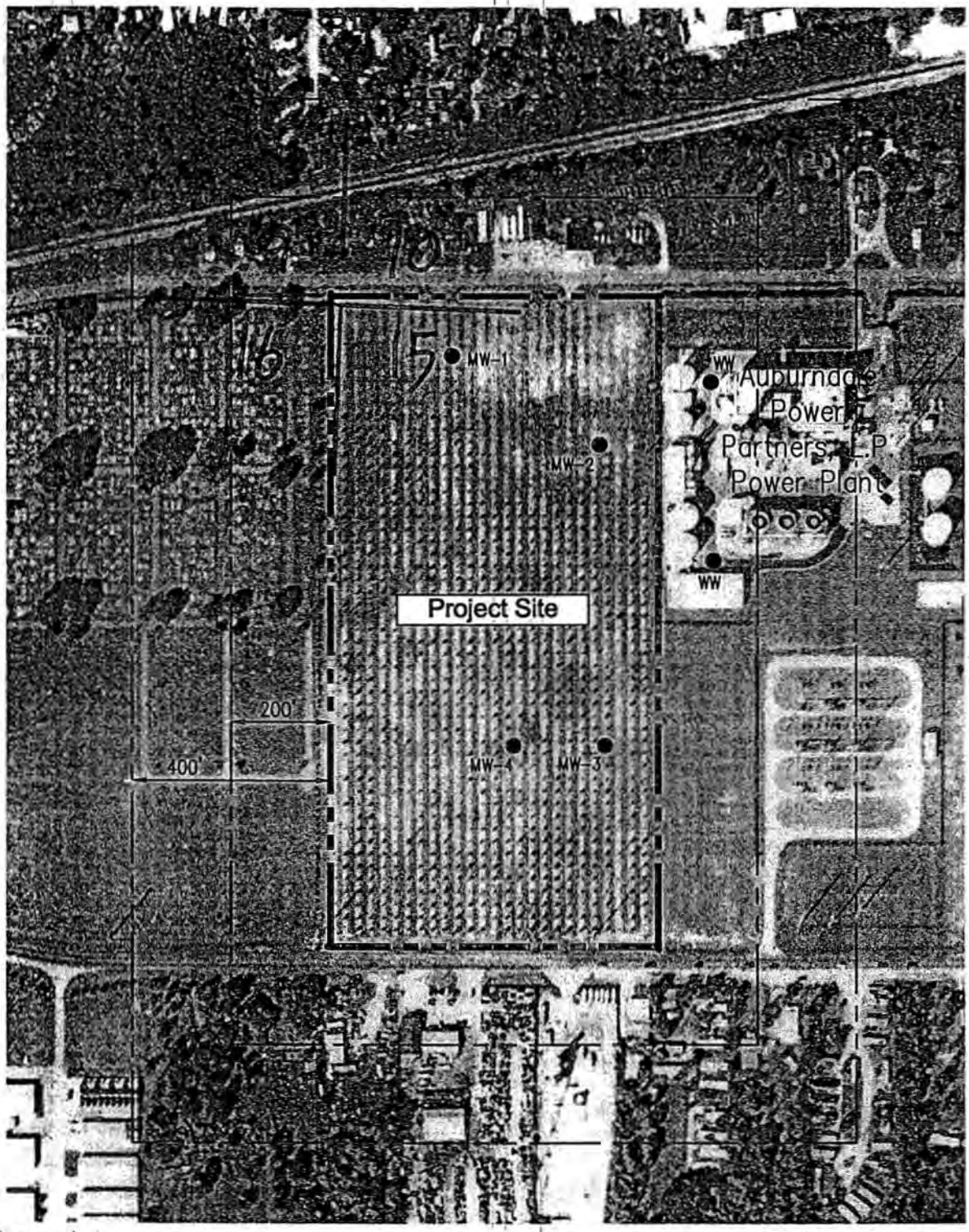
Golder Associates

Tampa, Florida

Aerial Map
And Approximate
Withdrawal Points

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	1"=200'	Job No.	993-9570
CHK BY:	AW	DATE:	01.25.00	FIGURE	Attachment B
REV BY:	–	FILE No.:	attachmentB.dwg		



Legend

MW : Monitor Wells
WW : Withdrawal Wells

Auburndale Power Partners, L.P. Water Consumption
Annual Average Withdrawal: 1,326,300 gallons per day
Peak Monthly Withdrawal: 1,894,700 gallons per day

Golder Associates
Tampa, Florida

Osprey Energy Center
Site Map and Surrounding Area

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: 1"=200'	Job No. 993-9570
CHK BY: AW	DATE: 03/07/00	FIGURE Attachment C
REV BY: -	FILE No.: AttachmentC.dwg	

ATTACHMENT D – ADJACENT PROPERTY OWNERS

Auburndale Power Partners LP, et al
12500 Fair Lakes Circle, Suite 200
Fairfax, VA 22033

Don E. Hemphill, et al
P.O. Box 875
Plant City, FL 33564

Computerized Auto Recycling Service Inc., et al
324 Recker Highway
Auburndale, FL 33823

Linda Reeves, et al
332 1/2 Recker Highway
Auburndale, FL 33823

City of Auburndale Cemetery, et al
P.O. Box 186
Auburndale, FL 33823

Delores A. Barton, et al
1815 Thornhill Rd.
Auburndale, FL 33823

Florida Mining Materials Corp, et al
Division Controller
P.O. Box 31965
Tampa, FL 33631

Marie J. Spencer, et al
c/o Beatrice Grizzle
4407 E. Saddle Creek Farm Rd.
Lakeland, FL 33801

Tampa Electric Company, et al
P.O. Box 111
Tampa, FL 33601

Haven Sales Inc., et al
P.O. Box 1491
Eagle Lake, FL 33839

Ewell Industries Inc., et al
P.O. Box 3858
Lakeland, FL 33802

Donald F. Webb, et al
1201 Highway 92 West
Auburndale, FL 33823

Cutrale Citrus Juices USA Inc., et al
602 McKean Street
Auburndale, FL 33823

Mildred Peterson, et al
P.O. Box 1274
Auburndale, FL 33823

Eldon R. Tipper, et al
336 Recker Hwy.
Auburndale, FL 33823

Joey K. Creekbaum, et al
2101 Lois Blvd.
Winter Haven, FL 33881

CSX Corporation, et al
Tax Dept J910
500 Water St.
Jacksonville, FL 32202

Mobile Home Park Housing Corporation, et al
32 Walton Way
Auburndale, FL 33823

Francisco R. Tavira, et al
38 Norman Lane
Auburndale, FL 33823

Zerkle E. Webb, et al
1311 US Hwy #92 W
Auburndale, FL 33823

Forrest c/o Irene Grizzle Spencer, et al
4421 E. Saddle Cr Farm
Lakeland, FL 33801

Lloyd H. Northrup, et al
43 Norman Lane
Auburndale, FL 33823

Valentin Barajas, et al
43 Kelly Lane
Auburndale, FL 33823

Terrell O. Webb, et al
160 Ave. F South
Auburndale, FL 33823

Marie J. Spencer, et al
1802 Derby Ave.
Auburndale, FL 33823

John W. Taylor, et al
P.O. Box 132
Auburndale, FL 33823

Gospel Tabernacle TRS
1802 W. Derby Avenue
Auburndale, FL 33823

Forrest Spencer
4421 E. Saddlecreek Farm Rd.
Lakeland, FL 33801

Horizon Gas, Inc.
1708 E. Busch Blvd.
Tampa, FL 33823

Leatrice M. Beemer, et al
1710 Derby Ave.
Auburndale, FL 33823

New Beulah Baptist Church Inc., et al
P.O. Box 1532
Lakeland, FL 33802

Mobile Home Park Housing Corporation, et al
4860 W. Gandy Boulevard
Tampa, FL 33611

ATTACHMENT E-1 – HYDROGEOLOGIC DESCRIPTION OF THE SITE AREA

The Osprey Energy Center site lies within Polk County. Approximately 4,200 feet of Tertiary sediments and rocks underlie the site (Miller, 1986). For the purposes of this study, the near-surface sediments of Holocene age, clastic sediments of Miocene age, and carbonate rocks (limestones and dolomites) of Oligocene to Middle Eocene age are the most significant. The combined thickness of these units is approximately 2,000 feet (Miller, 1986).

A generalized stratigraphic section for the region near the site is shown in **Figure E-1**. The lowermost unit is the Avon Park Formation. The Ocala Limestone overlies the Avon Park Formation. The Oligocene-age Suwannee Limestone overlies the Ocala Limestone. Overlying the Suwannee Limestone are the carbonates, clays, sands, and phosphates of the Pliocene- to Miocene-age Hawthorn Group. Undifferentiated Holocene-age sands overlie the Hawthorn Group and extend to the land surface. Generalized descriptions of the geologic units mentioned above are summarized in ascending order.

Avon Park Formation: The Avon Park Formation (Middle Eocene) is generally composed of fossiliferous limestone and dolostone (Gilboy, et al, 1988). The limestone is moderate brown to dark-yellow brown, to rusty-yellow brown, porous, and very fine- to medium-grained. The upper zone of the Avon Park Formation may contain peat and the lower zone may contain small lenses of evaporite (Gilboy, et al, 1988). The Avon Park Formation is the deepest potable water-bearing formation in the region. The upper zone combined with that portion of the lower zone above the evaporite lenses comprises the lowermost hydrogeologic unit of the Upper Floridan aquifer. The top of the Avon Park Formation is encountered approximately 400 feet bls in the vicinity of the site, and the formation is approximately 1,500 feet thick (Miller, 1986).

Ocala Limestone: The Ocala Limestone generally consists of muddy (carbonate) to finely pelletal limestone (Miller, 1986). The Upper Eocene Ocala Limestone typically consists of upper and lower subdivisions. The upper unit is composed primarily of soft, granular

limestone with numerous foraminifera (Copeland, 1991). The lower unit is composed of granular limestone and may be partially to completely dolomitized in some areas (Copeland, 1991). The Ocala Limestone is also a hydrogeologic unit of the Upper Floridan aquifer. The top of the Ocala Limestone is encountered approximately 150 feet bls in the vicinity of the site, and this unit is approximately 250 feet thick (Miller, 1986).

Suwannee Limestone: The Suwannee Limestone is the uppermost hydrogeologic unit of the Upper Floridan aquifer in the vicinity of the site. The Suwannee Limestone generally consists of muddy (carbonate) limestone (Copeland, 1991). The Suwannee Limestone is very thin to absent in the study area and, if present, pinches out to slightly to the north. The top of the Suwannee Limestone, if present, is encountered approximately 125 feet bls in the vicinity of the site, and is approximately 25 feet thick (Miller, 1986).

Hawthorn Group: The Hawthorn Group sediments are composed primarily of sandy clay, clay, marl, sand, and phosphate beds. More specifically, the lower portion of the Hawthorn Group consists of phosphatic carbonates, and the upper section consists of siliciclastics (Copeland, 1991). In the vicinity of the site, the Hawthorn Group is further divided into an upper unit known as the Peace River Formation, and a lower unit known as the Arcadia Formation (Scott, 1988). The Pliocene-age Bone Valley Member of the Peace River Formation forms the upper 25 feet of the Peace River Formation (Scott, 1988). The top of the Peace River Formation is encountered approximately 50 feet bls in the vicinity of the site, and is approximately 25 feet thick (Scott, 1988). The top of the Arcadia Formation is encountered approximately 75 feet bls in the vicinity of the site, and is approximately 50 feet thick (Scott, 1988).

In the vicinity of the site, the relatively impermeable clays of Hawthorn Group generally serve as a confining unit that hydraulically separates the underlying Upper Floridan aquifer from the overlying surficial aquifer system. In certain parts of peninsular Florida (particularly to the south and southwest of the site), there are permeable sands and carbonates within the Hawthorn Group that comprise the intermediate aquifer system.

In these areas, the intermediate aquifer system serves as an important local source of potable water. In the area near the site, the intermediate aquifer system/intermediate confining unit in approximately 75 feet thick.

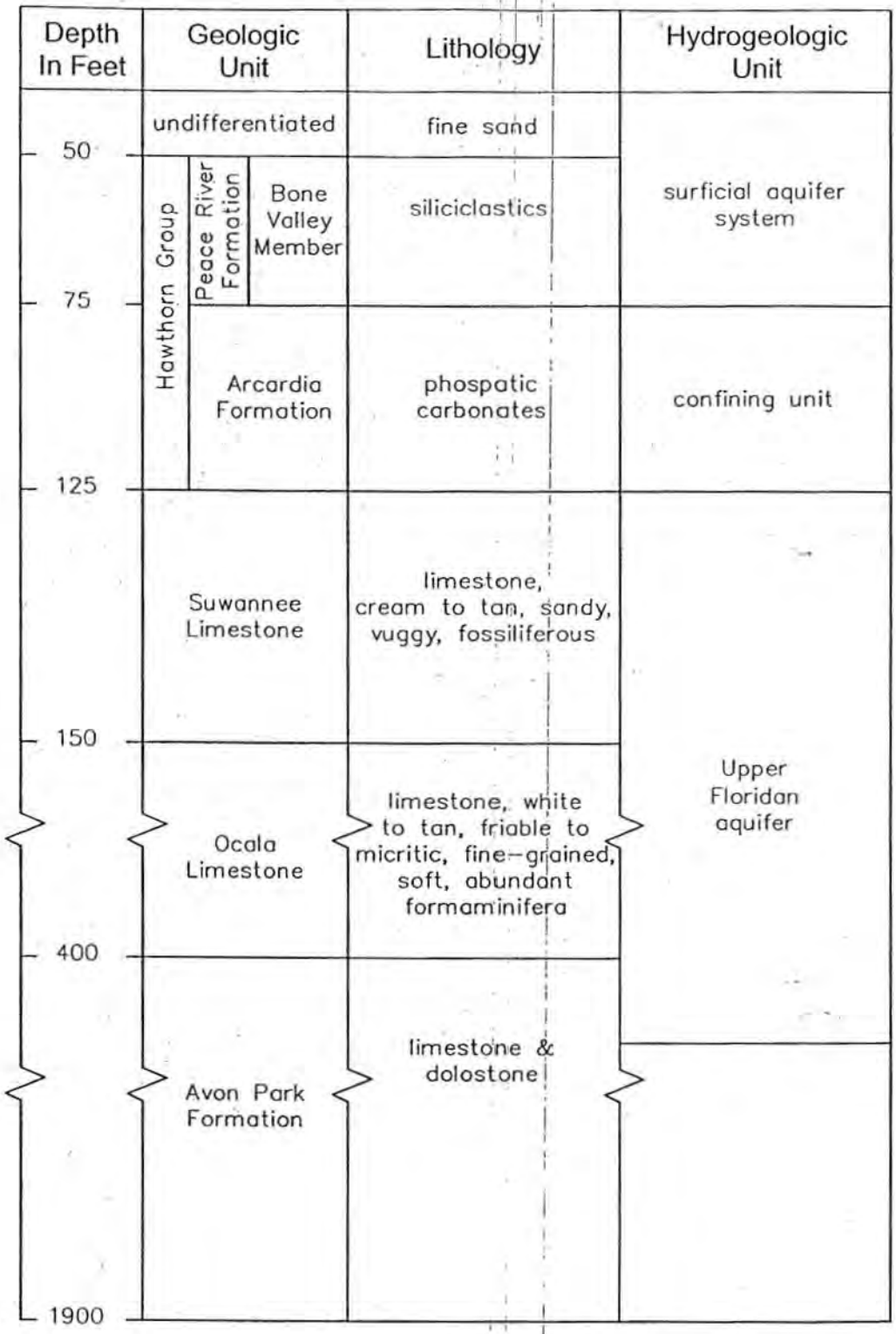
Undifferentiated Surficial Sands: Unconsolidated sands are present in the vicinity of the site from land surface to approximately 50 feet bls. The portions of the sands that are saturated with groundwater under water-table conditions comprise the surficial aquifer system. The water table is generally encountered 15 feet bls in the vicinity of the site. The surficial aquifer system extends to the top of the relatively impermeable clays in the Hawthorn Group.

The site falls into the Winter Haven Ridge Physiographic Subprovince of the Central Physiographic Division (White, 1970). The Winter Haven Ridge is a general north-northwest to south-southeast trending highland dissected by numerous lakes. The lakes formed as a result of the dissolution of underlying limestone by corrosive downward-percolating groundwater. The origin of the Winter Haven Ridge (and associated highland ridges, including the Lake Wales Ridge to the east and the Lakeland Ridge to the west) is debated. However, its orientation is parallel to the Atlantic Coast, which suggests a relict beach-ridge origin resulting from historical marine transgressive/regressive sequences, and subsequent reduction in elevation by solution-subsidence (White, 1970).

A preliminary geotechnical investigation was conducted to characterize subsurface conditions at the Osprey Energy Center site. The geotechnical investigation consisted of advancing 14 standard penetration test (SPT) borings at the site and completing geotechnical classification testing in the laboratory. The SPT borings were advanced using mud rotary drilling. Borings B-1 through B-5, B-7 through B-9, and B-11 through B-14 were sampled continuously for the first 10 feet and then at five-foot depth intervals using a split-barrel sampler. Borings B-6 and B-10 were sampled at five-foot depth intervals using a split-barrel sampler. Borehole depths ranged from 55 to 90 feet below land surface (ft bls). A Golder technician monitored the drilling on a full-time basis.

During drilling, the technician recorded the SPT N-values and visually characterized the soil types, thicknesses, and depths to the various geologic materials encountered. Geologic logs of the 14 SPT borings are attached in **Appendix 10.7.**

Based on the soils encountered in the borings, the site is covered by an approximately 1 to 2 foot layer of topsoil consisting of loose, fine sand. This topsoil layer is underlain by about 5 to 10 feet of fine sand with trace amounts of clays (SP). The upper sand deposits are typically underlain by sequences of fine sands with increasing amounts of clay with depth (SP-SC and SC). Clay contents of the soils in deep zones (greater than about 65 feet below land surface) in borings B-5 and B-9 were greater than 50 per cent (CH/MH). Based on the laboratory flexible-wall permeability test completed, the vertieal hydraulic conductivity of the clayey-sand specimen was 6.5×10^{-6} cm/sec. Based on the laboratory test results, the fine-grained fraction of the soils encountered generally exhibited medium to medium-high plasticity. The clayey-sand and sandy-clay deposits were about 60 to 80 feet thick and were underlain by fractured limestone. Borings B-2, B-4, B-5, B-9, B-11, and B-13 were advanced until a relatively hard-fractured limestone layer was encountered. Two geologic cross sections were developed from the boring logs and their transects are shown in **Figure E -2.** The cross sections are illustrated in **Figures E-3 and E-4.**



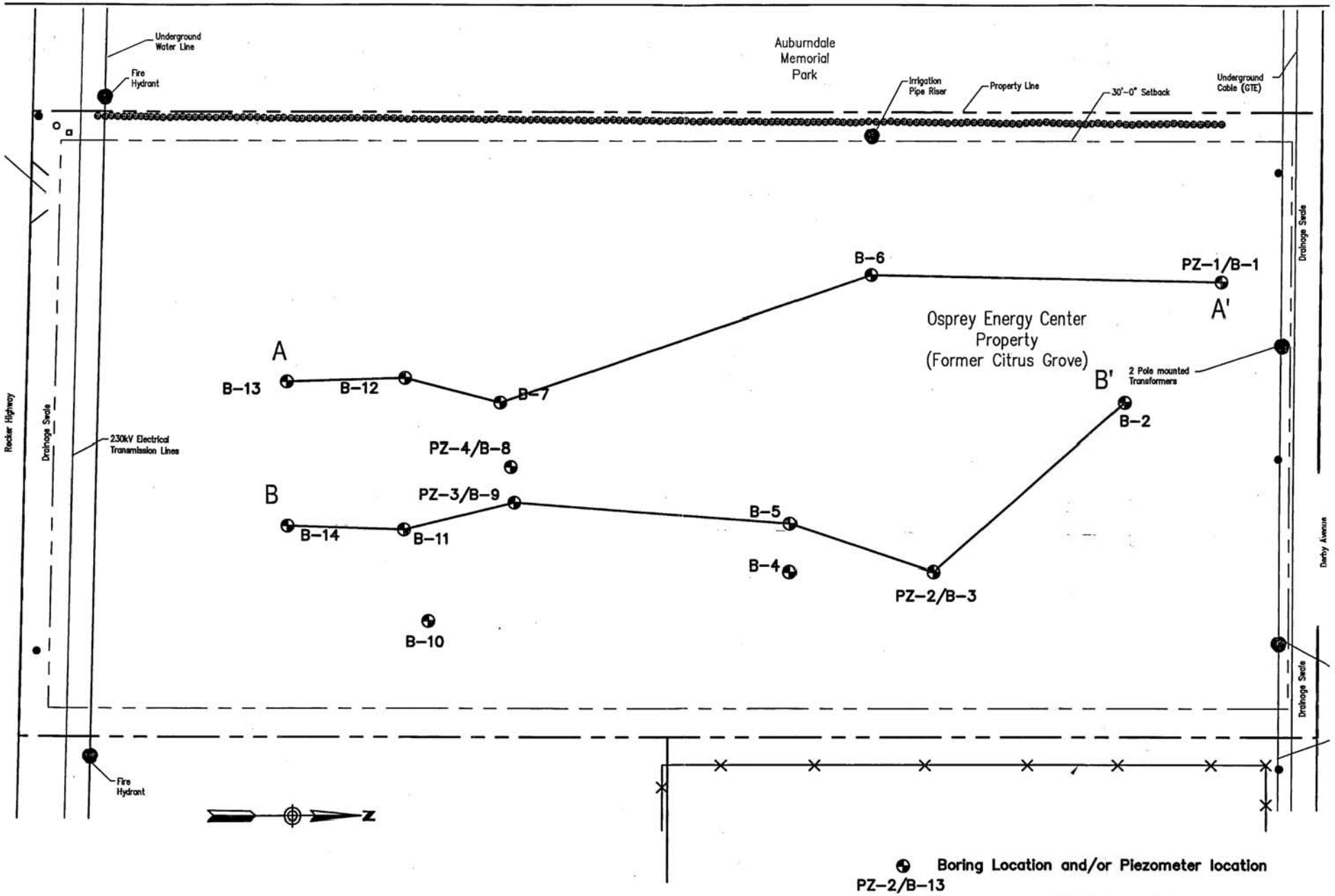
Golder Associates

Tampa, Florida

Generalized Regional Hydrogeological Column

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: NTS	Job No. 993-9530
CHK BY: AW	DATE: 01/21/00	FIGURE E-1
REV BY: -	FILE No.: figE-1.dwg	

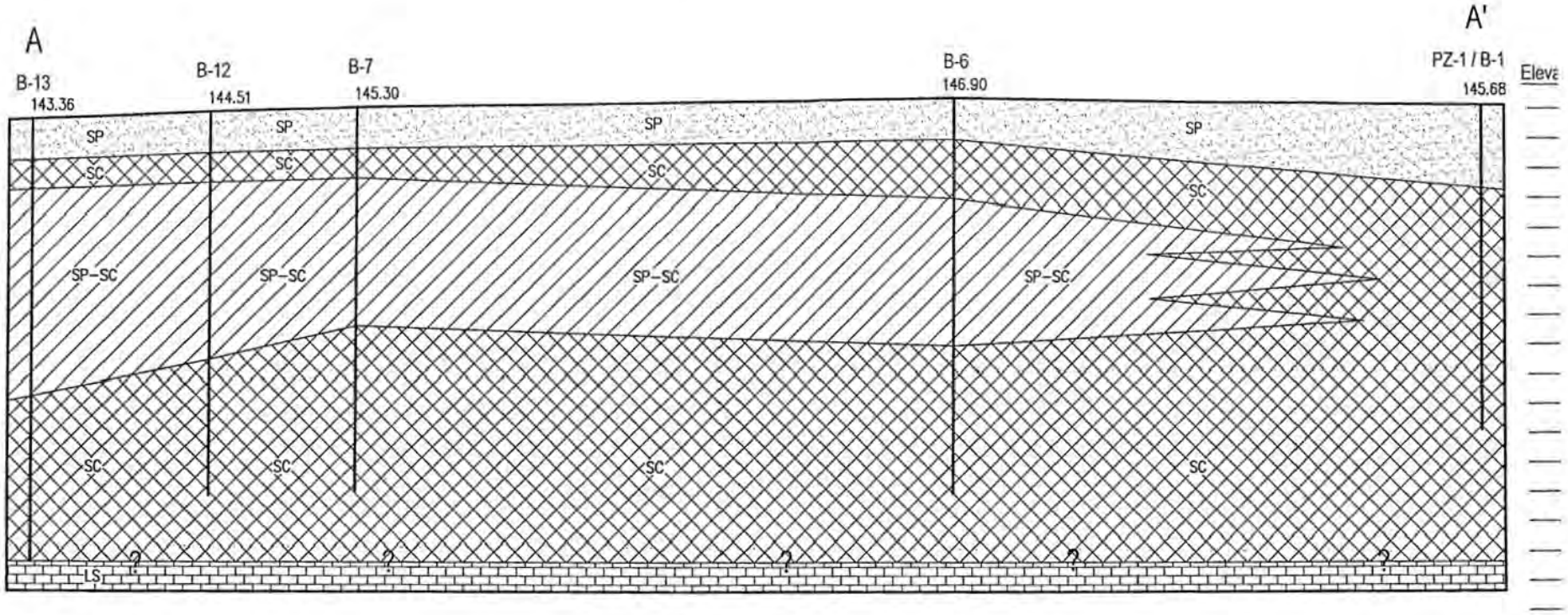


Golder Associates — Tampa, Florida

Geologic Cross-section Tran

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	1"=100'
CHK BY:	—	DATE:	03/07/00
REV BY:	AW	FILE No.:	figE-2.dwg



Legend

B-13 Boring ID and location

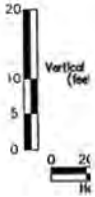
Gradational Contact

Fine sand with occasional trace to little clay and silt (SP)

Fine clayey sand with little clay (SP–SC)

Fine clayey sand (SC)

Fractured limestone (LS)

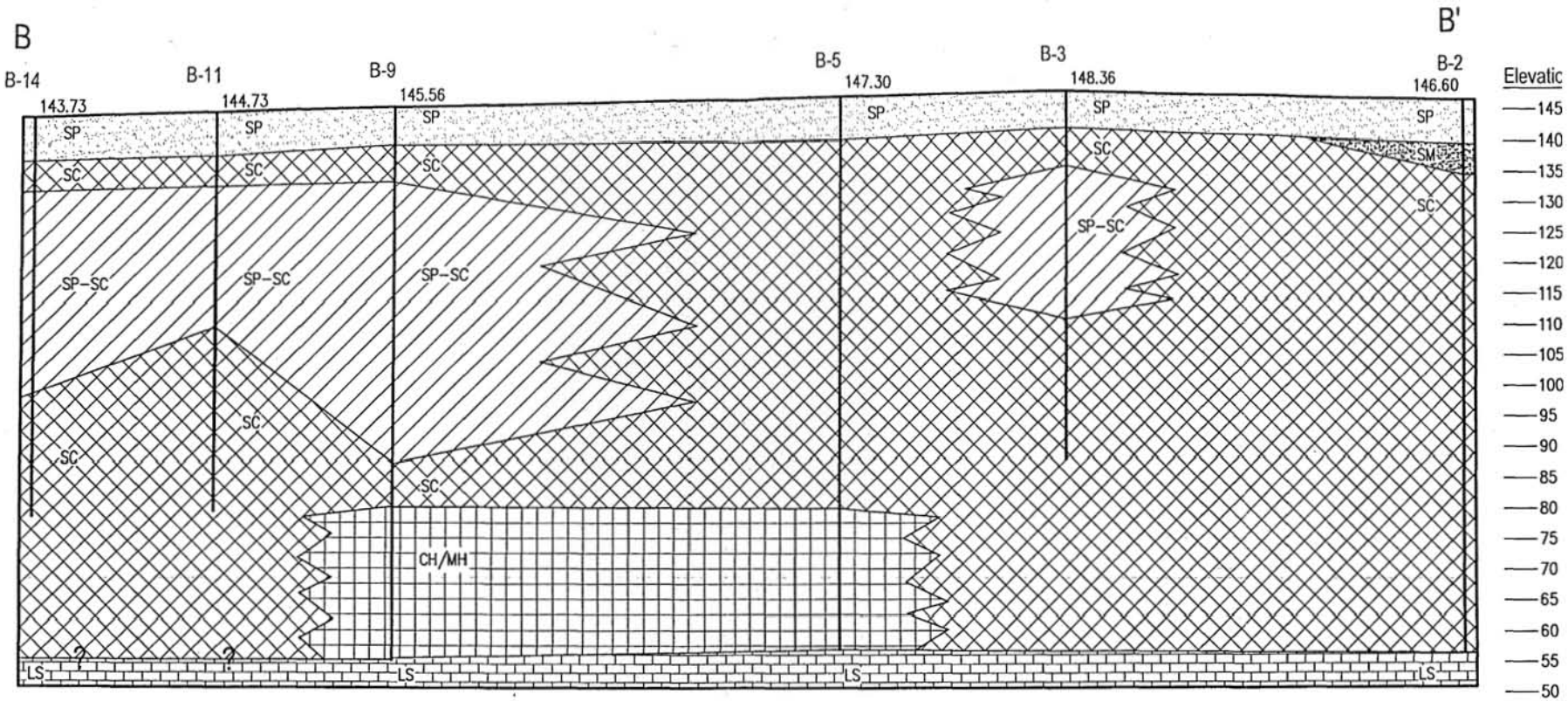


Golder Associates — Tampa, Florida

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

Osprey Energy Cent
Geologic Cross Section

CAD BY:	CDT	SCALE:	As Shown
CHK BY:	--	DATE:	03/07/00
REV BY:	AW	FILE No.:	figE-3.dwg



Legend

B-11 Boring ID and location

Gradational Contact

Fine sand with occasional trace to little clay and silt (SP)

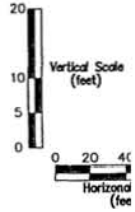
Fine sand (SM)

Fine clayey sand with little clay (SP-SC)

Fine clayey sand (SC)

Sandy clay (CH/MH)

Fractured limestone (LS)



Golder Associates — Tampa, Florida

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

Geologic Cross Section B–

CAD BY:	CDT	SCALE:	As Shown
CHK BY:	–	DATE:	03/07/00
REV BY:	AW	FILE No.:	figE-4.dwg

REFERENCES FOR ATTACHMENT E-1

Copeland, R., 1991. Florida's Ground Water Quality Monitoring Program: Hydrogeological Framework, Florida Geological Survey Publication no. 32.

Gilboy, Anthony E., et al, 1988. Ground-Water Resource Availability Inventory: Polk County, Florida, Resource Management and Planning Department of the Southwest Florida Water Management District, Brooksville, Florida.

Miller, James, 1986. Hydrogeologic Framework of the Floridan Aquifer System in Florida and in Parts of Georgia, Alabama, and South Carolina, U. S. Geological Survey Professional Paper 1403-B, United States Government Printing Office, Washington, D. C.

Scott, Thomas, 1988. The Lithostratigraphy of the Hawthorn Group (Miocene) of Florida, Bulletin No. 59, Florida Geological Survey, Tallahassee, Florida.

White, William A., 1970. The Geomorphology of the Florida Peninsula, Geological Bulletin no. 51, Florida Department of Natural Resources.

ATTACHMENT E-2 – OSPREY ENERGY CENTER GROUNDWATER MODEL

The effects that groundwater withdrawals will have on the area surrounding the proposed Osprey Energy Center Site were simulated by Golder using Visual MODFLOW created by Waterloo Hydrogeologic Inc. Visual MODFLOW combines a graphical user interface with MODFLOW, the modular three-dimensional finite-difference groundwater-flow model developed by the U.S. Geological Survey. Four simulations were developed to assess the potential impacts of the groundwater withdrawal.

OS1

The first model, Osprey Simulation 1 (OS1), was used to simulate conditions at the Osprey Energy Center during peak-month operation. This model was developed according to the guidelines set forth in Section C, Water Use Design Aids of the Southwest Florida Water Management District's (SWFWMD) Water Use Permit Information Manual (WUPIM). According to the WUPIM, Level 1 – Basic Analysis is to be performed using proposed peak-month quantities from the single permit application in a leaky-aquifer steady-state model. All performance standards are considered met and the analysis is complete if drawdown in the potentiometric surface (Upper Floridan aquifer) and the water-table aquifer (surficial aquifer system) is minimal beneath wetlands, water bodies, and the property boundary. In the southern portion of the SWFWMD, minimal drawdown for the Upper Floridan aquifer is defined as generally less than four feet, and in the surficial aquifer system it is defined as generally less than 0.5 feet. Since the hydrogeology of the Osprey Energy Center Site is characteristic of the southern portion of the SWFWMD, these criteria for the southern portion were used for the evaluation of the OS1 results.

INPUT

Model dimensions

The area modeled in OS1 included all of sections 9, 10, 15 and 16 and portions of sections 2-5, 11, 14, 17, and 20-23 of T28S, R25E and is approximately 8.0 mi^2 (14,922 feet by 14,979

feet) with the Osprey Energy Center Site located at the center. This size model was developed so that pumping from the proposed withdrawal points would not affect model edges (boundaries). For geographic reference, and to serve as a visual backdrop, a bitmap (*.bmp) image of the area to be simulated was imported and assigned real-world coordinates (*Figure E-5*).

The model grid was initially 100 cells wide by 100 cells long. Each cell was approximately 150 feet wide and 150 feet long. Prior to the installation of simulated wells on the Osprey Energy Center Site, the grid was refined to 116 by 108 cells. Model cells containing the wells were approximately four feet wide and four feet long. Around the cells containing the wells, cell size was progressively increased by a factor of three until the 150-ft by 150-ft size was reached. Four layers were assigned in the grid to simulate the surficial aquifer system (layer 1), the intermediate aquifer system (layer 2), a confining unit (layer 3), and the Upper Floridan aquifer (layer 4). Visual MODFLOW requires the user to designate a separate layer in order to simulate leakance. This was accomplished by creating a confining unit, layer 3, to simulate leakance of the intermediate aquifer system.

Model Boundaries

A line of constant head was assigned along around the edges of OS1 for all model layers. These constant-head boundaries were assigned because a north-to-south hydraulic gradient was established from field-measured hydraulic heads and from U.S. Geological Survey potentiometric-surface maps.

Values for constant-head boundaries were assigned in the upper three layers of the model according to overall topography elevations along the edges of the model. These values were assumed to be the same in the upper three layers because (1) no competent confining unit separates the surficial aquifer system from the underlying intermediate aquifer system, and (2) the modeled confining unit (layer 3) is considered to be part of the intermediate aquifer system. Values of 150 feet and 125 feet above National Geodetic Vertical Datum of 1929 (NGVD 1929) were assigned along the northern and southern

edges of the model, respectively. Along the eastern and western edges, values for constant-head boundary were varied incrementally from 150 at the northern extent of the model to 125 at the southern extent. For the layer representing the Upper Floridan aquifer, values for constant head were 118 feet and 117 feet above NGVD 1929 along the northern and southern edges of the model, respectively. Along the eastern and western edges, values for constant-head boundary were varied incrementally from 118 feet at the northern extent of the model to 117 feet at the southern extent.

Aquifer properties

Visual MODFLOW's required input for aquifer properties includes hydraulic conductivity in the horizontal and vertical directions ($K_{x,y}$ and K_z, respectively), specific yield, specific storage, and porosity. Horizontal hydraulic conductivity was calculated based on transmissivity values from various sources. Vertical hydraulic conductivity was assumed to be $1/10^{th}$ of horizontal hydraulic conductivity in layers 1, 2, and 4. Vertical hydraulic conductivity for the confining unit, Layer 3, was calculated from the value for leakance reported in Groundwater Resource Availability Inventory: Polk County, Florida (SWFWMD, 1988). Storativity (or storage coefficient) values acquired from various sources were divided by aquifer thicknesses to obtain specific storage for the lower three layers. ***Table E-1*** lists the aquifer properties, their values, and their sources.

Recharge

Recharge was omitted for all simulations. This creates a more conservative simulation and assumes drought-like conditions for the period of the analyses. The Southwest Florida Water Management District (SWFWMD) also omits recharge when developing groundwater models to assess withdrawal impacts (personal communication, Mike Phillippi, SWFWMD, 1999).

Calibration and Initial Heads

The model was calibrated based on field-measured values collected by Golder on December 9, 1999. Steady-state model runs without pumping wells were completed to approximate these field-measured heads and calibrate the model.

To establish an initial-head distribution for all models, the simulations were first run as steady state with no pumping wells. Resulting heads from these steady-state simulations produced initial head distributions that were input into the steady-state and transient simulations with active wells.

Pumping Wells

Total water demand at the Osprey Energy Center on an average day is expected to be 3.55 million gallons per day (mgd) and 4.79 mgd on a maximum day. The City of Auburndale will supply approximately 0.8 mgd of reclaimed water. The remainder of the demand will be met by groundwater withdrawals. Therefore, groundwater demand on an average day is expected to be 2.75 mgd and 3.99 mgd on a maximum day.

Withdrawals were simulated in OS1 by assigning two wells, one near the northwest corner of the Site (Osprey NW) and one near the southwest corner (Osprey SW). The wells were screened only in the layer representing the Upper Floridan aquifer, and their screened interval extended the entire thickness of this layer. To simulate peak-pumping conditions, maximum groundwater withdrawal rates for the wells were assigned, or 1.99 mgd/well.

OUTPUT

Surficial aquifer system

Maximum drawdown produced in OS1 at the Osprey Energy Center boundary in the surficial aquifer system was 0.36 feet. Beneath nearby wetlands and water bodies, the drawdown ranged from 0.25 feet to 0.30 feet. ***Figure E-6*** is a contour map of drawdown in the surficial aquifer system after a steady-state simulation of the impacts of peak-month withdrawals.

Intermediate aquifer system

Maximum drawdown produced in OS1 at the Osprey Energy Center boundary in the intermediate aquifer system was 0.36 feet. The distribution of drawdown contours in the

intermediate aquifer system is identical to that of the surficial aquifer system for this simulation.

Upper Floridan aquifer

Maximum drawdown produced in OS1 at the Osprey Energy Center boundary in the Upper Floridan aquifer was 2.80 feet. Beneath nearby wetlands and water bodies the drawdown in the Upper Floridan aquifer ranged from 0.50 feet and 1.00 feet. *Figure E-7* is a contour map of drawdown in the Upper Floridan aquifer after a steady-state simulation of peak-month withdrawals.

In all simulated layers, Level 1 – Basic Analysis (OS1) model results show less drawdown at the Osprey Energy Center Site boundary and beneath wetlands and water bodies than the maximum amount allowable according to the guidelines set forth in Part C of the WUPIM developed by the SWFWMD. Based on the results of OS1, all performance standards are considered met and the analysis is complete according to these guidelines. However, to be more conservative, Golder developed three further models to assess the impacts of long-term pumping, cumulative withdrawals (Level 2 – Comprehensive Analysis), and withdrawal impacts on a regional scale.

OS2

The second simulation, OS2, was used to determine the effects of long-term withdrawal on the aquifer systems beneath the Site. All model parameters for this simulation were held the same as they were for OS1, except OS2 was run for 365 days at annual-average pumping instead of steady-state peak-month pumping.

OUTPUT

Surficial aquifer system

Minimal drawdown (<0.01 feet) was produced in OS2 at the Osprey Energy Center boundary and beneath nearby wetlands and water bodies in the surficial aquifer system.

Intermediate aquifer system

Minimal drawdown (<0.01 feet) was produced in OS2 at the Osprey Energy Center boundary and beneath nearby wetlands and water bodies in the intermediate aquifer system.

Upper Floridan aquifer

Maximum drawdown produced in OS2 at the Osprey Energy Center boundary in the Upper Floridan aquifer was 1.90 feet. Beneath nearby wetlands and water bodies the drawdown in the Upper Floridan aquifer ranged from 0.50 feet and 1.00 feet. ***Figure E-8*** is a contour map of drawdown in the Upper Floridan aquifer after a 365-day simulation of annual-average withdrawals.

OS3

Cumulative impacts of all permitted users on the aquifer systems were modeled in OS3. Guidelines in Section C of the WUPIM indicate that the Level II – Comprehensive Analysis is to be run for a 90-day peak withdrawal period. The guidelines indicate that the model is first run with only the proposed quantities of the applicant. All permitted water withdrawals within the area encompassed by the 1.0-foot drawdown contour produced by this initial simulation in the artesian (Upper Floridan) aquifer are to be included in the next simulation. Four permitted water withdrawals were located inside the 1.0-foot drawdown contour and are listed below.

Permitted Withdrawal	Water Use permit number	Peak Water Use (gallons per day)
Auburndale Power Partners	20.10604.003	1,894,700
Dolores Barton	20.8945.001	44,150
E.E. Sawyer and Don C. Smith	20.10341.000	4,000
Talquin Development Company	20.3038.003	105,900

INPUT

The grid for OS3 was further refined to 130 by 124 cells in order to accommodate the additional wells of the four permitted users listed above. All other model parameters were held the same as in the initial simulation (OS1). Peak-month daily withdrawals of these users and the Osprey Energy Center were input, and the simulation was run for 90 days.

OUTPUT

Surficial aquifer system

Minimal drawdown (<0.01 feet) was produced in OS3 at the Osprey Energy Center boundary and beneath nearby wetlands and water bodies in the surficial aquifer system.

Intermediate aquifer system

Minimal drawdown (<0.01 feet) was produced in OS3 at the Osprey Energy Center boundary and beneath nearby wetlands and water bodies in the intermediate aquifer system.

Upper Floridan aquifer

Maximum drawdown produced in OS2 at the Osprey Energy Center boundary in the Upper Floridan aquifer was 3.50 feet. Beneath nearby wetlands and water bodies the drawdown in the Upper Floridan aquifer ranged from 1.00 feet and 1.50 feet. ***Figure E-9*** is a contour map of drawdown in the Upper Floridan aquifer after simulation of a 90-day peak-period of cumulative withdrawals.

The SWFWMD presumes that a withdrawal of water, when considered concurrently with other permitted withdrawals, will not cause significant adverse impacts if the withdrawal does not cause more than one foot of drawdown in the surficial aquifer system beneath a wetland or a lake. Results from OS3 show that the drawdown in the surficial aquifer system from the Project will be less than one foot, and therefore, according to SWFWMD guidelines, all performance standards are considered met.

OS4

A regional analysis (OS4) was performed to assess the impacts of groundwater withdrawal from the Osprey Energy Center on the Most Impacted Area (MIA) that lies approximately 27 miles to the west within portions of Sarasota, Manatee, and Hillsborough counties (SWFWMD, 1999). This simulation required the development of an entirely new model. However, all parameters for aquifer characteristics, aquifer thicknesses, and recharge were the same as they were for OS1, 2, and 3.

INPUT

Model dimensions OS4

The entire Southern West-Central Florida Groundwater Basin (SWCFGWB) served as the model domain for OS4. This Basin includes all of Hardee, De Soto, Sarasota, and Manatee Counties, and portions of Pinellas, Hillsborough, Polk, Highlands, and Charlotte Counties (***Figure E-10***). The Osprey Energy Center Site lies in the northeastern corner of the SWCFGWB. For geographic reference, and to serve as a visual backdrop, an AutoCAD image (*.dxf) of the SWCFGWB was imported and assigned real-world coordinates.

The model grid was initially 80 cells wide by 80 cells long. Each cell was approximately 1.2 miles wide and 1.3 miles long. Grid refinement around the Osprey Energy Center Site increased the grid to 82 cells by 82 cells. One cell, 1,320 feet long and 660 feet wide, represented the Site. Four layers were also assigned in the OS4 grid to simulate the surficial aquifer system (layer 1), the intermediate aquifer system (layer 2), a confining unit (layer 3), and the Upper Floridan aquifer (layer 4).

Boundaries OS4

The entire upper layer, the surficial aquifer system, was assigned as the constant-head boundary in OS4. The value of 150 feet for the constant-head boundary was arbitrarily selected. Additionally, only the impacts of the groundwater withdrawals on the Upper

Floridan aquifer at the MIA boundary were of concern. No other boundaries were assigned for OS4.

Pumping Wells

The entire cell representing the Osprey Energy Center Site was designated as a withdrawal point. Pumping rates were based on annual-average daily rates, 2.75 mgd, and the simulation was run for 365 days.

OUTPUT OS4

Surficial aquifer system

Drawdown was not evaluated in the surficial aquifer system because it was modeled as a constant-head boundary for OS4.

Intermediate aquifer system

No drawdown occurred in the intermediate aquifer system at the MIA boundary after a simulated 365-day average-annual pumping period.

Upper Floridan aquifer

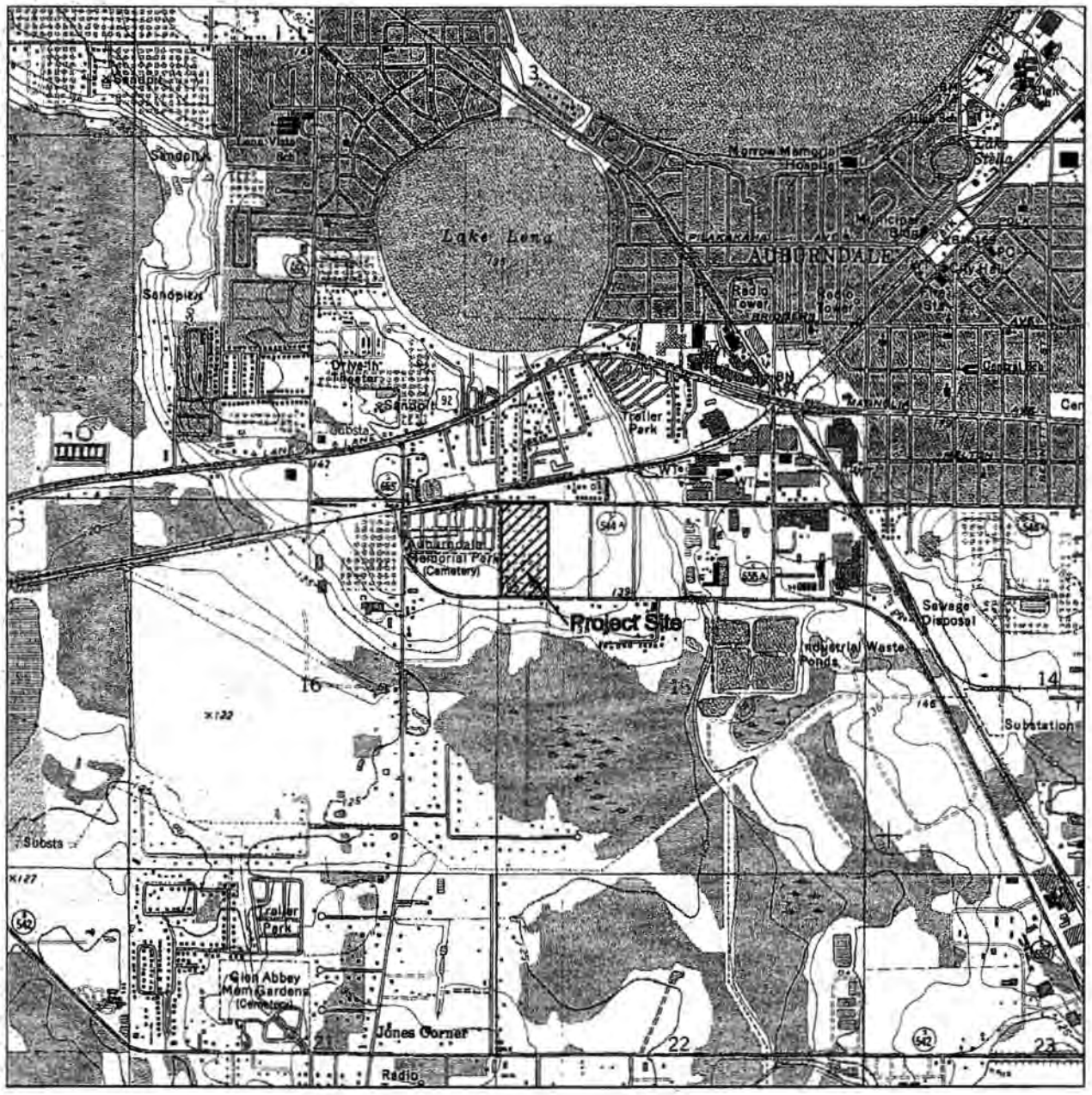
No drawdown occurred in the Upper Floridan aquifer at the MIA boundary after a simulated 365-day average-annual pumping period. ***Figure E-11*** is a contour map of drawdown in the Upper Floridan aquifer.

The results of these additional analyses fall within all screening thresholds for the guidelines set forth in the SWFWMD's WUPIM. Predicted drawdown in OS2 in the Upper Floridan aquifer at the Site boundary was 1.90 feet, and the drawdown in the Upper Floridan aquifer beneath nearby wetlands and water bodies ranged from 0.50 feet to 1.00 feet. In the Level 2 – Comprehensive Analysis (OS3), predicted drawdown in the surficial aquifer system was less than 0.01 foot beneath wetlands and water bodies adjacent to the Osprey Energy Center Site. In OS4, the regional analysis shows that no impacts will occur at the MIA boundary as a result of pumping from the Osprey Energy Center.

TABLE E-1
Aquifer Parameters

Osprey Energy Center Site
Polk County, Florida

Layer	parameter	value	source
Surficial aquifer system (Layer 1)	Horizontal hydraulic conductivity ($K_{x,y}$)	12.3 feet/day	Southwest Florida Water Management District, 1994, Aquifer Parameters Within The Southwest Florida Water Management District, pg. 89, index no. 17
	Vertical hydraulic conductivity (K_z)	1.23 feet/day	(one-tenth horizontal value)
	Specific yield (S_y)	0.26	Southwest Florida Water Management District, 1994, Aquifer Parameters Within The Southwest Florida Water Management District, pg. 89, average of index nos. 15 & 17
	Porosity	0.26	Driscoll, F.G., 1986, Groundwater and Wells, pg. 67, porosity value for sand
Intermediate aquifer system (Layer 2)	Horizontal hydraulic conductivity ($K_{x,y}$)	5.8 feet/day	Southwest Florida Water Management District, 1994, Aquifer Parameters Within The Southwest Florida Water Management District, pg. 61, index no. 2
	Vertical hydraulic conductivity (K_z)	0.58 feet/day	(one-tenth horizontal value)
	Specific storage (S_s)	8.70E-07	Southwest Florida Water Management District, 1988, Groundwater Resource Availability Inventory: Polk, County, Florida, pg. 38, tbl. 4, sites 43 & 50
	Porosity	0.25	Driscoll, F.G., 1986, Groundwater and Wells, pg. 67, porosity value for sand
Confining unit (Layer 3)	Horizontal hydraulic conductivity ($K_{x,y}$)	0.007 feet/day	(ten times vertical value)
	Vertical hydraulic conductivity (K_z)	0.0007 feet/day	Southwest Florida Water Management District, 1988, Groundwater Resource Availability Inventory: Polk, County, Florida, pg. 67, fig. 35 (leakance)
	Specific storage (S_s)	8.70E-07	Southwest Florida Water Management District, 1988, Groundwater Resource Availability Inventory: Polk, County, Florida, pg. 38, tbl. 4, sites 43 & 50
	Porosity	0.45	Driscoll, F.G., 1986, Groundwater and Wells, pg. 67, porosity value for clay
Upper Floridan aquifer (Layer 4)	Horizontal hydraulic conductivity ($K_{x,y}$)	97.92 feet/day	Southwest Florida Water Management District, 1994, Aquifer Parameters Within The Southwest Florida Water Management District, pg. 26, index no. 40
	Vertical hydraulic conductivity (K_z)	9.79 feet/day	(one-tenth horizontal value)
	Specific storage (S_s)	4.37E-06	Southwest Florida Water Management District, 1994, Aquifer Parameters Within The Southwest Florida Water Management District, pg. 26, average of index nos. 39 & 40
	Porosity	0.20	Driscoll, F.G., 1986, Groundwater and Wells, pg. 67, porosity value for limestone



LEGEND

PROJECT SITE

N

0 1 Mile

scale

REFERENCE

USGS 7.5 Minute Topographical Quadrangle, Auburndale, Florida

Golder Associates

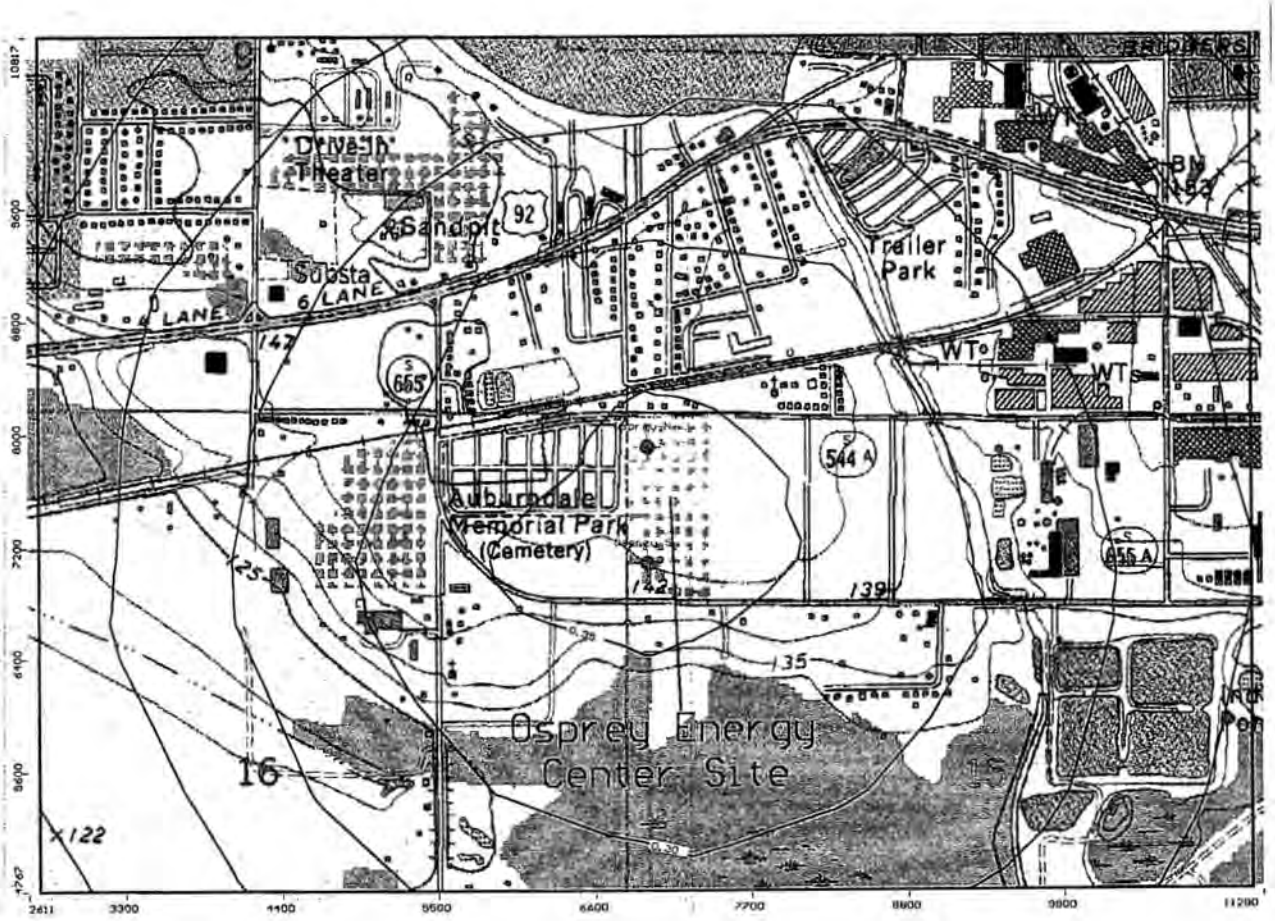
Tampa, Florida

Groundwater Model Extent for OS1-3

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	NTS	Job No.	993-9570
CHK BY:	RAZ	DATE:	03/04/00	FIGURE	E-5
REV BY:	-	FILE No.:	flaE-5.dwg		



Contour Interval: 0.05 feet

Scale: 1"=1320'

Withdrawal Well

N

Golder Associates

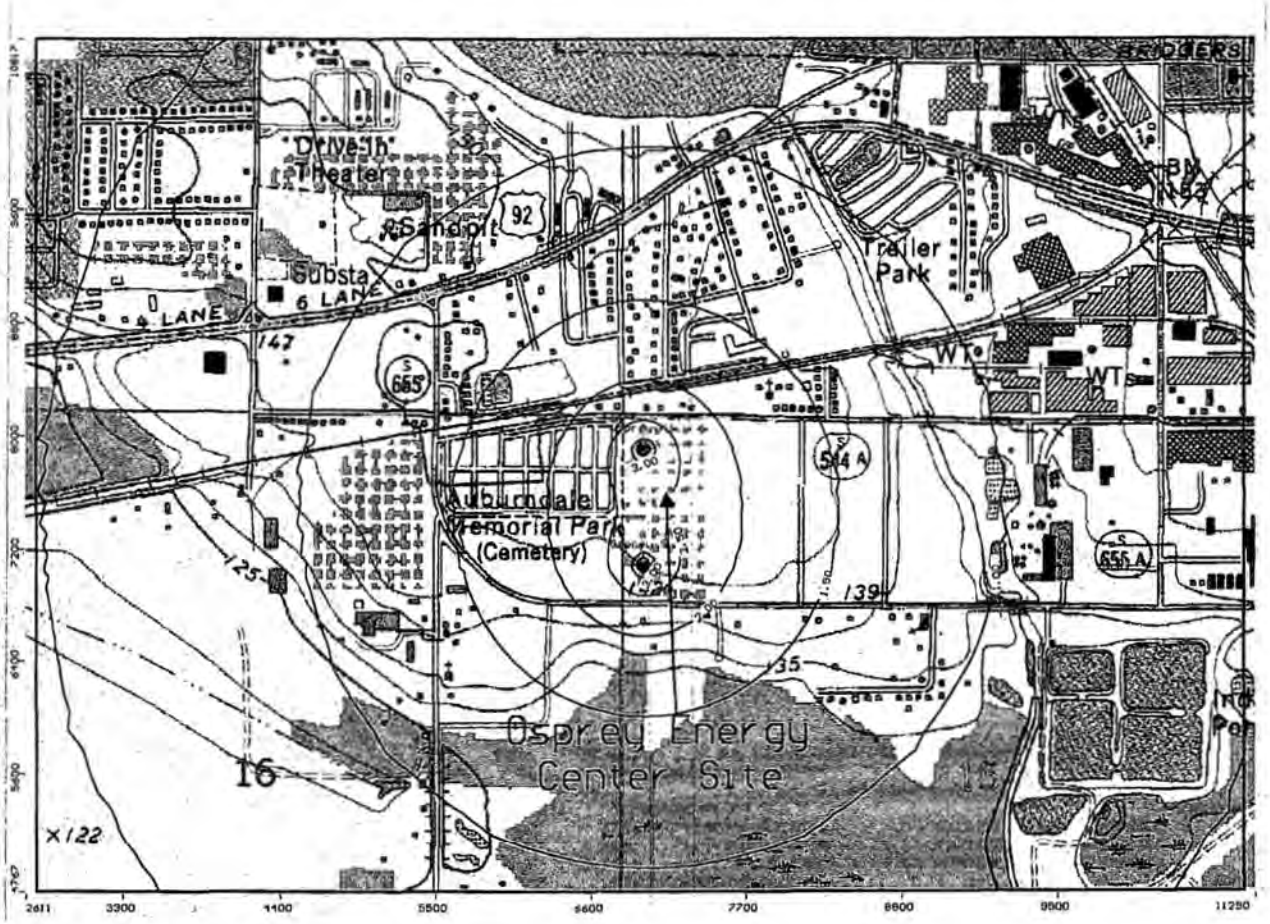
Tampa, Florida

Drawdown in the Surficial Aquifer System – Peak Withdrawal Rates, Steady State (OS1)

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: NTS	Job No. 993-9570
CHK BY: RAZ	DATE: 03/04/00	FIGURE E-6
REV BY: –	FILE No.: figE-6.dwg	



Contour Interval: 0.5 feet

Scale: 1"=1320'

Withdrawal Well

N

Golder Associates

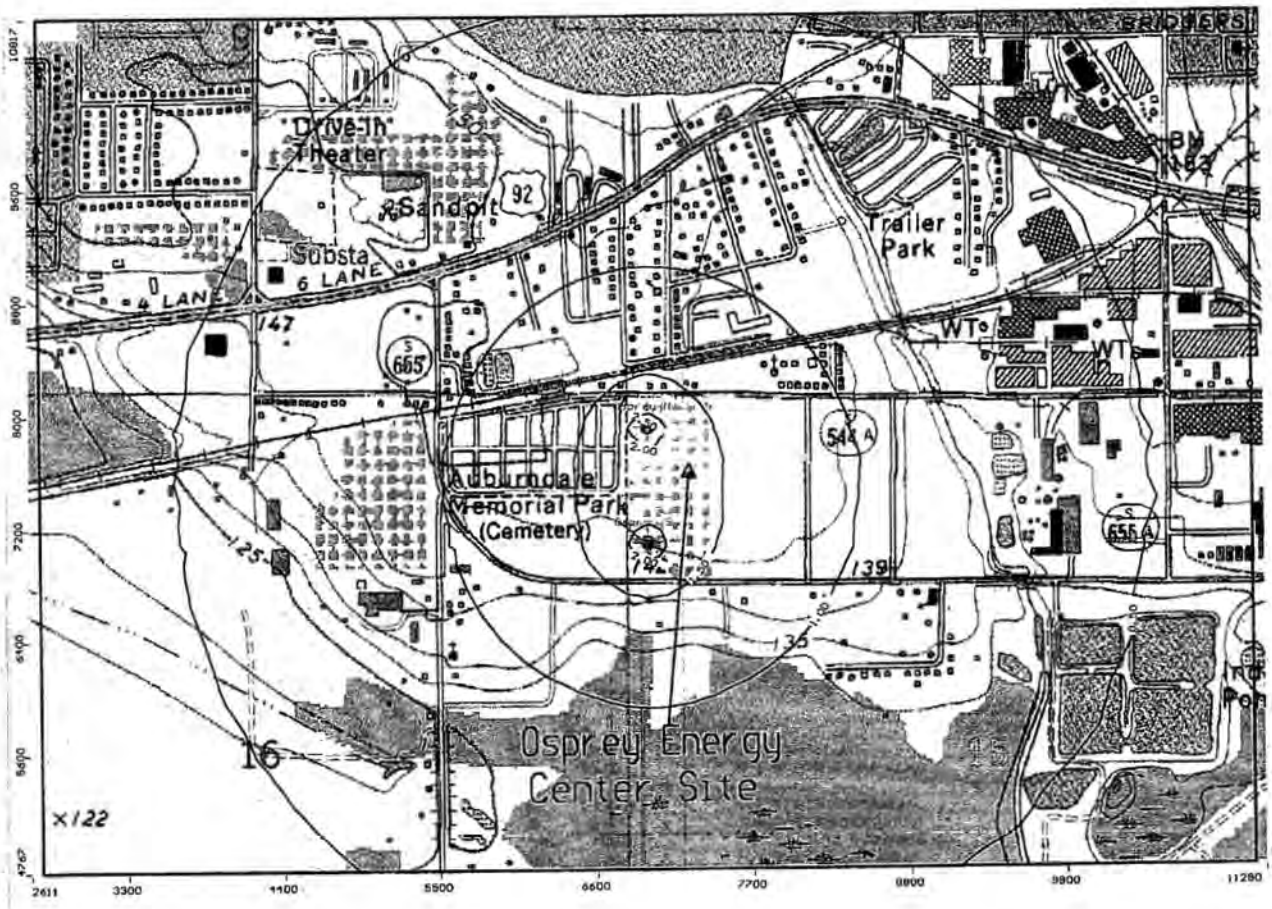
Tampa, Florida

Drawdown in the Upper Floridan Aquifer – Peak Withdrawal Rates, Steady State (OS1)

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	NTS	Job No.	993-9570
CHK BY:	RAZ	DATE:	03/04/00	FIGURE	E-7
REV BY:	–	FILE No.:	figE-7.dwg		



Contour Interval: 0.5 feet

Scale: 1"=1320'

⊕ Withdrawal Well

N

Golder Associates

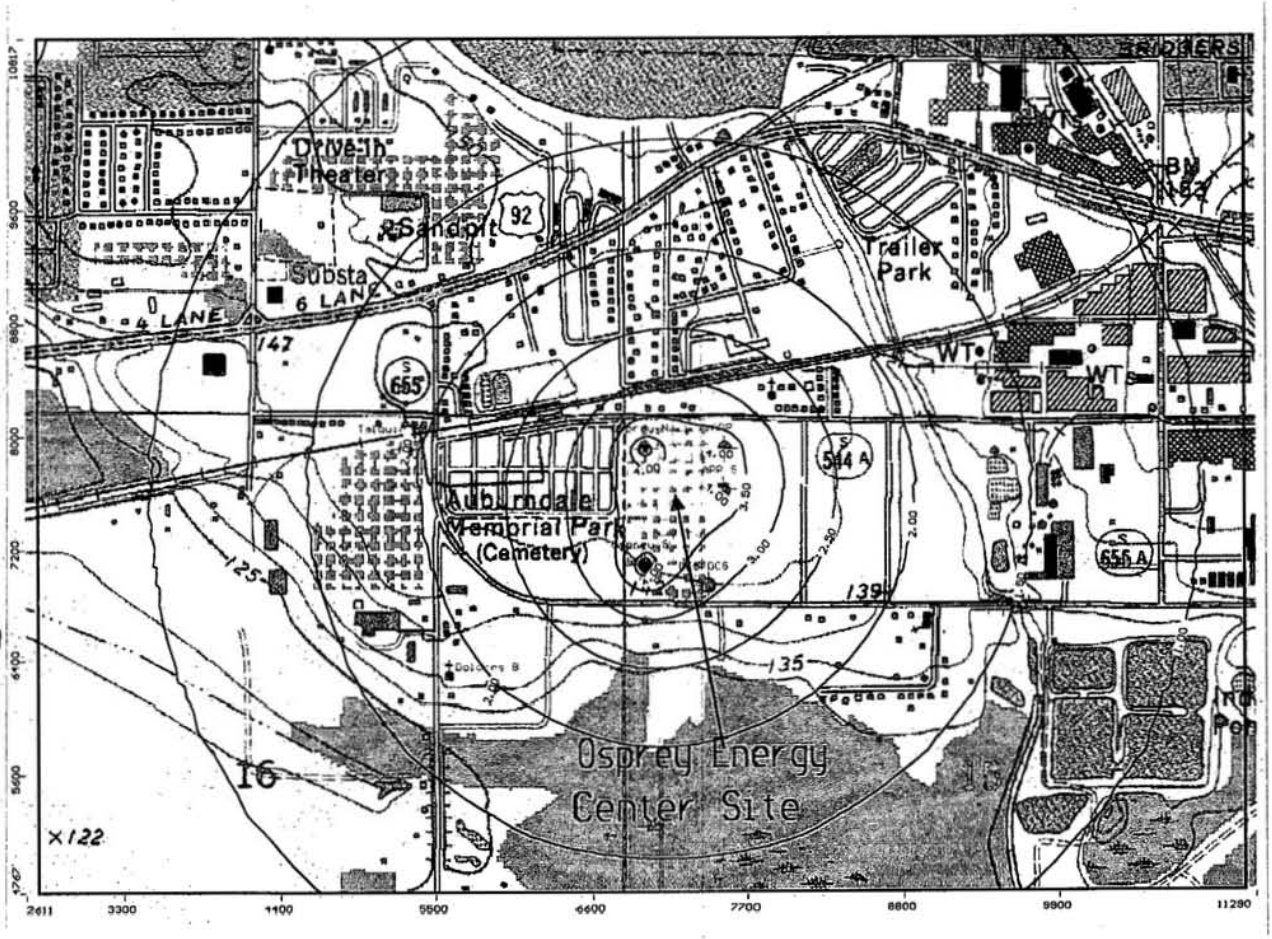
Tampa, Florida

Drawdown in the Upper Floridan Aquifer – Annual Average Withdrawal Rates, 365 Days (OS2)

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: NTS	Job No. 993-9570	
CHK BY: RAZ	DATE: 03/04/00	FIGURE E-8	
REV BY: –	FILE No.: figE-8.dwg		



Contour Interval: 0.5 feet

Scale: 1"=1320'

Withdrawal Well

N

Golder Associates

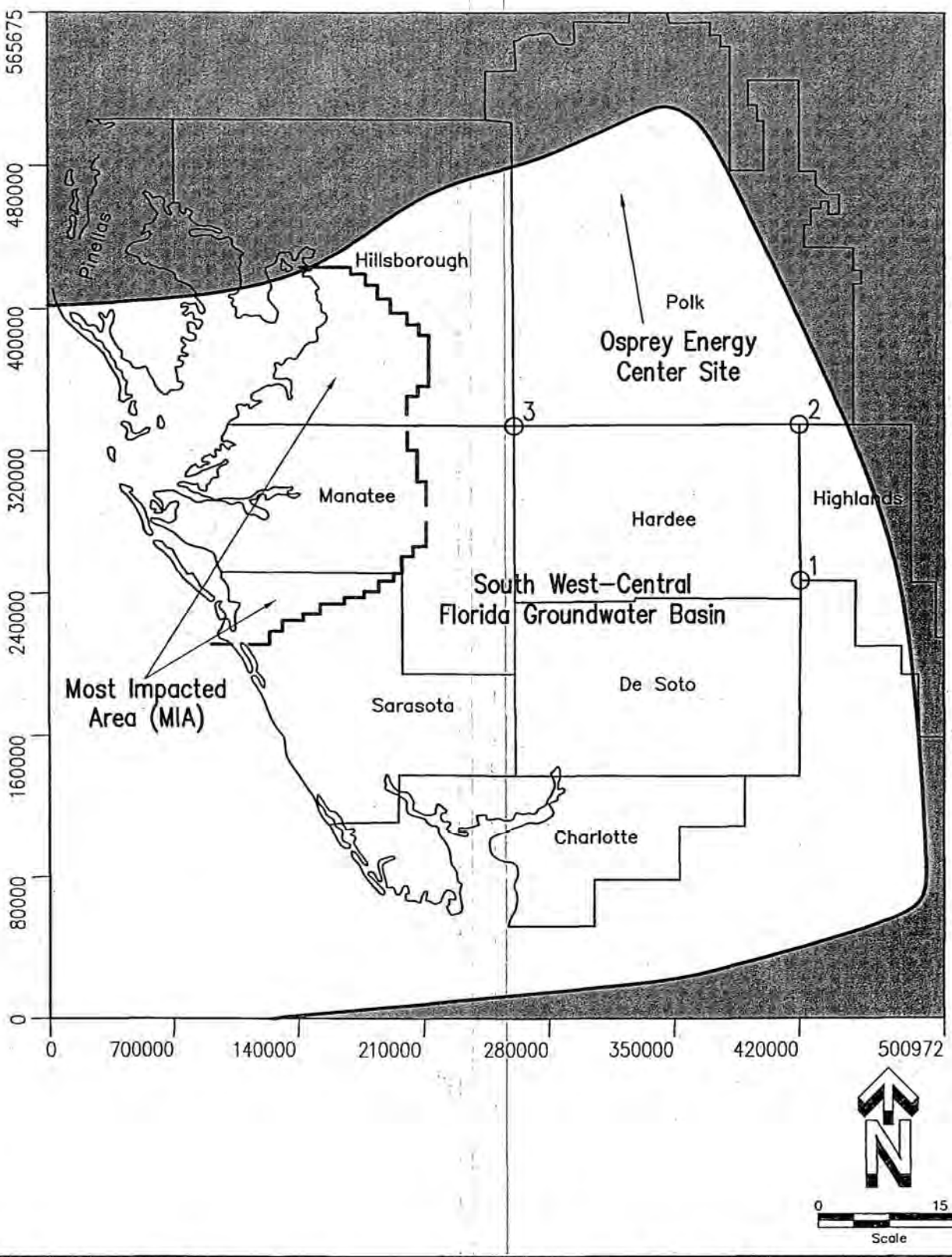
Tampa, Florida

Drawdown in the Upper Floridan Aquifer – Cumulative Withdrawals, 90-Day Peak Pumping (OS3)

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: NTS	Job No. 993-9570
CHK BY: RAZ	DATE: 03/04/00	FIGURE E-9
REV BY: –	FILE No.: figE-9.dwg	



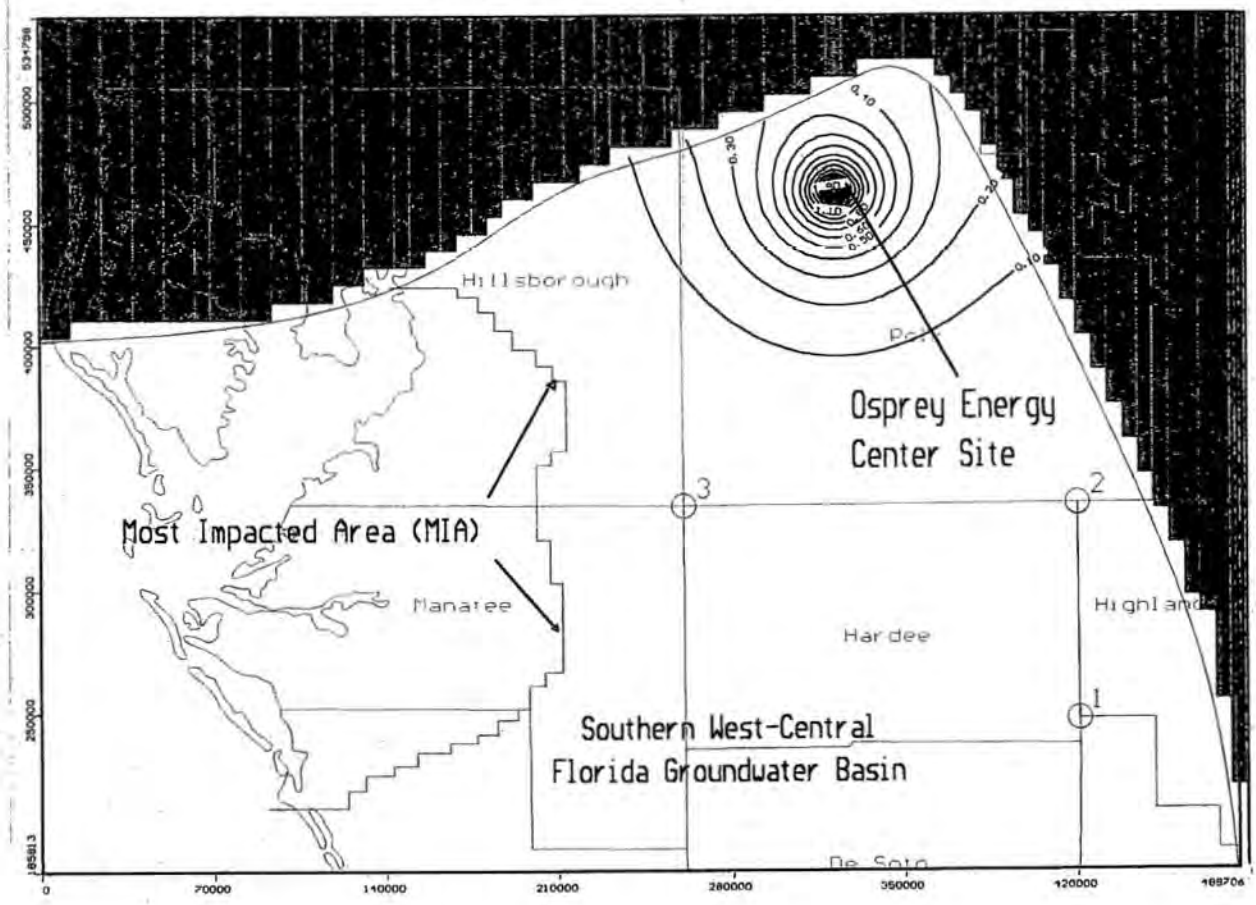
Golder Associates

Tampa, Florida

Groundwater Model
Extent for OS4
(Gray Shaded Area Not Simulated)

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: 1"=15 Miles	Job No. 993-9570
CHK BY: AW	DATE: 03/06/00	FIGURE E-10
REV BY: –	FILE No.: figE-10.dwg	



Contour Interval: 0.1 feet

Scale: 1"=15 Miles

Withdrawal Well

N

Golder Associates

Tampa, Florida

Drawdown in the Upper Floridan Aquifer – Annual Average Withdrawal Rates, 365 Days (OS4)

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: NTS	Job No. 993-9570
CHK BY: RAZ	DATE: 03/04/00	FIGURE E-11
REV BY: –	FILE No.: figE-11.dwg	

WATER USE PERMIT APPLICATION SUPPLEMENTAL FORM

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

2379 BROAD STREET • BROOKSVILLE, FL 34609-6899 • (352) 796-7211 or FLORIDA WATS 1 (800) 423-1476

INDUSTRIAL OR COMMERCIAL

ANSWER ALL QUESTIONS. IF A QUESTION IS NOT APPLICABLE, ENTER N/A. IF MORE SPACE IS NEEDED, ATTACH ADDITIONAL SHEETS AND REFER TO THE APPLICATION QUESTION NUMBER. PROVIDE DOCUMENTATION AND REFERENCES WHERE APPROPRIATE. IF THERE ARE OTHER USES, COMPLETE THE APPROPRIATE SUPPLEMENTAL FORM (S). THIS INFORMATION IS REQUESTED IN ACCORDANCE WITH RULES 40D-2.101 AND 40D-2.301, FLORIDA ADMINISTRATIVE CODE.

NOTE: IF PROCESSING OF MATERIALS IS ASSOCIATED WITH MINING OR DEWATERING, USE THE **MINING AND DEWATERING SUPPLEMENTAL FORM, WUP FORM NO 6,** AND INCLUDE THE INDUSTRIAL/COMMERCIAL USES ON THAT FORM.

*AN ASTERISK IDENTIFIES ITEMS TO BE INDICATED ON SITE MAP; YOU MAY USE THE MAP REQUESTED IN ITEM IV, SECTION B OF THE APPLICATION FORM.

PLEASE SUBMIT *THREE COPIES* OF THIS SUPPLEMENTAL FORM ALONG WITH YOUR APPLICATION, DRAWINGS, CALCULATIONS, ETC.

I. GENERAL INFORMATION

APPLICANT: Calpine Construction Finance Co.LP. (Same as shown on WUP application) WUP No. (If Existing): NA

II. SITE INFORMATION

SECTION A - *Fire Flow*

1. Describe fire flow and standby capacity (identify withdrawal points and when they would be used).

Fire flow is provided by the City of Auburndale, FL. The WUP is for generation of power. Majority of demand will be met by three on-site wells with 22% provided by reclaimed water (volume will ultimately increase to meet approx. 39% of demand). Two wells will be primary and one will act as standby if a primary well requires maintenance. Standby well will be operated intermittently to maintain well integrity.

SECTION B - *Existing Wellfields*

Describe the existing wellfield operation schedule, if applicable. Include in the description those wells that are primary, secondary, stand-by, and the well rotation schedule, if any. Description Attached ☐ N/A ☑

SECTION C - *Surface Water Management System*

Is a surface water management system proposed? Yes ☑ No ☐ Existing? Yes ☐ Permit No._____ No ☐

If so, an evaluation of the impact of the proposed withdrawal on the surface water management system, and conversely, the impact of the surface water management system on the withdrawal and water availability at the project site must be submitted.

SECTION D - *Discharge/Recirculation*

Identify the following items on a map or maps: 1. Discharge points; 2. Recirculation or settling ponds. Number the ponds, and list the acreage of each pond:

Pond No.	Acreage

III. WATER USE

SECTION A - *Annual Average Quantities in gallons per day (gpd)*

	Present	Projected 6-Year	Projected 10-Year
1. Potable and sanitary needs	0	Supplied	Supplied
2. Lawn and landscape irrigation	0	Supplied	Supplied
3. Outside use (washing, maintenance)	0	Supplied	Supplied
4. Fire protection (testing, maintenance)	0	Supplied	Supplied

5. Provide a Water Balance diagram, indicating all water sources (ground water from wells, ground water from water table dewatering or drainage, surface water, rainfall, recycled water, etc.), the amount of water entering and leaving each step in the process, all water losses (e.g. evaporation, product moisture, steam losses, waste-material entrainment, off-site discharge, recycle, etc.), and the final disposition of water. These diagrams should be based on the annual average daily quantity and the peak monthly quantity. All flows must be in units of gallons per day, and the total of all sources must equal the total of all losses.

	Present	*6-Year*	*10 -Year*
6. **Total Water Demand** (Total Items 1-5)	0	2,754,432	2,754,432
7. Provide the percentage of unaccounted water (total system throughout minus all accounted and in-plant uses):	0	0	0
8. Population served (works/visitors):	25	25	25

SECTION B - *Lawn and Landscape Irrigation*

If any of the projected water use will be for irrigation of lawns, landscaping of recreational areas, respond to items 1 through 5 below; if not, please check N/A. N/A ☑

If these quantities are greater than 100,000 gpd annual average, you must fill out the Recreational Supplemental Information Form, WUP 8.

1. Acres to be irrigated _____
2. Type(s) of vegetation to be irrigated _____
3. Irrigation method _____
4. Approximate peak monthly water use _____
5. Approximate annual average water use _____
6. Show irrigated area(s) on map.*

SECTION C - *Peak Month Quantity*

Provide the peak month quantity needed at present, in 6 years, and in 10 years. Provide calculations supporting these quantities.

	Present	6 year	10 year
9. **Total peak month quantity (gpd)**	0	3,988,679	3,988,679

IV. DISPOSAL

SECTION A - *Methods of Disposal*

SPECIFY THE PERCENTAGE FOR EACH, TO TOTAL 100%:

1. Individual septic tank	0	%
2. Percolation pond	0	%
3. Offsite discharge	0	%
4. Spray irrigation	0	%
5. Other	0	%
6. Discharge to other location	100	%
7. Discharge to other location	0	%
TOTAL	100	%

Specify Allred WWTP and/or regional WWTF
Name City of Auburndale, FL
NPDES, DER Discharge Permit Nos. NA
Name _____
NPDES, DER Discharge Permit Nos. _____

V. WATER CONSERVATION

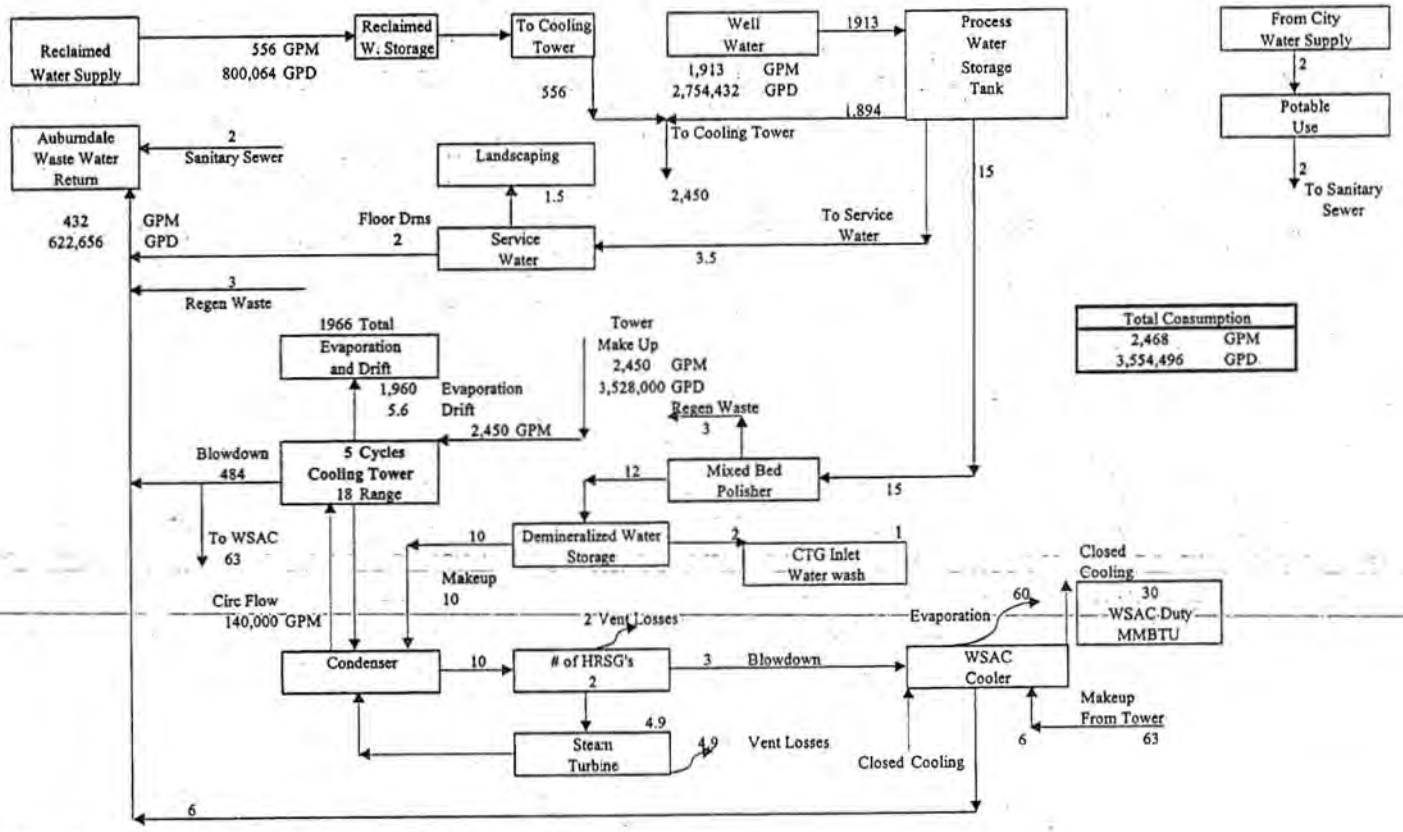
1. Attach a description of water conservation practices currently employed or planned. If planned, include an estimated time frame for implementation. ☑ Attached
2. Include plans to recycle waste water, and provide present and future quantities. ☑ Attached

ATTACHMENT F-1 – SURFACE WATER MANAGEMENT SYSTEM

The proposed withdrawal will come entirely from the Upper Floridan aquifer (artesian aquifer), which is separated from the overlying aquifers by a continuous confining unit. As a result, the withdrawal will have minimal impact on the surficial aquifer system and, therefore, minimal impact on the surface water management system (see Attachment E-2 for a detailed analysis of withdrawal impacts on the surficial aquifer system). Additionally, the surface water management system will have little or no impact on the proposed withdrawal or water availability at the Project Site. Refer to Appendix 10.1.7, Environmental Resource Permit, for a detailed description of the surface water management system.

ATTACHMENT F-2 – DISCHARGE/RECIRCULATION

A detailed analysis of proposed stormwater outfall-points is discussed in detail in Appendix 10.1.7, Environmental Resource Permit. No recirculation or settling ponds are proposed for the Osprey Energy Center Project. However, dry detention ponds are proposed to collect and treat non-contact storm water runoff from the plant. The dry-detention ponds are discussed in detail in Appendix 10.1.7, Environmental Resource Permit.



Note: (1) All numbers are in gallons per munite (GPM) unless otherwise noted.
(2) GPD = gallons per day.
(3) Water use estimates are based on 5 cycles of concnetration.
(4) Excludes duct firing, fogging and power augmentation.

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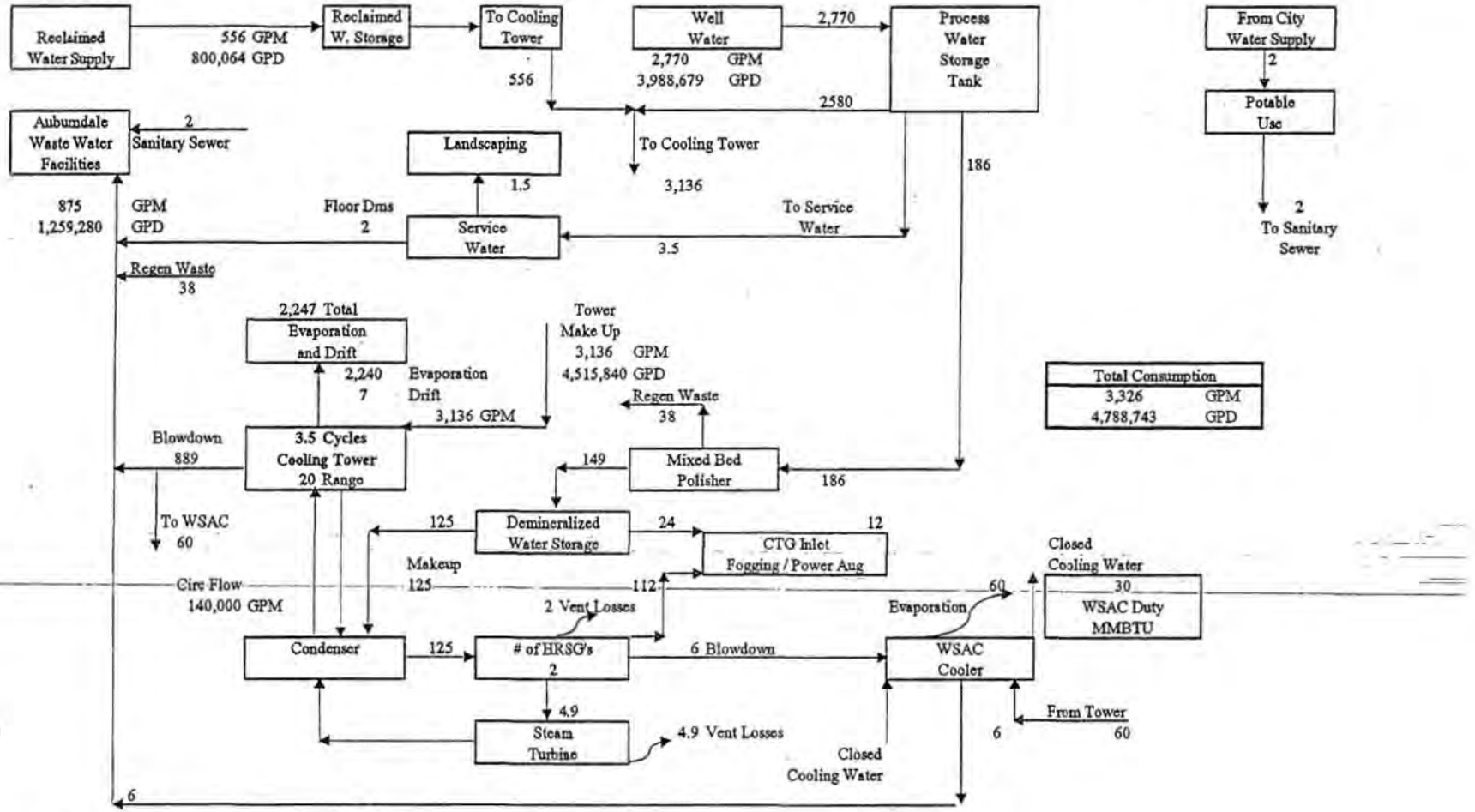
Tampa, Florida

Average Annual Daily Water Balance Diagram

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	NTS	Job No.	993-9570
CHK BY:	RAZ	DATE:	02/24/00	FIGURE	Attachment F-3A
REV BY:	–	FILE No.:	figf-3a.dwg		



Note: All numbers shown are in gallons per minute (GPM) unless otherwise noted.
GPD = gallons per day.
Water use estimates are based on 3.5 cycles of concentration.
Maximum water usage scenario reflects the use of duct firing, power augmentation and inlet fogging.

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Tampa, Florida

Peak Month Daily Water Balance Diagram

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: NTS	Job No. 993-9570
CHK BY: RAZ	DATE: 02/24/00	FIGURE Attachment F-38
REV BY: –	FILE No.: figF-3b.dwg	

ATTACHMENT F-4 – WATER CONSERVATION PLAN

Calpine's Osprey Energy Center will be designed and operated in a manner consistent with good engineering and environmental practices and will make every effort to conserve water. The Osprey Energy Center will use only the amount of water needed by putting in place those engineering controls that will ensure that water is not wasted.

All groundwater that is used at the Osprey Energy Center will serve a power function. It will be used either for cooling equipment or for steam generation. These functions will be constantly monitored for optimum performance by an elaborate set of sensors, including condensate in the main condenser, and steam injection in the combustion turbine. These and similar practices will be continuously monitored by an automatic control system designed to maximize efficiency within the limits of the equipment as well as the permit. Utilization of automatic control systems will maximize Osprey Energy Center efficiency and conserve water.

A drainage system within Osprey Energy Center will be designed such that all drains within the buildings, will drain to concrete sumps, and then will be pumped to a neutralization tank. From this tank the water will be neutralized (if needed), and reused. An internal collection system will be installed to collect inadvertent system leaks such as those from around a pump seal or valve, as well as any water that is spilled or applied.

Operators will continually check systems for leaks and proper performance. Any leaks that are found will be corrected as quickly as feasible. Any leaked water will go to a recycle drain.

Steam that is used to generate electricity through the steam turbine will be condensed and reused in a continuous loop. Emergency eyewash and shower stations will be provided with drains that lead to the reuse of that water.

Specific Measures:

Specific water conservation measures that will be implemented at the Osprey Energy Center are:

- Apply a xeriscape type landscape that incorporates the principles of design, appropriate plant selection, soil improvement, efficient irrigation, mulching, turf concentration, and proper maintenance.

- Utilize low volume plumbing fixtures.

- Apply other measures designed to reduce the amount of water needed, such as install automatic shutoff valves where technologically possible.

- As the industry develops new water conservation programs that can be economically achieved, they will be implemented.

The above conservation measures will be implemented upon start-up of the Osprey Energy Center. If new and innovative methods of water conservation become available in the future, Calpine will make every effort to implement any program that is economically feasible. If additional reclaimed water becomes economically feasible, it will also be considered as a means of reducing proposed groundwater use.

ATTACHMENT G -WATER SUPPLY ALTERNATIVES ANALYSIS

OSPREY ENERGY CENTER
AUBURNDALE, FLORIDA

Prepared for:

CALPINE
OSPREY

Calpine Construction Finance Company, L.P.
The Pilot House, 2nd Floor
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Boston, Massachusetts 02110

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February 2000

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1.0 INTRODUCTION/SUMMARY

Calpine Construction Finance Company, L.P. (Calpine) intends to build and operate a new electrical power plant (the Project) in the City of Auburndale, Florida. The Project will be known as the Osprey Energy Center. Calpine's proposed use of groundwater is subject to review by the Southwest Florida Water Management District (SWFWMD), pursuant to Chapter 40D-2, Florida Administrative Code (F.A.C.) and Calpine's overall plan for the Project is subject to review under the Florida Electrical Power Plant Siting Act (PPSA).

To satisfy the PPSA and SWFWMD requirements, Calpine has prepared a Site Certification Application (SCA) in compliance with the PPSA. The SCA includes a completed Water Use Permit (WUP) Application required by the SWFWMD. This Water Supply Alternatives Analysis supplements the SCA and WUP application and addresses specific requirements listed in Chapter 40D-2, F.A.C. This analysis demonstrates that Calpine will use the lowest quality water that is available and feasible for the Project.

The conclusion reached in this study is that reclaimed water from the City of Auburndale can be used in conjunction with groundwater for meeting the Project's specified water requirements. Calpine's assessment is that the combination of Auburndale's reclaimed water with groundwater provides the greatest net benefit while meeting Project economic and technical requirements and SWFWMD's Conditions for Issuance Criteria. Calpine's preliminary analysis indicated that groundwater alone would be adequate to meet the plant's water requirements. However, as a result of this analysis, the use of Auburndale's reclaimed water was found feasible, and therefore, incorporated as a planned water supply source for this Project. The inclusion of reclaimed water has added both capital and operating expenses, but these were found to be economically viable.

1.1 PURPOSE

The purpose of this study is to identify and assess the technical, environmental, and economic feasibility of the various water supply alternatives available for use by Calpine in conjunction with the Project. This study was undertaken to ensure that the lowest quality water resource, deemed feasible, is incorporated into the water supply plan for the Osprey Energy Center.

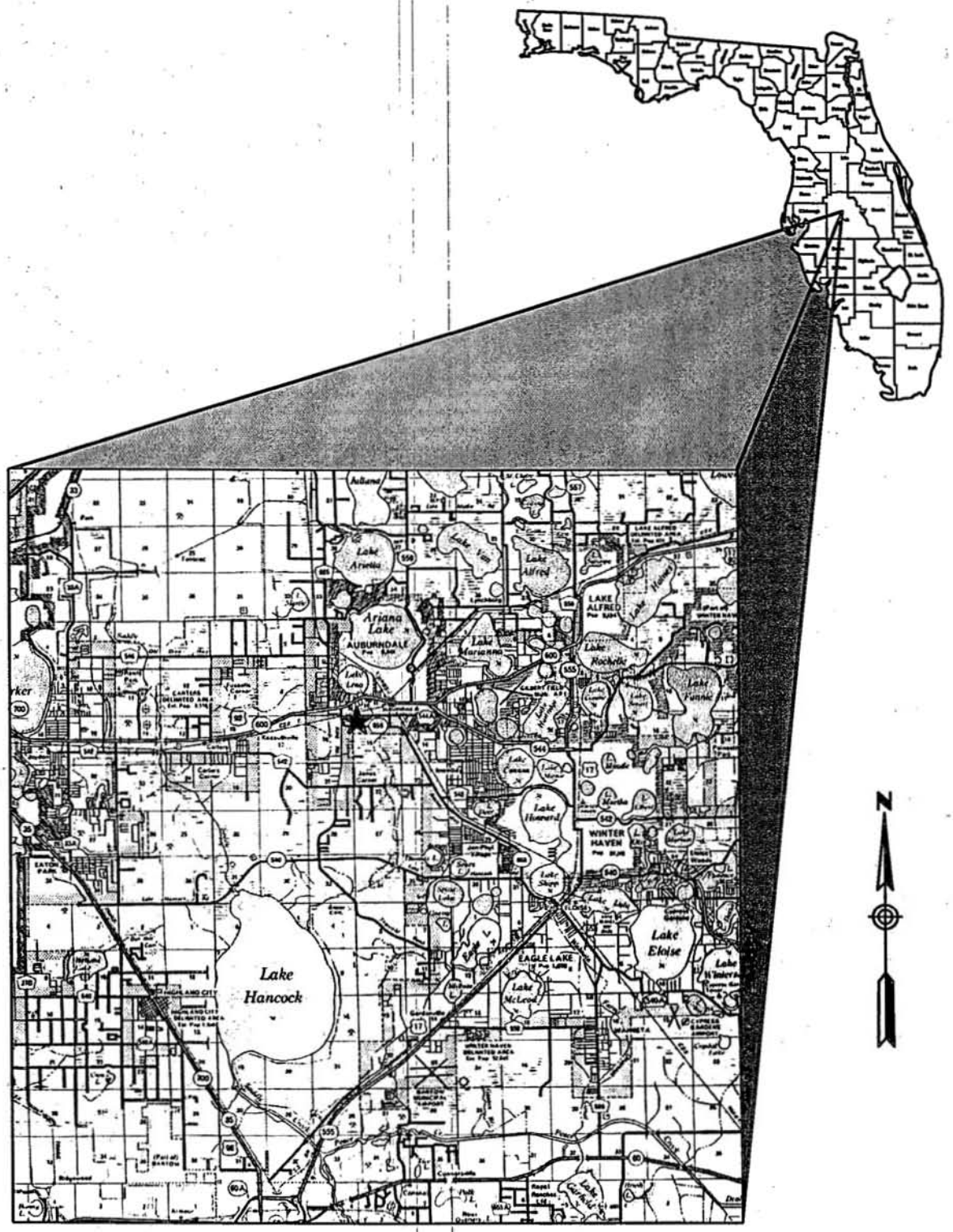
1.2 PROJECT DESCRIPTION

The Osprey Energy Center will be designed to operate as a base load power generating plant. The water use for the Project has been estimated on an average daily quantity and peak month daily quantity.

This section provides a description of the Osprey Energy Center, including the overall Site layout and key components of the Project, including their operation and proposed controls for air emissions and water discharges. Estimates of the expected quantity of water supply needs and water discharges from the Project are provided in Sections 2 and 3, based on the current available engineering and design information.

The Project will be located adjacent to an existing power plant and will tie into a number of facilities, including a proposed fuel supply pipeline, existing water supply and wastewater facilities, paved roads, Tampa Electric Company's Recker Substation, and associated 230-kV transmission lines. As a result, the location of the new facility at the Auburndale Site (see **Figure 1-1**) and the selection of the combined-cycle technology will maximize the beneficial use of the Site while minimizing environmental, land use, and cost impacts.

The Osprey Energy Center will consist of a nominal 527 megawatt (average ambient) combined-cycle power plant and directly associated facilities. The Project will include two 170-MW Westinghouse "F" Class combustion turbines (CTs) and associated heat recovery steam generators (HRSGs). The CTs will be equipped with Dry Low Nitrogen Oxide (NO_x) combustors (DLN) and Selective Catalytic Reduction (SCR) and have a combined generating capacity of nominal 340 megawatt (MW). The triple



★ Project Site

Golder Associates

Tampa, Florida

Project Site Area

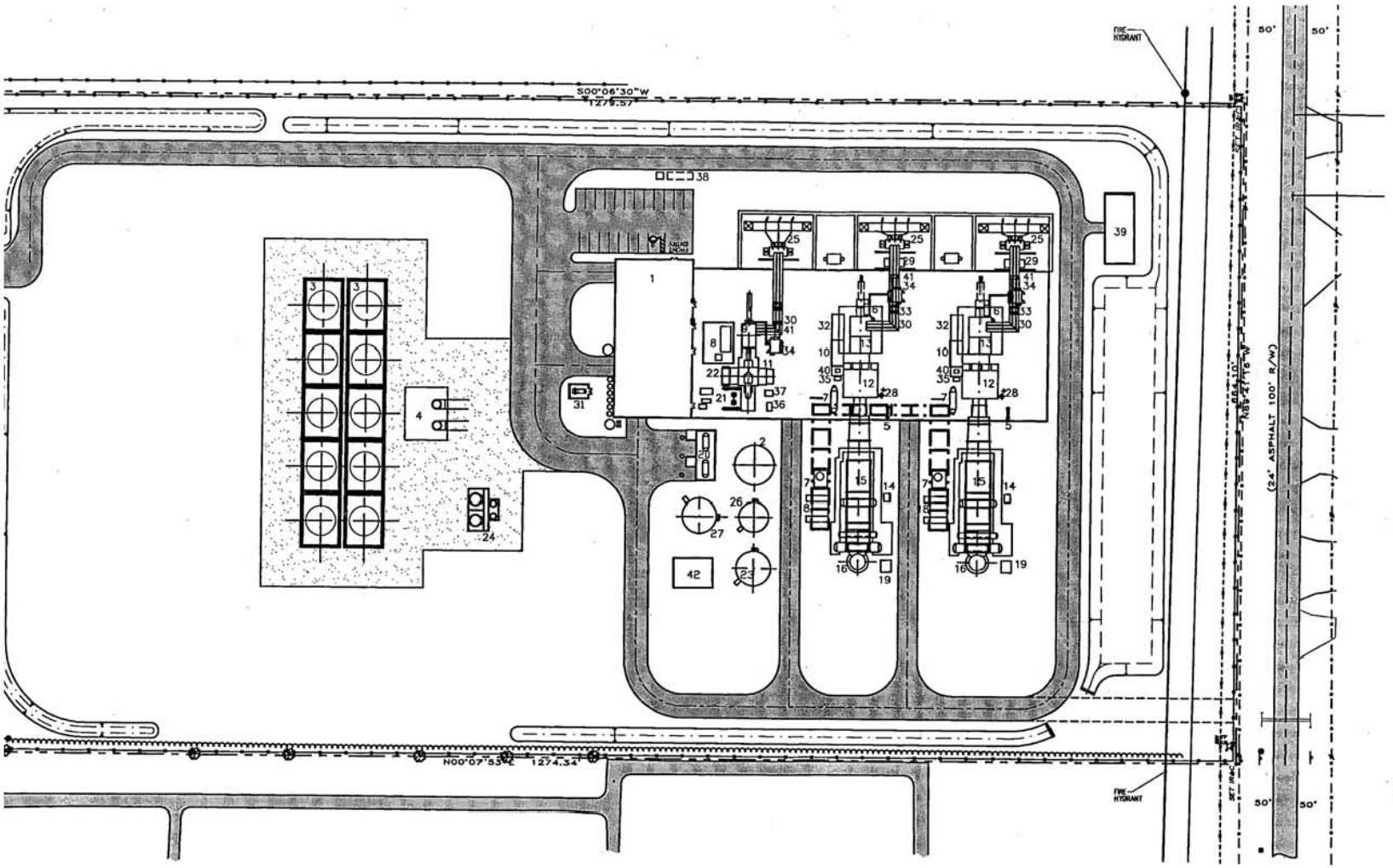
Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: NTS	Job No. 993-9570
CHK BY: CA	DATE: 02/04/00	FIGURE 1-1
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pressure HRSGs will have the ability to duct fire and will be connected to a nominal 270-MW steam turbine electric generator. The HRSG will utilize the waste heat from the CTs to produce steam for this new steam turbine. The facility (**Figure 1-2**) is commonly referred to as a "2 by 1" combined-cycle configuration. By utilizing the heat from the CTs, which otherwise would be wasted, the combined-cycle facility will be more efficient than simple cycle CTs and most existing steam cycle power plants. The facility will be fired exclusively with natural gas.

The DLN combustor designed for the "F" CTs consists of premixed fuel zones plus a standard diffusion flame pilot burner for flame stability. Low NO_x levels are achieved by introducing fuel primarily to the premix zones and reducing the amount of fuel being combusted from the pilot nozzle. Steam injection will be used during some operating conditions to increase the power output from the unit. This is commonly referred to as "steam for power augmentation." This is different than using steam injection in the combustion zone for standard combustors, which is used for NO_x control. The turbine inlet will be equipped with evaporative cooling to reduce the inlet temperature. This increases the power and output of the combined cycle. Thus, a number of water uses for the proposed Project will result in increased efficiency and performance, allowing more electricity to be generated per unit of fuel. In addition, these mechanisms to increase power output will assist in improving one of the primary goals of the Project, which is to increase the reserve margin in peninsular Florida (refer to SCA, Chapter 1, "Need for the Project"). Primary water uses for the Osprey Energy Center will also include condenser cooling, evaporative cooling and process water.

Natural gas will be transported to the Site via natural gas transport pipeline. The facility will connect with an on-site natural gas supply from the proposed "Gulfstream Natural Gas System," a subsidiary of the ANR/Coastal Pipeline Company, a natural gas transportation company.



Legend

1. ADMINISTRATION AND MAINTEN
2. SERVICE WATER TANK
3. COOLING TOWER
4. CIRCULATING WATER PUMPS
5. FUEL GAS HEATER
6. COMBUSTION TURBINE AIR INL
7. KETTLE BOILER
8. LUBE OIL SKID
9. ST GENERATOR
10. CT MECHANICAL PACKAGE
11. STEAM TURBINE
12. COMBUSTION TURBINE
13. CT GENERATOR
14. AMMONIA INJECTION SKID
15. HEAT RECOVERY STEAM GENE
16. HRSG STACK
17. HRSG BLOWDOWN TANK
18. BOILER FEED PUMP HOUSE
19. CEMS
20. AMMONIA STORAGE TANKS
21. CONDENSATE PUMPS
22. CONDENSER
23. DEMINERALIZED WATER STORA
24. WET SURFACE AIR COOLER
25. GENERATOR STEP-UP TRANSF
26. WASTEWATER TANK
27. RAW WATER STORAGE TANK
28. FUEL GAS SCRUBBER
29. UNIT AUX. TRANSFORMER
30. ISO-PHASE BUS DUCT
31. STANDBY GENERATOR
32. ELECTRICAL EQUIPMENT PACK
33. GENERATOR VT & SURGE CUB
34. GENERATOR EXCITATION SKID
35. COMPRESSOR WATER WASH SY
36. STEAM JET AIR EJECTORS
37. GLAND STEAM CONDENSER
38. OIL/WATER SEPARATOR
39. GAS METER BUILDING
40. HYDRAULIC SKID
41. EXCITATION TRANSFORMER
42. CENTRAL PUMP HOUSE

N

120' 0 120

scale feet

Golder Associates — Tampa, Florida

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

Site Plan

CAD BY:	CDT	SCALE: 1"=120'	Job
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Other on-site facilities to be constructed as part of the Osprey Energy Center include the transformer area, a building containing the CTs and the steam turbine, water treatment plant and administration, storage, and warehouse/service areas.

Non-contact stormwater runoff will be collected and routed to two stormwater retention ponds which will be designed to meet Southwest Florida Water Management District (SWFWMD), Florida Department of Transportation (FDOT) and City of Auburndale requirements. Wastewaters, including process water, pretreatment backwash, sanitary wastewater, plant and equipment drains, and neutralization unit effluent, will be treated as appropriate and discharged to the existing City of Auburndale municipal wastewater treatment and disposal system. The Osprey Energy Center will connect to the municipal water supply system for potable and fire protection needs.

The Osprey Energy Center will be connected to the electric power grid by direct interconnection with the existing Tampa Electric Company Recker Substation located immediately to the east of the southern portion of the Site.

1.3 CONDITIONS FOR ISSUANCE CRITERIA

Section 373.223, Florida Statute (F.S.), provides a three-prong test for evaluating a proposed water use plan. These tests are: 1) the use must be reasonable and beneficial; 2) the use must not interfere with any existing legal use of water; and 3) the use must be consistent with the public interest.

Chapter 40D-2, F.A.C., implements this statute and ensures that any proposed water use within the SWFWMD will meet these three conditions. As stated in Rule 40D-2.301, F.A.C., compliance with regulatory requirements can be demonstrated by providing reasonable assurances that the water use:

(a) Is necessary to fulfill a certain reasonable demand;
(b) Will not cause quality or quantity changes which adversely impact water resources, including both surface and ground waters;

(c) Will not cause adverse environmental impacts to wetlands, lakes, streams, estuaries, fish and wildlife, or other natural resources;

(d) Will not cause water levels or rates of flow to deviate from the ranges set forth in Chapter 40D-8, F.A.C.;

(e) Will utilize the lowest water quality the applicant has the ability to use;

(f) Will not significantly induce saline water intrusion;

(g) Will not cause pollution of the aquifer;

(h) Will not adversely impact offsite land uses existing at the time of application;

(i) Will not adversely impact an existing legal withdrawal;

(j) Will utilize local water resources to the greatest extent practicable,

(k) Will incorporate water conservation measures;

(l) Will incorporate reuse measures to the greatest extent practicable;

(m) Will not cause water to go to waste; and

(n) Will not otherwise be harmful to the water resources within the District.

The water requirements and the proposed sources of water for this Project have been carefully studied to ensure that the proposed water use meets the Conditions for Issuance set forth in Rule 40D-2.301 F.A.C. This document has been provided to demonstrate that the Osprey Energy Center complies with all Conditions for Issuance.

The identification, description, and evaluation of water resources alternatives for this Project are presented in the following sections. In the final section, the compliance of the selected alternative with regulatory requirements is presented.

2.0 PROJECT WATER REQUIREMENTS

The design of the Osprey Energy Center will employ a wet evaporative cooling tower, dual bed (cation, anion, mixed bed) demineralizer water treatment system, and a wet surface air cooler for plant component cooling needs. Wastewater for the plant will be sent to Auburndale's wastewater treatment facilities. The overall plant water use requirements are presented in **Table 2-1.** Average daily and maximum daily water balance are presented in **Figures 2-1** and **2-2.**

Table 2-1 Water Use Information for Osprey Energy Center Project

Description	Average Daily	Maximum Daily
Temperature (°F)	74	95
Cycles of Concentration	5.0	3.5
Power Augmentation	No	Yes
Fogging	No	Yes
Duct Firing	No	Yes
Cooling Tower Make-up Water (gpd)	3,528,000	4,515,840
Total Water Use (gpd)	3,554,496	4,788,743
WASTEWATER DISCHARGES (gpd)		
Tower Blowdown (gpd)	606,240	1,173,600
Wastewater From Other Sources (gpd)	16,416	66,240
Sanitary Wastewater (gpd)	2,880	2,880
Total Wastewater Discharge (gpd)	622,656	1,259,280

Note: gpm = gallons per minute
gpd = gallons per day

3.0 OSPREY ENERGY CENTER WATER USES

3.1 PROJECT WATER USES

3.1.1 COOLING TOWER MAKE-UP WATER

The single largest requirement for water for this Project is make-up water for the cooling tower. Water is lost due to evaporation and drift in the plant cooling tower. Additionally, water is needed to replace cooling tower discharge. Cooling tower discharge or blowdown is necessary to prevent an accumulation of solids in the cooling water.

The average daily and maximum daily water balance diagrams for the Project are presented in Attachments F-3A and F-3B, respectively. The average daily water use for the Project is estimated to be 3,554,496 gallons per day (gpd). The maximum estimated daily water demand for the Project is 4,788,743 gpd. The average and maximum daily water use figures are based on 5 and 3.5 cycles of concentrations, respectively. Cooling tower evaporative losses for the average daily case accounts for 2,831,040 gpd, or approximately 79.6-percent of the total plant requirement.

3.1.2 STEAM CYCLE MAKE-UP WATER

Steam cycle make-up water is required to replace water that is vented as steam, or is blowdown from the heat recovery steam generators' steam drums to prevent an accumulation of solids in the boiler water. On an average daily basis, steam cycle make-up accounts for 21,600 gpd, or slightly more than 0.6-percent of the total plant requirement (Attachment F-3A).

3.1.3 WATER FOR POWER PRODUCTION

Evaporative fogging type coolers are provided to enhance efficiency and to improve plant performance by cooling the temperature of the inlet air by evaporating a small amount of water in the air stream. The evaporation process transfers heat from the atmosphere to the water resulting in a drop in air temperature. This process helps to

improve combustion turbine performance. During this process, water will be lost due to evaporation. Make-up water is required to replace evaporative water loss.

Additionally, during periods of high power demand, demineralized water will be used for added steam generation and injection into the combustion turbine. This process is known as "power augmentation." Since steam injection for power augmentation will only be done during certain peak demand hours, the demineralization water treatment system and storage tank capacity will be sized to accommodate the steam flow into the combustion turbine. Based on a peak demand period of six hours per day, the demineralized water consumption will be approximately 161,000 gpd.

3.1.4 MISCELLANEOUS USE

In addition to cooling tower make-up and steam cycle make-up, water is needed to support miscellaneous Project services, such as fire protection, drinking and sanitary use, equipment cleaning and maintenance, and landscaping.

The Project service water will be used for landscaping and general cleaning. Demineralized water is used for periodic equipment cleaning and maintenance activities such as backwashing filters and water washing the combustion turbine. Demineralized water is also needed for equipment sealing and flushing.

Water is also required for fire protection. The raw water (well water) storage tank will have a dedicated volume of water for the purpose of fire protection. The fire protection system will operate only on an emergency basis but will be tested monthly. The maximum water use for testing the fire protection system is anticipated to be 1,500 gallons per test. This fire protection will be operated in addition to City of Auburndale's Fire Services.

The required potable water for the Project will be provided from the City of Auburndale water supply system. Potable water will also be used for sanitary facilities and for

emergency eyewash stations at the facility. Potable water demands are estimated to be 2,880 gpd.

On an annual average basis, miscellaneous uses account for approximately 26,640 gpd, or approximately 1-percent of the total Project requirement.

3.2 FACTORS INFLUENCING WATER REQUIREMENTS

The following factors directly affect the quantity of water needed by the Project.

3.2.1 ANNUAL HOURS OF OPERATION

The Osprey Energy Center is a base load combined-cycle plant intended to operate at approximately 85-percent capacity factor and 8,760 hours (365 days) per year. Reducing the number of hours per year that the Project operates could reduce annual water consumption. However, reducing the annual hours of operation would be inconsistent with the prime objectives of the Project and, as such, is not considered a viable option for reducing water requirements. Therefore, water use analyses were performed assuming an operating capacity of 100-percent.

3.2.2 PLANT LOAD

Since the Project is intended to operate as a base load plant, it is expected that the plant will operate at full load (527 MV at average ambient) or 8,760 hours per year. Reducing the plant load below the 527 MW (average ambient) would result in a marginal reduction in instantaneous water consumption. For instance, a reduction in plant load from 100 to 50-percent would only result in a 20-percent drop in water consumption. Any reduction in plant load directly conflicts with the prime objectives of the Project, i.e., to provide the maximum amount of power possible from Osprey Energy Center for sale to wholesale customers in Florida. Consequently, reducing plant load is not considered a viable option for reducing water requirements.

3.2.3 WATER QUALITY

The water quality of the cooling tower make-up has a significant effect on the water consumption of the plant. Lower quality water will require a reduction in the number of cycles of concentration in the cooling towers, resulting in both higher water demand and higher wastewater discharge. The use of higher quality make-up water increases the recovery of usable product water by reducing water losses incurred in the treatment processes. Therefore, optimal water efficiency is obtained by using a combination of reclaimed water and groundwater.

3.3 WATER CONSERVATION MEASURES

To minimize the Project's water usage, the following water conservation measures have been evaluated.

3.3.1 RECLAIMED WATER USE

The Project intends to utilize all of the reclaimed water available (800,000 gpd) from the Allred Wastewater Treatment Plant when the Project becomes operational in the 1st Quarter, 2003. The Project intends to increase the usage of reclaimed water, as more reclaimed water becomes available in the future. **Figure 3-1** presents a projection of reclaimed water availability from the Allred Wastewater Treatment Plant for the next 20 years. ***Figure 3-1*** indicates that the quantity of reclaimed water from the City of Auburndale will be approximately 800,000 gpd in 2003 and will increase gradually to approximately 1,400,000 gpd by 2003. A **Figure 3-1** indicates, the Project intends to utilize all available reclaimed water from the City throughout the life of the Project (i.e., 20 years).

The reclaimed water usage will reduce groundwater requirements. Therefore, it is considered a valuable water conservation measure.

3.3.2 MAXIMIZE COOLING TOWER CYCLES OF CONCENTRATION

The term "cycles of concentration" refers to the number of times the cooling tower make-up water can be recycled before the dissolved solids become concentrated to unacceptable levels in the cooling tower circulating water. Loss of water due to evaporation in the cooling tower will result in an increase in certain chemical constituents in the cooling tower circulating water. After several "cycles of concentration," the concentration of constituents in water will become unacceptable for the system. Since evaporation from the cooling tower will be a function of ambient conditions, and therefore cannot be limited by plant operational factors, the chemical composition of the circulation water must be routinely monitored and adjusted to prevent the accumulation of undesirable constituents from exceeding acceptable limits. To accomplish this process, a stream of water (blowdown) will be removed from the

tower and sent to the City of Auburndale's wastewater treatment facilities for treatment and disposal. This blowdown volume will be replaced with fresh make-up water, thus reducing the overall concentration level in the cooling tower. In general, it is desirable to maximize the cycles of concentration because more cycles of concentration requires less blowdown, thereby reducing overall plant water consumption. To maximize the overall efficiency of the system and for the purpose of water conservation, the number of cycles will be maximized by the Project.

3.3.3 UTILIZE COOLING TOWER DRIFT ELIMINATORS

Cooling tower drift is the water which is lost from the cooling tower through the air while still in liquid form. Drift is distinguished from evaporation by the fact that it leaves the tower while still a liquid (mist). As a water conservation measure, the Project will install drift eliminators on the cooling towers. The drift eliminators are extremely effective and will limit drift to less than 0.002-percent of total circulating flow.

3.3.4 UTILIZE NATURAL GAS EXCLUSIVELY FOR POWER GENERATION

The Project will use natural gas as the exclusive source of fuel for power generation. By using natural gas only, Calpine will eliminate the need to use significant quantities of water for the control of air pollutant emissions. For power plants that operate on distillate fuel oil, demineralized water oftentimes is injected into the combustion chamber of the combustion turbine at the rate of approximately one pound of water per pound of fuel oil to reduce NO_x emissions. If the Project had included the use of fuel oil, the Project would have required approximately 500,000 gpd of additional water.

3.3.5 OPERATIONAL CONSERVATION MEASURES

The Osprey Energy Center will be designed and operated in a manner consistent with good engineering and environmental practices and will make every effort to conserve water. The plant will use only the amount of water needed by putting in place those engineering controls that will ensure that water is not wasted.

All groundwater that is used at the plant will serve a power function; it will be used either for cooling equipment or for steam. These functions will be constantly monitored for optimum performance by an elaborate set of sensors, including condensate in the main condenser and steam injection in the combustion turbine. These and similar practices will be continuously monitored by an automatic control system designed to maximize efficiency within the limits of the equipment as well as the permit. Utilization of automatic control systems will maximize Osprey Energy Center efficiency and conserve water.

A drainage system within the plant will be designed such that all drains within the buildings will drain to concrete sumps and then will be pumped to a neutralization tank. From this tank the water will be neutralized (if needed), and reused. An internal collection system will be installed to collect inadvertent system leaks such as those from around a pump seal or valve, as well as any water that is spilled or applied.

Operators will continually check systems for leaks and proper performance. Any leaks that are found will be corrected as quickly as feasible. Any leaked water will go to a recycle drain.

Steam that is used to generate electricity through the steam turbine will be condensed, and reused in a continuous loop. Emergency eyewash and shower stations will be provided with drains that lead to the reuse of that water.

Specific Measures:

Specific water conservation measures that will be implemented at the facility are:

- Apply a xeriscape type landscape that incorporates the principles of design, appropriate plant selection, soil improvement, efficient irrigation, mulching, turf concentration, and proper maintenance.

- Utilize low volume plumbing fixtures.

- Apply other measures designed to reduce the amount of water needed, such as install automatic shutoff valves where technologically possible.

- As the industry develops new water conservation programs that can be economically achieved, they will be implemented.

The above conservation measures will be implemented upon start-up of the power plant. If new and innovative methods of water conservation become available in the future, Calpine will make every effort to implement any program that is economically feasible.

4.0 PROJECT WATER SUPPLY SOURCES

4.1 WATER SOURCES

There are a number of potential sources of water for this Project. However, selection of the source(s) to be used is a function of technical, financial, and regulatory constraints. Following is a list of potential water sources.

1. Surface water,
2. Groundwater,
3. Municipal Treated Water Supply, and
4. Reclaimed water.

4.2 SURFACE WATER

Surface water is available from Lake Lena (approximately 2,400 feet north-northeast of the Site) and Lake Ariana (approximately one mile north of the Site). The surface water quality of Lake Lena is characterized as fair to poor water quality. The surface water quality of Lake Ariana is characterized as good.

4.3 GROUNDWATER

Groundwater at the Site is available. The sources of groundwater include: 1) the surficial aquifer system (SAS); the Upper Floridan aquifer (UFA); and the Lower Floridan aquifer (LFA). Water quality in the SAS is generally fair to good. However, the available resource is not able to meet the Project demand. Water quality and quantity in the UFA is good. Water in the LFA is generally sufficient in quantity but low in quality. The water quality of the LFA is brackish or highly mineralized in the area of the Site.

4.4 MUNICIPAL TREATED WATER SUPPLY

The City of Auburndale's potable water treatment capacity is 6.46 mgd. Approximately 3.46 mgd of the water is currently supplied to the consumers. The City needs the additional 3 mgd to supply potable water for future growth and development. In addition, potable water from other municipalities, such as Winter Haven (7-10 miles to

the southeast) and Lakeland (10-12 miles to the west and northwest) are available. However, due to the distance and associated costs with obtaining water from other municipalities, these alternatives are not considered.

4.5 RECLAIMED WATER

Reclaimed water is potentially available from both the cities of Auburndale and Winter Haven. There are two wastewater treatment plants owned and operated by the City of Auburndale: 1) the Allred Wastewater Treatment Plant (south plant); and 2) the Regional Wastewater Treatment Plant (north plant). There is no reclaimed water available from the Regional Wastewater Treatment Plant; all of the present and future supply of reclaimed water from the Regional Wastewater Treatment Plant has been committed to other uses. However, all reclaimed water from Allred Wastewater Treatment Plant is available for the Project use. **Table 4-1** presents the reclaimed water characteristics for the Allred Wastewater Treatment Plant.

Figure 3-1 shows a projection for available reclaimed water from the City of Auburndale's Allred Wastewater Treatment Plant. This projection shows that the City will be able to provide an initial 800,000 gpd of reclaimed water for the Project. The amount of reclaimed water is projected to increase to 1.4 mgd by the year 2023. The Project will utilize all of the reclaimed water available from the Allred Wastewater Treatment Plant. The balance of the water required for the Project needs to be provided from another source.

Reclaimed water from the City of Winter Haven's South Wastewater Treatment Plant is potentially available. However, there is no existing pipeline in place to transmit reclaimed to the Site. The distance between Winter Haven's South Wastewater Treatment Plant and the Site is approximately 10.8 miles. **Figure 4-1** shows a potential corridor for a pipeline to carry reclaimed water from the Winter Haven Site to the Project Site. As shown in **Figure 4-1**, the pipe would need to cross through both highly urbanized and environmentally sensitive areas. **Table 4-2** presents the reclaimed water characteristics for the Winter Haven Wastewater Treatment Plant.

Table 4-1

City of Auburndale Wastewater Treatment Plant
Monthly Operating Report, Lena Run - 1999

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly average daily flow (mgd[1])	0.48	ND[2]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Permitted capacity (mgd)	0.65	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Three-month average daily flow (mgd)	0.16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Percent of permitted capacity (%)	74%	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CBODs Effluent (mg/l[3])	0.76	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CBODs Effluent (lbs/day)	3.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TSS Effluent (mg/l)	1.19	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TSS Effluent (lbs/day)	4.78	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Minimum pH (SU[4])	6.70	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum pH (SU)	7.40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total N (mg/l)	1.36	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TKN (mg/l)	1.02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ammonia (mg/l)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate (mg/l)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Phosphorus (mg/l)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Minimum chlorine residual (mg/l)	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum chlorine residual (mg/l)	3.14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fecal Coliform (#100mls)	2.99	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ultimate oxygen demand (lbs/day)	23.08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dissolved oxygen (mg/l)	7.50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

[1]mgd: million gallons per day
[2]ND: No Data
[3]mg/l: milligrams per liter
[4]SU: Standard Units

Table 4-1 (con't)

City of Auburndale Wastewater Treatment Plant
Monthly Operating Report, Irrigation Spray Field - 1999

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly average daily flow (mgd[1])	0.72	0.68	0.65	0.62	0.63	0.74	0.72	0.86	0.85	ND[2]	ND	ND
Permitted capacity (mgd)	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	ND	ND	ND
Three-month average daily flow (mgd)	0.73	0.70	0.68	0.65	0.63	0.66	0.70	0.77	0.81	ND	ND	ND
Percent of permitted capacity (%)	51%	49%	46%	45%	45%	53%	52%	61%	61%	ND	ND	ND
CBODs Effluent (mg/l[3])	0.76	1.47	0.97	2.55	3.81	1.92	2.19	2.18	1.87	ND	ND	ND
CBODs Effluent (lbs/day)	4.55	8.36	5.23	13.28	19.91	11.80	13.23	15.60	13.28	ND	ND	ND
TSS Effluent (mg/l)	1.19	1.04	0.74	5.83	2.47	1.86	1.32	1.17	3.04	ND	ND	ND
TSS Effluent (lbs/day)	7.13	5.92	3.99	30.35	2.47	11.43	7.97	8.38	21.59	ND	ND	ND
Minimum pH (SU[4])	6.70	6.70	6.50	6.70	12.91	6.60	6.70	6.60	6.60	ND	ND	ND
Maximum pH (SU)	7.40	7.50	7.80	7.80	6.70	7.40	7.40	7.40	7.40	ND	ND	ND
Total N (mg/l)	1.36	ND	ND	ND	7.80	ND	ND	ND	ND	ND	ND	ND
TKN (mg/l)	1.02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ammonia (mg/l)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate (mg/l)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Phosphorus (mg/l)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Minimum chlorine residual (mg/l)	0.00	0.00	0.00	0.56	0.00	0.00	0.00	0.00	0.00	ND	ND	ND
Maximum chlorine residual (mg/l)	2.14	0.00	0.86	2.10	3.90	2.20	0.00	0.00	0.00	ND	ND	ND
Fecal Coliform (#100mls)	2.99	2.87	2.99	22.14	3.44	<1.00	4.59	6.32	3.95	ND	ND	ND
Pond avg. daily flow (mgd)	0.25	0.68	0.65	0.62	0.63	0.74	0.72	0.86	0.85	ND	ND	ND
TDS (total dissolved solids; mg/l)	110.00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

[1]mgd: million gallons per day
[2]ND: No Data
[3]mg/l: milligrams per liter
[4]SU: Standard Units

Table 4-1 (con't)

City of Auburndale Wastewater Treatment Plant
Monthly Operating Report, Lena Run - 1998

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly average daily flow (mgd[1])	0.57	0.53	0.55	0.49	0.48	ND[2]	ND	ND	ND	ND	ND	ND
Permitted capacity (mgd)	0.65	0.65	0.65	0.65	0.65	ND	ND	ND	ND	ND	ND	ND
Three-month average daily flow (mgd)	0.19	0.37	0.55	0.52	0.51	ND	ND	ND	ND	ND	ND	ND
Percent of permitted capacity (%)	87%	82%	70%	80%	74%	ND	ND	ND	ND	ND	ND	ND
CBODs Effluent (mg/l[3])	0.50	0.96	1.72	0.96	0.51	ND	ND	ND	ND	ND	ND	ND
CBODs Effluent (lbs/day)	2.36	4.25	7.83	3.90	2.05	ND	ND	ND	ND	ND	ND	ND
TSS Effluent (mg/l)	1.63	1.03	1.60	1.27	0.85	ND	ND	ND	ND	ND	ND	ND
TSS Effluent (lbs/day)	7.71	4.56	7.29	5.16	3.42	ND	ND	ND	ND	ND	ND	ND
Minimum pH (SU[4])	6.84	6.70	6.80	6.50	6.50	ND	ND	ND	ND	ND	ND	ND
Maximum pH (SU)	7.95	7.80	7.80	7.60	8.10	ND	ND	ND	ND	ND	ND	ND
Total N (mg/l)	10.47	4.34	1.62	9.02	2.27	ND	ND	ND	ND	ND	ND	ND
TKN (mg/l)	1.20	1.94	1.10	0.94	0.20	ND	ND	ND	ND	ND	ND	ND
Ammonia (mg/l)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate (mg/l)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Phosphorus (mg/l)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Minimum chlorine residual (mg/l)	0.00	0.00	0.00	0.00	0.00	ND	ND	ND	ND	ND	ND	ND
Maximum chlorine residual (mg/l)	0.00	0.00	0.00	1.05	0.00	ND	ND	ND	ND	ND	ND	ND
Fecal Coliform (#100mls)	6.32	25.30	6.67	24.80	1.00	ND	ND	ND	ND	ND	ND	ND
Ultimate oxygen demand (lbs/day)	29.00	39.49	33.60	40.10	7.70	ND	ND	ND	ND	ND	ND	ND
Dissolved oxygen (mg/l)	7.20	7.90	7.35	8.60	7.47	ND	ND	ND	ND	ND	ND	ND

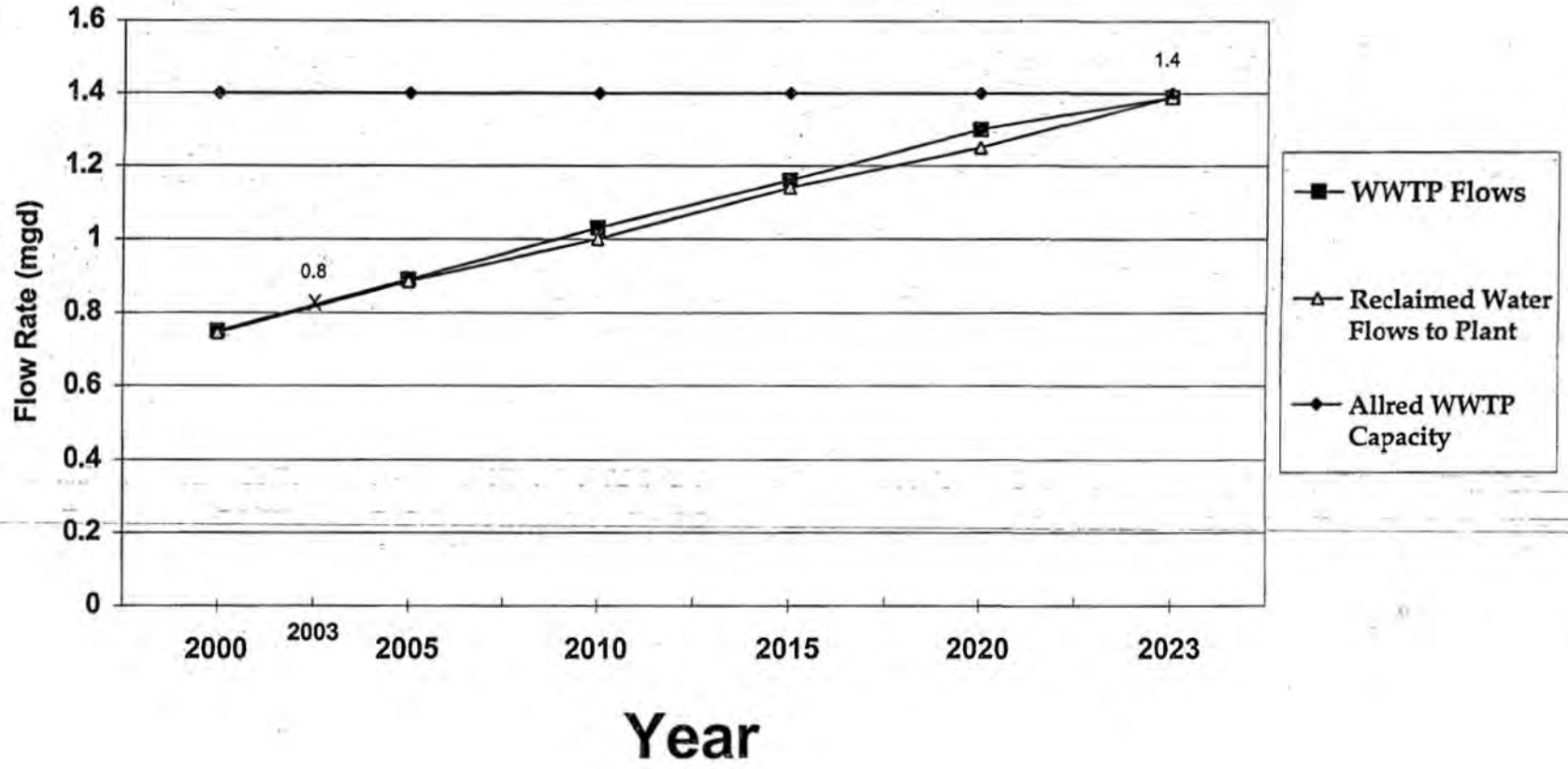
[1]mgd: million gallons per day
[2]ND: No Data
[3]mg/l: milligrams per liter
[4]SU: Standard Units

Table 4-1 (con't)

City of Auburndale Wastewater Treatment Plant
Monthly Operating Report, Irrigation Spray Field - 1998

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly average daily flow (mgd[1])	1.61	1.41	1.41	1.05	0.79	0.48	0.62	0.66	1.01	0.87	0.77	0.70
Permitted capacity (mgd)	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
Three-month average daily flow (mgd)	0.54	1.01	1.48	1.29	1.08	0.48	0.53	0.59	0.77	0.85	0.88	0.78
Percent of permitted capacity (%)	115%	101%	101%	75%	56%	34%	38%	48%	72%	62%	55%	50%
CBODs Effluent (mg/l[2])	0.50	0.96	1.72	0.96	0.50	1.11	2.20	2.82	2.50	1.34	2.18	1.78
CBODs Effluent (lbs/day)	4.85	11.30	20.20	8.40	3.35	4.43	11.30	15.70	21.10	9.70	13.96	10.46
TSS Effluent (mg/l)	1.63	1.03	1.60	1.27	0.85	1.58	1.10	2.16	2.44	1.61	1.55	2.50
TSS Effluent (lbs/day)	21.90	12.10	18.80	11.10	5.58	6.31	5.70	12.06	20.60	11.70	9.93	14.69
Minimum pH (SU[3])	6.84	6.70	6.80	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.70
Maximum pH (SU)	7.95	7.80	7.80	7.60	8.10	8.30	7.50	7.30	7.00	7.20	7.20	7.80
Total N (mg/l)	10.47	4.34	1.62	9.02	ND[4]	1.09	0.70	1.38	ND	ND	ND	ND
TKN (mg/l)	1.20	1.94	1.10	0.94	ND	0.92	0.40	0.80	ND	ND	ND	ND
Ammonia (mg/l)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrate (mg/l)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Phosphorus (mg/l)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Minimum chlorine residual (mg/l)	0.00	0.00	0.00	0.00	0.00	ND	0.24	0.45	0.20	0.43	0.00	1.00
Maximum chlorine residual (mg/l)	0.00	0.00	0.00	1.05	0.00	4.00	2.00	2.20	2.20	2.20	3.60	4.38
Fecal Coliform (#100mls)	6.32	25.30	6.67	24.80	1.00	<1.00	<1.00	<1.00	24.40	<1.00	49.00	30.50
Pond avg. daily flow (mgd)	1.01	0.88	0.90	0.56	0.29	0.48	0.62	0.67	1.01	0.87	0.77	0.70

[1]mgd: million gallons per day
[2]mg/l: milligrams per liter
[3]SU: Standard Units
[4]ND: No Data



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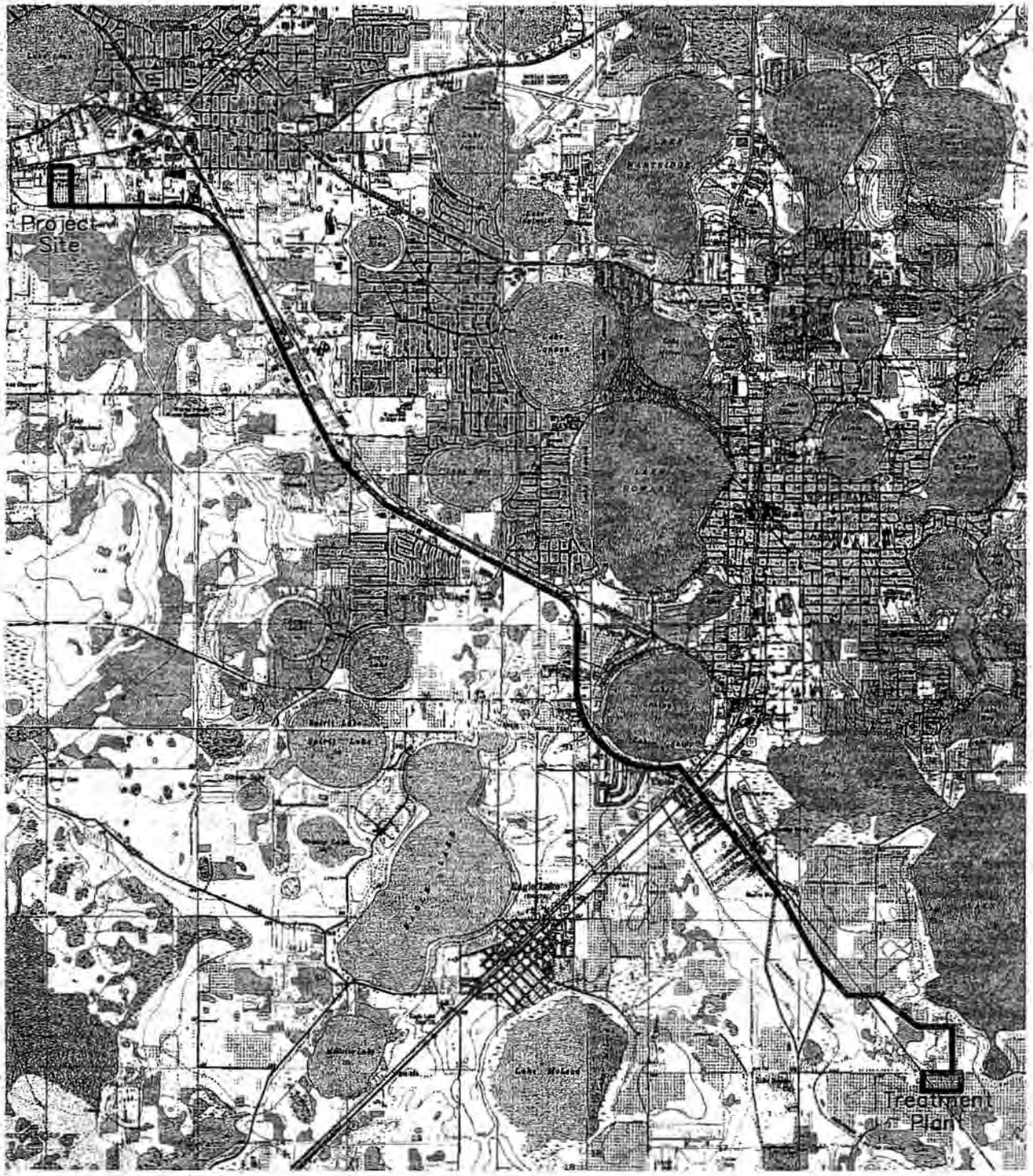
Tampa, Florida

Wastewater and Reclaimed Water Flow Rates for the Allred Wastewater Treatment Plant

Client / Project

Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY:	CDT	SCALE:	NTS	Job No.	993-9570
CHK BY:	RAZ	DATE:	03/10/00	FIGURE	3-1
REV BY:	-	FILE No.:	fig3-1.dwg		



Golder Associates

Tampa, Florida

Potential Pipeline
Route to Winter Haven
POTW

Client / Project
Calpine Construction Finance Company, L.P.
Osprey Energy Center

CAD BY: CDT	SCALE: 1"=5000'	Job No. 993-9570
CHK BY: HGB	DATE: 02/10/00	FIGURE 4-1
REV BY: –	FILE No.: fig4-1.dwg	

Table 4-2

City of Winter Haven Wastewater Treatment Plant
Monthly Operating Report - 1999

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly average daily flow (mgd[1])	2.93	3.18	3.00	2.81	2.79	2.74	2.87	ND[2]	ND	ND	ND	ND
Permitted capacity (mgd)	5.00	5.00	5.00	5.00	5.00	5.00	5.00	ND	ND	ND	ND	ND
Three-month average daily flow (mgd)	3.10	3.12	3.03	3.00	2.87	2.78	2.80	ND	ND	ND	ND	ND
Percent of permitted capacity (%)	62%	62%	61%	60%	57%	56%	56%	ND	ND	ND	ND	ND
CBODs Effluent (mg/l[3])	21.36	7.47	3.45	5.70	11.09	6.15	4.71	ND	ND	ND	ND	ND
TSS Effluent (mg/l)	113.00	31.70	14.59	32.01	89.19	26.48	8.47	ND	ND	ND	ND	ND
Minimum pH (SU[4])	6.50	6.70	6.70	6.80	6.40	6.70	6.50	ND	ND	ND	ND	ND
Maximum pH (SU)	7.20	7.30	7.20	7.30	7.40	7.50	7.30	ND	ND	ND	ND	ND
Total N (mg/l)	11.03	9.05	6.65	ND	4.07	0.49	6.21	ND	ND	ND	ND	ND
TKN (mg/l)	4.13	ND	2.32	4.32	ND	0.00	5.44	ND	ND	ND	ND	ND
Ammonia (mg/l)	0.00	0.18	0.00	0.00	ND	ND	1.85	ND	ND	ND	ND	ND
Nitrate (mg/l)	6.90	9.05	4.33	ND	4.07	0.49	0.77	ND	ND	ND	ND	ND
Total Phosphorus (mg/l)	8.81	1.25	0.07	7.00	9.70	2.22	1.33	ND	ND	ND	ND	ND
Minimum chlorine residual (mg/l)	0.50	0.60	0.70	0.60	0.40	0.30	0.60	ND	ND	ND	ND	ND
Maximum chlorine residual (mg/l)	6.00	1.30	1.70	1.40	1.70	1.90	1.80	ND	ND	ND	ND	ND
Discharge to Peace Creek Canal (mgd)	4.53	2.98	2.20	1.56	1.60	2.35	1.94	ND	ND	ND	ND	ND
Dissolved oxygen (mg/l)	6.30	6.60	5.90	5.10	6.30	5.00	5.40	ND	ND	ND	ND	ND
CBOD (mg/l)	1.05	1.42	1.57	2.74	3.52	2.49	2.43	ND	ND	ND	ND	ND
NH3-N (mg/l)	0.00	0.51	0.12	0.16	0.02	0.15	0.12	ND	ND	ND	ND	ND
Alkalinity (mg/l, as CaCO3)	110.00	287.00	186.00	260.00	271.00	273.00	229.00	ND	ND	ND	ND	ND
TDS (total dissolved solids; mg/l)	602.32	573.05	533.39	616.73	664.60	663.82	484.57	ND	ND	ND	ND	ND

[1]mgd: million gallons per day

[2]ND: No Data

[3]mg/l: milligrams per liter

[4]SU: Standard Units

Table 4-2 (con't)

City of Winter Haven Wastewater Treatment Plant
Monthly Operating Report - 1998

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly average daily flow (mgd[1])	3.70	4.03	ND[2]	3.43	2.39	1.92	2.60	2.20	2.54	2.49	3.12	3.24
Permitted capacity (mgd)	5.00	5.00	ND	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Three-month average daily flow (mgd)	3.49	3.81	ND	3.94	3.11	2.33	2.54	2.20	2.45	2.40	3.01	2.95
Percent of permitted capacity (%)	70%	76%	ND	79%	62%	47%	51%	44%	49%	48%	60%	59%
CBODs Effluent (mg/l[3])	5.57	6.09	ND	6.90	5.74	10.03	6.73	5.70	4.69	5.12	3.41	2.56
TSS Effluent (mg/l)	50.98	65.23	ND	18.60	6.53	6.36	14.90	10.17	8.46	5.71	4.00	5.04
Minimum pH (SU[4])	6.60	6.40	ND	6.30	6.50	6.60	6.40	6.50	6.30	6.40	6.30	6.50
Maximum pH (SU)	6.90	6.80	ND	7.30	7.30	6.90	6.90	7.00	6.90	6.90	7.00	7.20
Total N (mg/l)	2.87	2.25	ND	7.04	5.57	1.17	1.02	3.43	4.93	4.66	ND	2.80
TKN (mg/l)	ND	ND	ND	2.60	2.55	0.81	0.00	1.92	1.22	0.95	ND	2.26
Ammonia (mg/l)	4.16	0.00	ND	0.62	0.32	0.46	2.22	0.02	0.00	0.00	0.00	0.04
Nitrate (mg/l)	2.87	2.25	ND	4.44	3.02	1.98	1.02	1.51	3.71	3.71	8.55	0.54
Total Phosphorus (mg/l)	4.36	4.81	ND	5.15	5.01	3.80	2.41	7.86	1.86	12.45	0.07	1.82
Minimum chlorine residual (mg/l)	0.60	0.50	ND	0.70	0.50	0.70	0.60	0.70	0.50	0.60	0.50	0.50
Maximum chlorine residual (mg/l)	ND	ND	ND	1.60	1.30	1.60	2.20	2.00	1.70	1.40	2.10	1.70
Discharge to Peace Creek Canal (mgd)	3.49	1.39	ND	2.18	3.44	1.07	2.20	3.42	1.76	2.76	3.34	2.54
Dissolved oxygen (mg/l)	5.90	5.30	ND	5.20	4.30	3.20	4.50	5.00	5.40	5.80	5.80	6.20
CBOD (mg/l)	2.35	1.94	ND	1.88	2.44	4.19	1.61	1.18	1.47	1.13	1.33	0.98
NH3-N (mg/l)	0.14	0.06	ND	0.03	0.03	0.10	0.03	0.03	0.06	0.00	0.06	0.04
Alkalinity (mg/l, as CaCO3)	83.00	34.00	ND	98.00	145.00	117.00	92.00	118.00	100.00	114.00	106.00	115.00
TDS (total dissolved solids; mg/l)	391.79	404.00	333.64	399.81	374.74	374.29	366.18	400.21	377.52	362.18	382.67	391.81

[1]mgd: million gallons per day
[2]ND: No Data
[3]mg/l: milligrams per liter
[4]SU: Standard Units

Additionally, the use of reclaimed water from the City of Winter Haven at the Project would require the City upgrade its existing treatment system to achieve compliance with the requirements in Chapter 62-610, F.A.C.). As required by this rule, the reclaimed water used at the Project has to be highly disinfected (see **Table 4-2**). Otherwise, the cooling tower would need to be located at least 300 feet from the property line. Since there is no room at the Site to comply with the 300-foot setback requirement, only highly disinfected reclaimed water can be used at the Site. The cost associated with this treatment would be in addition to the pipeline costs.

5.0 WATER SUPPLY ALTERNATIVE IDENTIFICATION AND ANALYSIS

5.1 GENERAL DISCUSSION

Water source alternatives for the Project are described in this section. As discussed before, a high quality water is a preferred as the make-up source of water. High quality water will reduce the Project cost since it requires less treatment and provides the opportunity to increase the number of cycles of concentration, which results in less water use and wastewater production. Therefore, the base case alternative will consider the best water quality.

5.2 BASE CASE (Groundwater from UFA)

The base case for the Project water alternatives involves the use of groundwater from the UFA. The maximum daily water demand for the Project in this case will be approximately 4.788 mgd. On-site wells completed into the UFA would be used to withdraw groundwater.

A numerical groundwater model (Visual MODFLOW) was used to simulate drawdown in the SAS, intermediate aquifer system, and the UFA based on withdrawals from two wells. A steady state model was developed. Based on SWFWMD rule criteria and the Water Use Permit Information Manual, the model results indicate that the UFA could be used as the sole source of water for the Project. At 100-percent maximum daily consumption, there would be no adverse impacts.

5.3 ALTERNATIVE 1 (Groundwater from UFA and Reclaimed Water from City of Auburndale)

This alternative would use a combination of groundwater and reclaimed water. The City of Auburndale's Allred Wastewater Treatment Plant is located approximately one mile east of the Site. The Allred Wastewater Treatment Plant presently produces an average daily volume of 800,000 gallons of reclaimed water. Currently, the City does not have any beneficial use for its reclaimed water from Allred Wastewater Treatment Plant. The effluent (reclaimed water) is discharged to the Derby Sprayfield or into the Lake Lena

Run when the sprayfield is saturated due to precipitation. Currently, the City's maximum discharge to the Derby Sprayfield is 750,000 gpd. Any generated reclaimed water in excess of 750,000 gpd is discharged by the City to the Lake Lena Run.

Under this water supply alternative, the Project would use all available reclaimed water from the City (800,000 to 1,400,000 gpd). The additional water needed for the Project would be provided from on-site wells completed in the UFA. This alternative would require the construction of a reclaimed water supply line from the Allred Wastewater Treatment Plant to the Site, a return line to the Allred Wastewater Treatment facility, and in the event that the wastewater chemistry exceeds the limits imposed by the treatment facility, an alternative discharge to the City's North Regional Plant will be provided. In addition, in order for the Project to use reclaimed water, this water must conform to high-level disinfection standards. This requires an upgrade to the Allred facility. The upgrade would consist of adding an open channel ultraviolet (UV) system. The total cost of this alternative, including groundwater withdrawal, is estimated at $1.74 million. As discussed in **Section 3.3** and illustrated by **Figure 3-1**, the volume of reclaimed water generated at the Allred Wastewater Treatment Plant will increase over the next 20 years. As more reclaimed water becomes available, the Project will use it instead of groundwater. **Figure 3-1** depicts the growth in reclaimed water volume over time. As such, the Project's use of reclaimed water is expected to increase approximately 75-percent over the next 20 years. This plan will provide a further reduction of 600,000 gpd of groundwater extraction for the Project based on the City of Auburndale's future effluent flow projection.

5.4 ALTERNATIVE 2 (Surface Water)

Surface water from Lake Lena is available. Lake Lena is located approximately 2,400 feet north-northeast of the Site.

Surface water quality in Lake Lena is generally fair to poor. This may require on-site treatment prior to use. Environmental concerns and public opposition are major constraints in using surface water for this Project. Because of potential impacts to lake

levels, wetlands, and stream flow in Lake Lena Run, it is not certain that a permit for withdrawal of surface water could be obtained. As a result, this alternative is not considered viable.

5.5 ALTERNATIVE 3 (Groundwater from SAS)

Groundwater from the SAS is generally of fair to good quality in the Project area. However, the limited yield from the SAS makes it very difficult to obtain meaningful quantities of groundwater from the Site. Assuming a yield of 50,000 gallons per well per day, a total of 66 on-site wells would be required to meet the Project demand. In addition, pumping the SAS may impact nearby wetlands and lakes. This would be a major environmental constraint for utilizing the SAS. As such, this alternative was not found to be viable.

5.6 ALTERNATIVE 4 (Brackish Groundwater from LFA)

Brackish water from the LFA is available. However, the poor quality of the LFA water would require both additional capital expenditures and increased operational expenses for pretreatment systems. In addition, capital costs (specifically well construction costs and pumping costs) would increase substantially utilizing water from the LFA, as compared with the UFA. Another significant cost associated with this alternative is the disposal of the brackish water reject from the pretreatment plant. The only feasible means of disposal for the concentrated reject liquid is via deep well injection. The cost and permitting difficulties associated with this alternative is presented in Section 6.0. The additional capital cost (estimated at $3.9 million) and uncertainty involved in obtaining a permit for injection makes this option not viable.

5.7 ALTERNATIVE 5 (Potable Water)

Water from municipal sources is available. The closest source to the Project is the City of Auburndale. They have a total of 3 mgd of available water. A 12 inch diameter water transmission main is located on the north side of Recker Highway (along the south side of the property line). The impact fee and consumptive use cost for this alternative, as well as the City's obligation to reserve potable water for the City's future growth and

development, would become serious constraints in developing this alternative. As such, the alternative use was not deemed to be viable.

5.8 ALTERNATIVE 6 (Maximum Reclaimed Water)

This alternative will require the Site to receive reclaimed water from both the City of Auburndale and City of Winter Haven. Winter Haven has approximately 3.0 mgd available of reclaimed water. Therefore, some groundwater will still be required. No reclaimed water is available from the City of Lakeland, since their reclaimed water is committed to other sources.

Due to lack of existing pipelines for transport and delivery of reclaimed water, this alternative will require design and construction of piping systems to the Site from both the Auburndale and Winter Haven wastewater treatment facilities. Improvements to the City of Winter Haven's treatment facilities would also be required. The maximum use of reclaimed water would degrade the water quality for the Site, thereby increase the overall water consumption. In addition, using only reclaimed water at the Site may increase the generation of wastewater. The combination of increased wastewater and proposed discharge to Auburndale's treatment facilities would effectively require Auburndale to treat Winter Haven's water. Therefore, a separate additional pipeline would be required between the Site and the Winter Haven Wastewater Treatment Plant for delivery of wastewater from the Project to the Winter Haven Wastewater Treatment Plant. The cost estimate for this option is approximately $6 million, not including land or right-of-way acquisition costs, operation and maintenance costs (water treatment/chemistry usage), and costs associated with upgrading Winter Haven's Wastewater Treatment Plant to allow for unrestricted public access.

Permitting and construction of the pipelines will be difficult, at best. Since the pipeline has to cross environmentally sensitive and highly urbanized areas, environmental concerns, public opposition, engineering constraints and economical factors would pose serious problems. Additionally, this alternative may face concerns regarding the mixing of reclaimed water from two different sources. The wastewater generated at the Site will

have the water quality characteristics of reclaimed waters from both Winter Haven and Auburndale. It may not be possible to discharge the resulting Project wastewater to either of the treatment plants. Both cities may refuse accepting the wastewater from the Project due to concerns of violating their NPDES permit conditions. Therefore, due to issues discussed above, Winter Haven is not a viable option for reclaimed water.

6.0 SELECTED PROJECT WATER SUPPLY ALTERNATIVE

Following is a descriptive analysis of the water supply alternatives for the Project.

6.1 ANALYSIS OF ALTERNATIVES

Table 6-1 provides a summary of the water alternative analysis. This table provides a descriptive evaluation of each alternative.

From a development perspective, fresh groundwater is the most cost-effective alternative for the Project. As mentioned in Section 5.2, the UFA could provide the total water needs for the Project. However, compliance with the Conditions for Issuance presented in Section 1 may make this alternative less attractive from the permitting perspective in comparison to Alternative 2 (Groundwater from UFA and Reclaimed Water from the City of Auburndale). To establish a base for economic analysis of alternatives, the cost for development of groundwater from the UFA is used. The capital cost for development of this alternative is estimated as $0.5 million.

Using reclaimed water is another option for this Project. Sources of reclaimed water include wastewater treatment plants for the cities of Auburndale (located less than one mile due east of the Site) and Winter Haven (approximately 10.8 miles from the Site). The use of reclaimed water from Auburndale's Allred Wastewater Treatment Plant is feasible, both from an economic and engineering perspective. The Allred Wastewater Treatment Plant currently can provide 800,000 mgd of reclaimed water to the plant, and in the future, may provide a total of 1.4 mgd (see **Figure 3-1**). The difference between these numbers and the total annual average water demand of 3,554,000 gpd needs to be provided by other sources. In Alternative 2, a combination of reclaimed water and groundwater from the UFA is considered. The volumetric ratio between the reclaimed water and groundwater in Alternative 2 is 1 to 3.5. The total cost for this alternative is estimated as $1,740,000.

Table 6-1
Water Supply Options
Osprey Energy Center

SOURCES	SITE		RESOURCE		REGULATORY		ENGINEERING/COST	
	Opportunity	Constraint	Opportunity	Constraint	Opportunity	Constraint	Opportunity	Constraint
Groundwater Upper Floridan Aquifer (Base Case)	Available.	None with respect to water quantity.	Sufficient quantity available in vicinity of site.	None	Impact on other users; environmental constraints.	None, if regulatory requirements are met. Lengthy process for obtaining permit.	Accessible by drill rig; well installation required, pumps/hardware required, APT recommended.	Three wells proposed, any two achieve project requirements. The total cost for this alternative (3 wells) is $500,000.
Groundwater Upper Floridan Aquifer Combined With Reclaimed Water From City of Auburndale	Available.	None with respect to quantity. Reclaimed water has lower quality.	Groundwater is available at site. Reclaimed water needs to be conveyed to the site via piping. (approximately 1 mile)	No apparent constraints for GW withdrawal. No infrastructure for delivery of reclaimed water.	A good alternative for meeting permitting requirements. Good for water conservation plan.	No apparent constraints Chapter 62-610 F.A.C. requirements (High Disinfection) for reclaimed water.	Groundwater is accessible by drilling. Reclaimed water is accessible by piping	See above. Reclaimed water needs to be delivered at the site. Piping cost is $740,000. UV system upgrading cost is $500,000. The total cost for this alternative, including groundwater withdrawal, is $1,740,000.
Surface Water	None.	Available from Lakes Lena (0.5 miles) and Ariana (1 mile)	Available.	May not be able to withdraw at minimum flow Poorer water quality than potable.	Apparent permitting fatal flaws.	No permit may be granted Lakes are headwater for Peace River.	Accessible by public R.O.W. in distances shown under site category.	Water quality varies with season. The total cost for this alternative is $300,000.
Groundwater Surficial Aquifer System	Available.	Insufficient yield (50,000 gpd/well, max).	Available.	Insufficient yield.	No apparent permitting concerns.	Potential impact on wetland and surface water bodies.	Accessible by drill rig; well installation required, pumps/hardware required, aquifer performance tests (APTs) recommended.	Limited room on site to construct multiple wells (95 wells estimated at 50,000 gpd each 4.788 mgd peak).
Lower Floridan Aquifer (Brackish Water)	Available.	None.	Available.	Water quality is poor.	None.	Pretreatment reject water will require disposal. Difficult to permit deep injection well.	Accessible by drill rig; well installation required, pumps/hardware required, APT recommended.	Three wells (2 operating at a time) to achieve 4.788 mgd estimated peak. The average cost for design, permitting and installation of wells is $700,000. Pilot study, engineering design, permitting installation of the deep well injection is $3,900,000. The total cost for this alternative is $4,600,000.
Municipal Water City of Auburndale	None.	Available from a 12" main along the southern property line.	Available.	Economic constraints Limits by the City.	No apparent permitting fatal flaws.	City's obligation to reserve resources for future development.	Available at the property boundary. Good quality.	Connection fee and impact fee by the City.
Reclaimed Water From Winter Haven and Auburndale	None.	No infrastructure to deliver reclaimed water to the site. Site is 10.8 miles from Winter Haven's WWTP.	Available.	No infrastructure Water quality is questionable Winter Haven's WWTP requires upgrades.	Using reclaimed water (i.e. reuse) is encouraged by SWFWMD.	Chapter 62-610 F.A.C. requirements. (High Disinfection) Mixing wastewater from two sources is not well received.	Design and installation of a pipeline.	Permitting for piping system. Difficulties in piping installation. High cost of piping system ($6.1M). Disposal of pretreatment reject is high ($3.9M). The total cost for this alternative, including groundwater withdrawal, is $10,500,000 (not including ROW access, etc).

Notes:

mgd: million gallons per day

$1.2M: 1.2 million dollars

APT: Aquifer performance test

F.A.C.: Florida Administrative Code

SWFWMD: Southwest Florida Water Management District

gpd: gallons per day

Estimated Costs do not include the operation and maintenance costs.

The City of Winter Haven treatment plant is located approximately 10.8 miles from the Site. It can potentially provide up to 3 mgd of reclaimed water, but only if a pipeline to the Site is installed and improvements to the Winter Haven Wastewater Treatment Plant are constructed. The additional capital costs for pipeline installation and engineering constraints makes this option unreasonably expensive and infeasible. In addition, when reclaimed water is used as the sole source for cooling tower make-up, the number of cycles of concentration will be reduced significantly, resulting in much larger quantities of wastewater (over 1,200,000 gpd). Since the City of Auburndale treatment system has a limited treatment capacity, part or all of the wastewater would need to be returned to the City of Winter Haven. However, this approach would create a liability concern for the City of Winter Haven because the composition of the waste stream would include wastes from Auburndale. In addition, another pipeline will need to be built to carry the Project's wastewater to Winter Haven and add to the Project's cost. If wastewater discharges to the City of Winter Haven sewer system are not a practical option, other means of wastewater discharge would need to be used. The only other reasonable option for the disposal of wastewater is deep well injection. This option would require a vigorous testing, documentation and permitting process. The cost for design, permitting, and installation of the injection wells is $3.9 million (est.). The total cost associated with this alternative, including groundwater withdrawal, is $10,500,000.

The remaining alternatives (surface water, brackish water, groundwater from surficial aquifer) are not considered viable options, mainly due to regulatory, engineering, and economic constraints (see **Table 6-1**).

6.2 WATER SUPPLY ALTERNATIVES CONCLUSION

When considering the foregoing alternatives analysis and the information contained in ***Table 6-1,*** it is clear that the only feasible alternative to groundwater as a sole source is to utilize a combination of UFA groundwater and reclaimed water from the City of Auburndale The significant points that lead to this include:

- During the beginning of the Project approximately one-fourth of the average groundwater requirement will be eliminated by using reclaimed water in the

plant processes. As additional reclaimed water becomes available, approximately one-third of the groundwater requirement will be eliminated.

- Utilization of a local reclaimed water resource that is currently disposed of with no beneficial purpose.
- Plant upgrade costs for additional ultraviolet treatment at the Allred Wastewater Treatment Plant are deemed reasonable.
- While there are considerable costs for acquiring and transferring the City of Auburndale's reclaimed water, the economics are feasible.
- An analysis of using groundwater exclusively at the Project demonstrates no significant adverse effects on existing legal uses on the environment.
- By supplementing groundwater use with reclaimed water, withdrawal impacts are reduced further, ensuring that there will be no adverse impacts to other existing legal withdrawals and environmental features.
- This choice makes maximum use of lower quality water resources prior to utilizing groundwater resources.

6.3 CONDITIONS FOR ISSUANCE SUMMARY

Following is a summary of the information presented in the Water Use and Water Supply Alternatives Analysis to demonstrate that the Project water use satisfies the requirements of Chapter 373, F.S., and Chapter 40D-2, F.A.C. With respect specifically to Rule 40D-2.301, F.A.C., Conditions for Issuance of Permits, the information presented herein demonstrates that the water use is reasonable and beneficial, is in the public interest, and will not interfere with any existing legal use of water.

(a) <u>The water use is necessary to fulfill a reasonable demand.</u>

The generation of electrical power is a necessary and highly regulated industry. Operation of the Osprey Energy Center, and its concomitant water use, is entirely contingent upon the demand for electricity. The water use associated with power production has long been recognized as reasonable, beneficial and in the public interest. To demonstrate this for the Project, water demand and the

various water uses have been properly accounted for by addressing process requirements, system efficiency and reuse, treatment effects, disposal, alternative sources of water and conservation measures. Documentation has been provided to demonstrate that the proposed withdrawal quantities are necessary to supply a reasonable demand for electrical power generation.

(b) The water use will not cause quantity or quality changes which adversely impact the water resources, including both surface and ground waters.

The proposed withdrawal of water meets all rule criteria for approval. There is no proposed use that would adversely impact surface water or groundwater resources due to quantity or quality changes. Worst-case groundwater modeling simulations predict drawdown in the UFA at the property boundary will be 2.80 feet. This is less drawdown than the screening threshold allowed by the SWFWMD in the WUPIM, Section C. Documentation is provided in Attachment E-2 of Appendix 10.1.8 to demonstrate that all applicable performance standards are met.

(c) The water use will not cause adverse environmental impacts to wetlands, lakes, streams, estuaries, fish and wildlife, or other natural resources.

The proposed withdrawal of water will not cause unacceptable adverse impacts to environmental features related to water resources of the District, for two reasons: 1) there are no environmental features on the Site, and 2) groundwater modeling simulations predict drawdown in the SAS, beneath nearby wetlands and water bodies, will be less than 0.5 feet, which is less than the screening threshold allowed by the SWFWMD in the WUPIM, Section C. Documentation is provided in Attachment E-2 of Appendix 10.1.8 to demonstrate that all applicable performance standards are met.

(d) The water use will not cause water levels or rates of flow to deviate from the ranges set forth in Chapter 40D-8, F.A.C.

The proposed withdrawal of water will not cause deviation in any applicable water levels or rates of flow. There are no minimum flow rates, minimum potentiometric surface levels or minimum water-table levels established. There are no defined stressed lakes within the area influenced by the proposed withdrawal. Further, the results of the groundwater model simulation of the proposed withdrawal, combined with other groundwater withdrawals, indicate that there would not be adverse or unacceptable impact if stressed lakes were present.

(e) The water use will utilize the lowest water quality the Applicant has the ability to use.

Consideration has been given to using the lowest quality water available, and the project has been designed to use the lowest quality water which is acceptable for the proposed use. Alternative sources including highly-mineralized water from the Lower Floridan aquifer and reclaimed water were evaluated for feasibility. It was determined that utilizing reclaimed water from the City of Auburndale's Allred Wastewater Treatment Plant is a viable alternative to the exclusive use of groundwater because this alternative is environmentally and economically feasible. It is expected that this alternative source will eventually be able to supply approximately 40-percent (1.4 mgd reclaimed water vs. 3.55 mgd average daily annual water use) of the water requirement. This is the only feasible alternative to the exclusive use of groundwater because of the environmental impacts and economic considerations associated with other alternatives.

(f) The water use will not significantly induce saline water intrusion.

Results of the groundwater model simulation of the requested withdrawal rates indicate that the proposed water use will not induce movement of a saline water interface inland or towards a potable withdrawal. Further, there is no discernible drawdown of the potentiometric surface at the boundary of the Most Impacted Area of the Eastern Tampa Bay Water Use Caution Area. Documentation has been provided to demonstrate that the requested withdrawal will not cause significant saline water intrusion.

(g). The water use will not cause pollution of the aquifer.

A Phase 1 Environmental Site Assessment (ESA), following American Society for Testing and Materials (Designation E 1527-97), was completed for the Project Site during August 1999. The ESA results revealed no evidence of recognized environmental conditions associated with the Site. The proposed withdrawals are not expected to degrade the water quality of the aquifer by causing pollutants to spread.

(h) The water use will not adversely impact offsite land uses existing at the time of the application.

The proposed withdrawal of water will not cause an adverse unmitigated impact on any existing land use. Results of the steady-state, peak-month groundwater model simulation predicted drawdown in the SAS at the Project Site boundary is 0.36 feet. Therefore, there will be no significant reduction in water levels in an adjacent surface water body to the extent that utilization of the water body is impaired and no significant damage to crops or other types of vegetation.

(i) The water use will not adversely impact an existing legal withdrawal.

The proposed withdrawal of water together with other withdrawals will not cause an unmitigated adverse impact on a legal withdrawal existing at the time of

application. Based on the results of groundwater model simulation, the requested withdrawal will not impair the withdrawal capability of an existing legal withdrawal to a degree that the existing withdrawal would require modification or replacement to obtain the water it was originally designed to obtain. Documentation has been provided to demonstrate that all applicable performance standards are met and there will be no adverse impact on a legal water withdrawal existing at the time of application.

(j) The water use will utilize the local water resources to the greatest extent practicable.

The Project will be relying exclusively on the local water resources for all of the water supply. Demand will be met through utilization of all the reclaimed water available from the City of Auburndale's Allred Wastewater Treatment Plant, with the balance derived from the local groundwater resource.

(k) The water use will incorporate water conservation measures.

The Project incorporates a multitude of water conservation design features. One of the most significant water conserving aspects is the selection of natural gas fuel for firing the combustion turbines instead of distillate fuel oil. It is estimated that this will save approximately 500,000 gpd of water that would otherwise be required to control air pollutant emissions if firing with distillate fuel oil. Conservation of cooling water is another area of significant water savings, achieved by maximizing the number of times that cooling water is recycled and by employing drift eliminators in the cooling towers. Many other water conservation measures involving Project design and operating practices are specified in the Water Conservation Measures section.

(l) The water use will incorporate reuse measures to the greatest extent practicable.

Two sources of available reclaimed water were evaluated and it was determined that reclaimed water is available and appropriate for reuse. It was determined that one of the sources is not feasible for use because of excessive environmental impacts and costs associated with 1) construction and operation of transmission pipelines, and 2) inadequate water quality characteristics. However, all available reclaimed water from the City of Auburndale's Allred Wastewater Treatment Plant will be used for the Project at startup, and will ultimately be able to provide approximately 40-percent of the water requirements. Reclaimed water is incorporated into the Project water use to the greatest extent practicable.

(m) The water use will not cause water to go to waste.

The proposed withdrawal of water will not result in the waste of water. Waste is defined as the causing of excess water to run into a surface system. There are no water use activities associated with the Project that will result in runoff.

(n) The water use will not otherwise be harmful to the water resources within the District.

The proposed withdrawal and use of water will not otherwise be harmful to the water resources within the District. Further, the Project intends to utilize a reclaimed water resource that is currently disposed of prior to any beneficial use.

10.2 Zoning Descriptions

Sec. 5.6.14 LI - LIGHT INDUSTRIAL.

5.6.14.1 STATEMENT OF INTENT. These districts are intended for light manufacturing, processing, storage and warehousing, wholesaling, and distribution. Institutional and residential uses are prohibited as not in character with the activities conducted in these districts. Service and commercial activities relating to the character of the district are permitted. Regulations are intended to prevent or reduce friction between uses in this district and also to protect nearby residential districts. Performance standards are applied at lot lines.

5.6.14.2. PERMITTED PRINCIPAL USES AND STRUCTURES.

5.6.14.2.1. Light manufacturing, processing, fabricating and similar uses.

5.6.14.2.2. Wholesaling, warehousing, storage, distribution establishments and the like.

5.6.14.2.3. Bulk storage inflammable liquids.

5.6.14.2.4. Outdoor storage lots and yards; except wrecking yards, junk yards or yards used in whole or in part for scrap or salvage operations or for processing, storage, display, or sales of any scrap, salvage or second-hand building materials, junk automobiles.

5.6.14.2.5. Vocational schools and trade schools involving operations of a light industrial nature.

5.6.14.2.6. Retail establishments for sale of new and used automobiles, motor cycles, truck and tractors, manufactured homes, boats, automotive vehicle parts and accessories (but not junk yards or automotive vehicle wrecking yards), heavy machinery and equipment, farm equipment and supplies, lumber and building supplies, monuments, and similar uses.

5.6.14.2.7. Service establishments catering to commerce and industry including linen supply, freight movers, communications services, business machine services, canteen service, restaurant, hiring and union halls, employment agency, sign company, automobile service stations and truck stops, grocery stores and similar uses.

5.6.14.2.8. Vocational, technical, trade, or industrial schools and similar uses.

5.6.14.2.9. Clinic in connection with industrial activity.

5.6.14.2.10. Miscellaneous uses such as express office, telephone exchange, commercial parking lots and parking garages, motor bus, truck or other transportation terminal.

5.6.14.3. PERMITTED ACCESSORY USES AND STRUCTURES. Uses and structures which:

5.6.14.3.1. Are customarily accessory and clearly incidental and subordinate to permitted or permissible uses and structures.

5.6.14.3.2. Are located on the same lot as the permitted or permissible use or structure, or on a contiguous lot in the same ownership.

5.6.14.3.3. Do not involve operations or structures not in keeping with the character of the district.

5.6.14.3.4. Dwelling units when a part of the permitted principal use, for owners and employees only, provided all minimum requirements for the area, setback, height and related requirements for the district are met, and provided further, that all such dwellings shall be confined to the rear one-half of the ground floor, or to a floor other than the ground floor of the principal permitted use. Dwelling units shall be limited to one for each permitted principal use and contain a minimum of 500 sq. ft. of living area but in no case shall the aggregate residential floor area exceed the aggregate floor area of the permitted principal use. One off-street parking space shall be provided for each dwelling unit in addition to the required off-street parking for the permitted principal use and shall be provided at the rear or side of the principal use.

5.6.14.3.5. Dish Antennas.

5.6.14.4. SPECIAL EXCEPTIONS.

5.6.14.4.1. One manufactured home or recreational vehicle for residential purposes, in connection with a principal use when used strictly for demonstrated security purposes and provided further that all yard requirements shall be met as for a principal use.

5.6.14.4.2. Manufacturing, processing and assembly, but with the following conditions: these land uses shall be conducted on property(s) within structure(s) enclosed on 3 sides with no openings, other than windows and personnel doors for ingress and egress, when the property abuts or is adjacent to properties classified residential, institutional or commercial on the Auburndale Zoning Map. Site

compatibility requirements shall, at a minimum, be met in compliance with Sec. 5.2.17. of the LDR.

5.6.14.5. PROHIBITED USES AND STRUCTURES.

5.6.14.5.1. Dwelling units except as provided otherwise herein.

5.6.14.5.2. Private or public elementary or high schools.

5.6.14.5.3. Yards or lots for scrap or salvage operations or for processing, storage, display, or sales of any scrap, salvage, or second-hand building materials, junk automobiles, second hand automotive parts; wrecking yards or junk yards; all uses or structures not of a nature specifically permitted herein, and any use not conforming to the performance standards set forth in Article IV.

5.6.14.5.4. Junk Yards.

5.6.14.5.5. Off-site signs.

5.6.14.5.6. Abandoned signs.

5.6.14.5.7. Excavation, borrow pits.

5.6.14.5.8. Mining.

5.6.14.5.9. Salvage operations, recycling, building, yard.

5.6.14.5.10. Livestock, including swine, cattle, sheep, goats, and poultry.

5.6.14.6. MINIMUM LOT REQUIREMENTS. (Area & width) As needed to meet other requirements herein.

5.6.14.7. MINIMUM YARD REQUIREMENTS. (Depth of front & rear yard, width of side yard)

Front: 25 feet.

Side: 15 feet, provided however that this requirement may be reduced to 10 feet if structure is built with a minimum of one hour fire walls or contains an internal fire sprinkler system or if the yard abuts a railroad right of way, alley or an easement.

Rear: 20 feet, provided however that this requirement may be reduced to 10 feet if structure is built with a minimum of one hour fire

walls or containing an internal fire sprinkler system or if the yard abuts a railroad right of way, alley or an easement.

Where an LI district adjoins a residential district without an intervening street or alley, the required adjoining yard shall be a minimum of 25 feet and shall be maintained as a live landscaped area, except for necessary access drives and walkways and shall not be used for parking. (See Sec. 5.2.17.)

5.6.14.8. MAXIMUM LOT COVERAGE BY ALL BUILDINGS. As needed to meet other requirements herein.

5.6.14.9. MAXIMUM IMPERVIOUS SURFACE COVERAGE. 70% for all upland soils. All other soils shall remain unimproved.

5.6.14.10. MAXIMUM HEIGHT OF STRUCTURES. Except as provided in Sec. 5.2.4. no portion shall exceed: 150 feet.

5.6.14.11. MINIMUM OFF-STREET PARKING AND LOADING REQUIREMENTS.

5.6.14.11.1. Off-street Parking:

5.6.14.11.1.1. Service Stations, repair garages: No vehicle being serviced, repaired, or stored, or awaiting or following service, repair or storage, shall be parked on any public street, alley or right-of-way by persons operating or employed by such service stations or repair garages.

5.6.14.11.1.2. All other uses or structures: Parking space shall be determined by the Administrative Official in an amount appropriate to the circumstances of the case, but in no case shall off-street parking space required be less than one space for each employee on peak shifts.

5.6.14.11.2. Off-street Loading: All permitted or permissible uses requiring loading space for normal operations shall provide adequate loading space so that no vehicle being loaded or unloaded in connection with normal operations shall stand in or project into any public street, walk, alley or required yard.

5.6.14.12. LIMITATIONS ON SIGNS. No signs intended to be read from off the premises shall be permitted except:

5.6.14.12.1. Signs relating only to identification of the premises and occupants and to goods sold or services rendered on the premises, limited as to number and area as follows:

5.6.14.12.1.1. One sign, with not to exceed 20 sq. ft. of surface area, for each 10 lineal feet of building frontage, the location of which is identified on the Occupational License. Such sign shall be mounted on the main building and shall not extend more than 3 feet above the roof or beyond the sides of the building. In addition, when one or more places of business or activities exist in a building, not more than one free standing combined identification sign may be permitted when mounted on a permanent support in any required front yard in this district, if such sign and its support do not impede visibility in relation to traffic flow on the site or on the adjacent streets. Such free-standing sign shall not exceed 80 square feet in surface area per side or 160 square feet in total combined surface area. If at a later date other places of business or activities locate on the subject site, the original individual sign structure and copy shall be surrendered and combined as for Sec. 5.6.14.12.1.2. below. No source of incandescent or mercury vapor illumination for any sign on premises shall be directly visible in any portion of a residential district or from any room used for sleeping purposes in any district.

5.6.14.12.1.2. When more than one place of business or activity exist in combination on a site, not more than one free-standing identification sign may be permitted when mounted on a permanent support in any required front yard in this district if such sign and its support do not constitute substantial impediments to visibility in relation to traffic flow on the site or on the adjacent street. Such free-standing sign, whether identifying a single place of business or activity or a combined grouping of places of business or activities, shall not exceed 80 square feet in surface area per side or 160 square feet in total combined surface area. No source of incandescent or mercury vapor illumination for any sign on premises shall be directly visible in any portion of a residential district or from any room used for sleeping purposes in any district.

5.6.14.12.2. In advertising any property for sale, rent or lease, signs with a combined total surface area not exceeding 3 sq. ft. are permitted.

5.6.14.12.3. All off-site signs are prohibited.

5.6.14.12.4. Portable signs as provided in Chapter 7 of the LDR.

5.6.14.12.5. No sign support(s) shall be erected within 10 feet of any property line.

10.3 Land Use Plan Descriptions

Poor Original

Location: Intersections of arterial roads or along arterial roads; minimum traveling distance of two miles between Neighborhood Activity Centers within the Urban Development Area.

Percent of Lot Coverage: 40 percent.
Usable Site Area: 5 to 20 acres.
Gross Floor Area: 20,000 to 150,000 square feet.
Min. Population Served: 5,000 to 10,000 people.
Market Area Radius: 1 1/4 miles or more.
Typical Lead Tenant: Supermarket, related retail sales.

Other Typical Tenants: Office, convenience store, service station, drug store, gas station, related commercial services.

(c) The City shall use a modified version of a Polk County land use designation known as **Business Park Centers**. The following criteria shall be utilized for the designation of Business Park Centers on the Future Land Use Map:

Business Park Centers may be located within the Urban Development Area providing the necessary public facilities and services are available or scheduled to be available at the time of issue of any development order. Business Park Centers are intended to provide locations for the placement of establishments to accommodate light assembly (non-manufacturing) and wholesale employment needs of the residents of the Auburndale Planning Area and the adjacent areas. General characteristics of Business Park Centers are:

Location: Intersection of arterial roads or along arterial roads and preferably with rail access.

Percent of Lot Coverage: 50 percent.
Usable Site Area: 5 acres or more.
Gross Floor Area: 200,000 to 1,000,000 square feet.
Min. Population Served: 10,000 or more people.
Service Area Radius: 20 miles or more.
Typical Lead Tenant: One or more light assembly plants, or warehouse facility, employing at least 50 people.

Poor Original

Other Typical Tenant: Office, distributors, research and development.

(a) The City shall use the following criteria as a guideline for locating Residential land uses in the Urban Development Area on the Future Land Use Map:

Low Density Residential: 0 to 6 dwelling units per acre/43%.
Medium Density Residential: 7 to 10 dwelling units per acre/17%.
High Density Residential: 11 to 14 dwelling units per acre/2%.

tatement of Intent. The City shall use the following statements of intent when utilizing the residential future land use categories:

ow Density Residential has been applied to those areas that primarily consist of existing low density single family detached dwellings established over the past years. As the City expands its boundaries, this classification will have considerable additional application. The primary type dwelling suited for this classification is the free standing or single family detached dwelling unit. Schools, parks and related public uses will be a part of this classification.

edium Density Residential areas have been utilized in areas where mixtures of dwelling types exist on smaller lots and generally have access to minor arterial and urban collector streets. The primary intent of this classification is to encourage the continuation of mixtures of housing types. These dwelling units should include one and two story apartments, townhouses, duplexes, and single family dwellings. Schools, parks and related public uses will be a part of this classification. Development activities within the intent of this classification can be achieved where such requirements as minimum land areas are met, open space is provided, public facilities and services are available and access to principal streets is safe and convenient.

igh Density Residential future land use classification is available for use but has not has been applied to any of the present land areas in the City. The intent of the classification is to encourage various dwelling unit mixes, including apartments, townhouses, low rise multiple family dwellings and certain single family type structures. Densities up to 14 dwelling per acre currently do not exist in the City. Such densities will require a high demand for public facilities and services and direct access to principal streets. Schools, parks and related public uses will be a part of this classification. It is anticipated that this classification will be used as the City expands its

10.4 Existing State Permits

Not Applicable

10.5 Monitoting Programs

Raw data from monitoring tasks are incorporated in the SCA text or specific appendices

10.6 Site Boundary and Topographic Survey Map

(See Appendix 10.1.7 for Survey Map)

10.7 Concurrency System Management Report

CONCURRENT MANAGEMENT SYSTEM REPORT

TO:

Susan S. Patton, AICP
Environmental Planner
Golder Associates Inc.
Reporting Period: through February 1, 2000

POTABLE WATER CAPACITY:

Total Plant Capacity:	6,460,000 GALLONS PER DAY
Remaining Plant Capacity:	2,909,000 GALLONS PER DAY
Percentage of Remaining Capacity:	45%

SANITARY SEWER CAPACITY:

Total Plant Capacity:	1,400,000 GALLONS PER DAY
Remaining Plant Capacity:	661,200 GALLONS PER DAY
Percentage of Remaining Capacity:	47.2%

TRAFFIC INFORMATION:

Road segment(s) operating in violation of the minimum LOS: NONE.

NOTES:

Plant capacity is based on 1999 annual average daily flows for water and sewer.

Date: February 1, 2000

Prepared by: John Dickson, Public Utilities Director
City of Auburndale

Signature: _____

10.8 Correspondence with Florida Department of State, Division of Historical Resources, Florida Fish and Wildlife Conservation Commission, and U. S. Fish and Wildlife Service

Golder Associates Inc.

5405 West Cypress Street, Suite 215
Tampa, FL 33607
Telephone (813) 287-1717
Fax (813) 287-1716

Golder Associates

January 27, 2000

Ms. Laura Kammerer
Historic Preservationist Supervisor
Florida Department of State
Division of Historical Resources
R. A. Gray Building
500 South Bronough
Tallahassee, FL 32399-0250

RE: Request for Concurrence of Review for Historical or Archaeological Sites
Osprey Energy Center (located in Section 15, Township 28, Range 25E)
Auburndale, Florida

Dear Ms. Kammerer:

The purpose of this letter is to request that you concur with our determination that the above referenced project does not have any significant archaeological or historical sites and that a pedestrian survey with subsurface testing is not required. Our determination is based on review of areas considered to be potentially significant archaeologically or historic as identified by the Department of State, Division of Historical Resources (DHR) based on your database described herein. The significance is to be determined in terms of the criteria presented in 36 C.F.R. 63 "Determinations of Eligibility for Inclusion in the National Register of Historic Places."

Golder Associates, Inc. (Golder) has been retained to assist in the environmental licensing (Site Certification) of a proposed power project as referenced above. The proposed project would be located in the southwestern portion of Auburndale, Florida. The subject parcel (19.46 acres) is presently an orange grove, although it is overgrown and in decline. **Attachment A** contains a topographic map with a conceptual site plan and color site map for the Osprey Energy Center.

The site is located at Latitude 28° 02' 54" and Longitude 81° 47' 54". The northwest corner of the site has a State Plane Coordinate for Florida West Zone NAD 1988 of 17730.4190 for the easting and 1352804.0820 for the northing in US feet. The Universal Transverse Mercator (UTM) number is 17.421.3103.2 (zone 17 with an easting of 421 km and a northing of 3103.2 km.)

Golder has obtained a map from ECO SEARCH to identify historic places and archeological sites (related report and map are enclosed as **Attachment B.**)

An approval is requested at your earliest convenience. A response by February 25, 2000 would be appreciated.

If you need additional information or have any questions, please call Betty Robinson, Susan Patton, or me at (813) 287-1717. Thank you for your assistance.

Sincerely,

Golder Associates Inc.

Richard A. Zwolak, AICP
Associate, Director of Environmental Planning

Attachments

cc: Clay Adams, Golder
David Dee, Landers and Parsons
John Niland, Calpine
Paul Barnett, Calpine

993-9570/Landuse/SCAssp/Letters SHPO etc/Hist Preservation LTR

DIVISIONS OF FLORIDA DEPARTMENT OF STATE
Office of the Secretary
Office of International Relations
Division of Elections
Division of Corporations
Division of Cultural Affairs
Division of Historical Resources
Division of Library and Information Services
Division of Licensing
Division of Administrative Services

MEMBER OF THE FLORIDA CABINET
State Board of Education
Trustees of the Internal Improvement Trust Fund
Administration Commission
Florida Land and Water Adjudicatory Commission
Siting Board
Division of Bond Finance
Department of Revenue
Department of Law Enforcement
Department of Highway Safety and Motor Vehicles
Department of Veterans' Affairs

FLORIDA DEPARTMENT OF STATE
Katherine Harris
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Mr. Richard A. Zwolak
Golder Associates, Inc.
5405 West Cypress Street, Suite 215
Tampa, Florida 33607

February 29, 2000

RE: DHR Project File No. 2000-00806
Cultural Resource Assessment Request
Federal Energy Regulatory Commission
Proposed Osprey Energy Center
Auburndale, Polk County, Florida

Dear Mr. Zwolak:

In accordance with Chapter 403, *Florida Statutes*, and implementing state regulations, we have reviewed the above referenced project. It is the opinion of this office that the proposed project will have no effect on historic properties listed, or eligible for listing, in the *National Register of Historic Places*, or otherwise of historical or archaeological value. The project is consistent with the historic preservation aspects of Florida's Coastal Management Program.

If you have any questions concerning our comments, please contact Scott Edwards, Historic Preservation Planner, at 850-487-2333 or 800-847-7278. Your interest in protecting Florida's historic properties is appreciated.

Sincerely,

Laura A. Kammerer

for Janet Snyder Matthews, Ph.D., Director
Division of Historical Resources
State Historic Preservation Officer

JSM/Ese

Golder Associates Inc.

5405 West Cypress Street, Suite 215
Tampa, FL 33607
Telephone (813) 287-1717
Fax (813) 287-1716

January 31, 2000

Mr. Jay Slack
U.S. Fish and Wildlife Service
Vero Beach Field Office
1360 U.S. Highway 1, Suite 5
Vero Beach, FL 32961

RE: Request for Concurrence of No Significant Impact for
Listed Species or Critical Listed Species Habitat
Osprey Energy Center (located in Section 15, Township 28, Range 25E)
Auburndale, Florida

Dear Mr. Slack:

The purpose of this letter is to request that you concur with our determination that the above referenced project will not significantly impact listed species or their habitat. This review included an area of 8-kms (5-miles) from the proposed power plant exhaust stacks on the site.

As discussed in your phone conversation with Betty Robinson, on November 23, 1999, Golder Associates, Inc. has been retained to assist in the environmental licensing (Site Certification) of a proposed power project. The proposed project would be located in the southwestern portion of Auburndale, Florida. The subject parcel (19.46 acres) is presently an orange grove, although it is overgrown and in decline. **Attachment A** contains a topographic map with a conceptual site plan and color site map for the Osprey Energy Center.

The proposed project is a 540 -MW combined-cycle power plant with heat-recovery steam generators using natural gas (not fuel oil) as an energy source. The site is located at Latitude 28° 02' 54" and Longitude 81° 47' 54". The northwest corner of the site has a State Plane Coordinate for Florida West Zone NAD 1988 of 17730.4190 for the easting and 1352804.0820 for the northing in US feet. The Universal Transverse Mercator (UTM) number is 17.421.3103.2 (zone 17 with an easting of 421 km and a northing of 3103.2 km.)

Ecologists conducted an environmental evaluation on the basis of a review of information available to the public and visits to the site. Tables of listed species are included as **Attachment B.** Golder employed ECO SEARCH and Florida Natural Areas Inventory to map listed species habitat and wetlands (related reports and maps are enclosed as **Attachment C.)**

Thank you for the referral to your office's web site. I'm sure it will prove to be most helpful. However, as Ms. Robinson mentioned in the phone conversation, due to the formal processes associated with approval of this project site, input from your office is necessary. Therefore, I am requesting your assistance with the following information:

- The location of any known endangered or threatened (listed) flora or fauna within or immediately adjacent to the delineated area,

- The location of any areas within the 8-km (5 mile) radius of the delineated area that are likely to contain endangered or threatened (listed) flora or fauna, and

An approval is requested at your earliest convenience. A response by February 25, 2000 would be appreciated. If you need additional information or have any questions, please call Betty Robinson, Susan Patton, or me at (813) 287-1717. Thank you for your assistance.

Sincerely,

Golder Associates Inc.

Richard A. Zwolak, AICP
Associate, Director of Environmental Planning

Attachments

cc: Clay Adams, Golder
David Dee, Landers and Parsons
John Niland, Calpine
Paul Barnett, Calpine

993-9570/Landuse/SCAssp/Letters SHPO etc/Endangered LTR

Golder Associates Inc.

5405 West Cypress Street, Suite 215
Tampa, FL 33607
Telephone (813) 287-1717
Fax (813) 287-1716

February 14, 2000

Mr. Isaac Chandler
Florida Fish and Wildlife Conservation Commission
Wildlife Division
3900 Drane Field Road
Lakeland, FL 33811

RE: Request for Concurrence of No Significant Impact for
Listed Species or Critical Listed Species Habitat
Osprey Energy Center (located in Section 15, Township 28, Range 25E)
Auburndale, Florida

Dear Mr. Chandler:

The purpose of this letter is to request that your office concur with our determination that the above referenced project will not significantly impact listed species or their habitat. This review included an area of 8-kms (5-miles) from the proposed power plant exhaust stacks on the site.

Golder Associates, Inc. has been retained to assist in the environmental licensing (Site Certification) of a proposed power project. The proposed project would be located in the southwestern portion of Auburndale, Florida. The subject parcel (19.46 acres) is presently an orange grove, although it is overgrown and in decline. **Attachment A** contains a topographic map with a conceptual site plan and color site map for the Osprey Energy Center.

The proposed project is a 540-MW combined-cycle power plant with heat-recovery steam generators using natural gas (not fuel oil) as an energy source. The site is located at Latitude 28° 03' 09" and Longitude 81° 48' 30". The northwest corner of the site has a State Plane Coordinate for Florida West Zone NAD 1988 of 17730.4190 for the easting and 1352804.0820 for the northing in US feet. The Universal Transverse Mercator (UTM) number is 17.421.3103.2 (zone 17 with an easting of 421 km and a northing of 3103.2 km.)

Ecologists conducted an environmental evaluation on the basis of a review of information available to the public and visits to the site. Tables of listed species are included as **Attachment B.** Golder employed ECO SEARCH and Florida Natural Areas Inventory to map listed species habitat and wetlands (related reports and maps are enclosed as **Attachment C.)**

Due to the formal processes associated with approval of this project site, input from your office is necessary. Therefore, I am requesting your assistance with the following information:

- The location of any known endangered or threatened (listed) flora or fauna within or immediately adjacent to the delineated area.

- The location of any areas within the 8-km (5 mile) radius of the delineated area that are likely to contain endangered or threatened (listed) flora or fauna.

An approval is requested at your earliest convenience. A response by March 3, 2000 would be appreciated. If you need additional information or have any questions, please call Betty Robinson, Susan Patton, or me at (813) 287-1717. Thank you for your assistance.

Sincerely,

Golder Associates Inc.

Richard A. Zwolak, AICP
Associate, Director of Environmental Planning

Attachments

cc: David Dee, Landers and Parsons
John Niland, Calpine
Paul Barnett, Calpine

993-9570/Landuse/SCAssp/Letters SHPO etc/Endangered-FL LTR

RESOLUTION NO. 2000-02

A RESOLUTION PROPOSING AN AMENDMENT TO THE FUTURE LAND USE MAP OF THE COMPREHENSIVE PLAN OF THE CITY OF AUBURNDALE, FLORIDA AND TRANSMITTING SUCH PROPOSED AMENDMENT TO THE FLORIDA DEPARTMENT OF COMMUNITY AFFAIRS FOR STATE REVIEW (General Location: Derby Avenue, West, adjacent to Auburndale Memorial Park).

WHEREAS, the City Commission adopted Ordinance No. 752, the Comprehensive Plan, including a Future Land Use Map; and

WHEREAS, a petition for an amendment to the City of Auburndale's Comprehensive Plan and Future Land Use Map has been requested by Mr. Donald E. Hemphill for a nineteen (19) acre parcel of property within the City's corporate limits; and

WHEREAS, the aforementioned proposed amendment is required to be transmitted to and reviewed by the Florida Department of Community Affairs in accordance with Chapter 163, Florida Statutes; and

WHEREAS, the Local Planning Agency, at an advertised Public Hearing, has reviewed and heard public input and recommended that the City Commission amend the Future Land Use Map; and

WHEREAS, the City Commission of the City of Auburndale, Florida, has held a Transmittal Public Hearing in accordance with Florida Statute Chapter 163.3184(15)(b), paragraph 1, concerning the proposed amendment; and

WHEREAS, in exercise of its authority, the City Commission of the City of Auburndale, Florida has determined it necessary and desirable to amend the Future Land Use Map contained in the Comprehensive Plan and adopted by Ordinance No. 752, consistent with the public interest within Auburndale, Florida.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COMMISSION OF THE CITY OF AUBURNDALE, FLORIDA:

1. The proposed amendment to the Future Land Use Map of the Auburndale Comprehensive Plan is identified and shown on Exhibit "A," which is attached hereto and made a part of this Resolution.

2. The legal description of the property proposed for amendment to the Future Land Use Map of the Auburndale Comprehensive Plan is as follows:

LEGAL DESCRIPTION:

The West one-half of the Northwest 1/4 of the Northwest 1/4 of Section 15, Township 28, Range 25 East, Polk County, Florida, subject to road rights of way over the North and South sides thereof.

3. The City of Auburndale hereby transmits said proposal, which amends the Auburndale Future Land Use Map of the Comprehensive Plan, to the Florida Department of Community Affairs for review.

INTRODUCED, PASSED AND DULY ADOPTED by the City Commission of the City of Auburndale, Florida, meeting in Regular Session this 21st day of February, 2000.

CITY COMMISSION
OF AUBURNDALE, FLORIDA

By: _____
MAYOR

ATTEST:

By: _____
CITY CLERK

LEGAL IN FORM AND VALID IF ENACTED

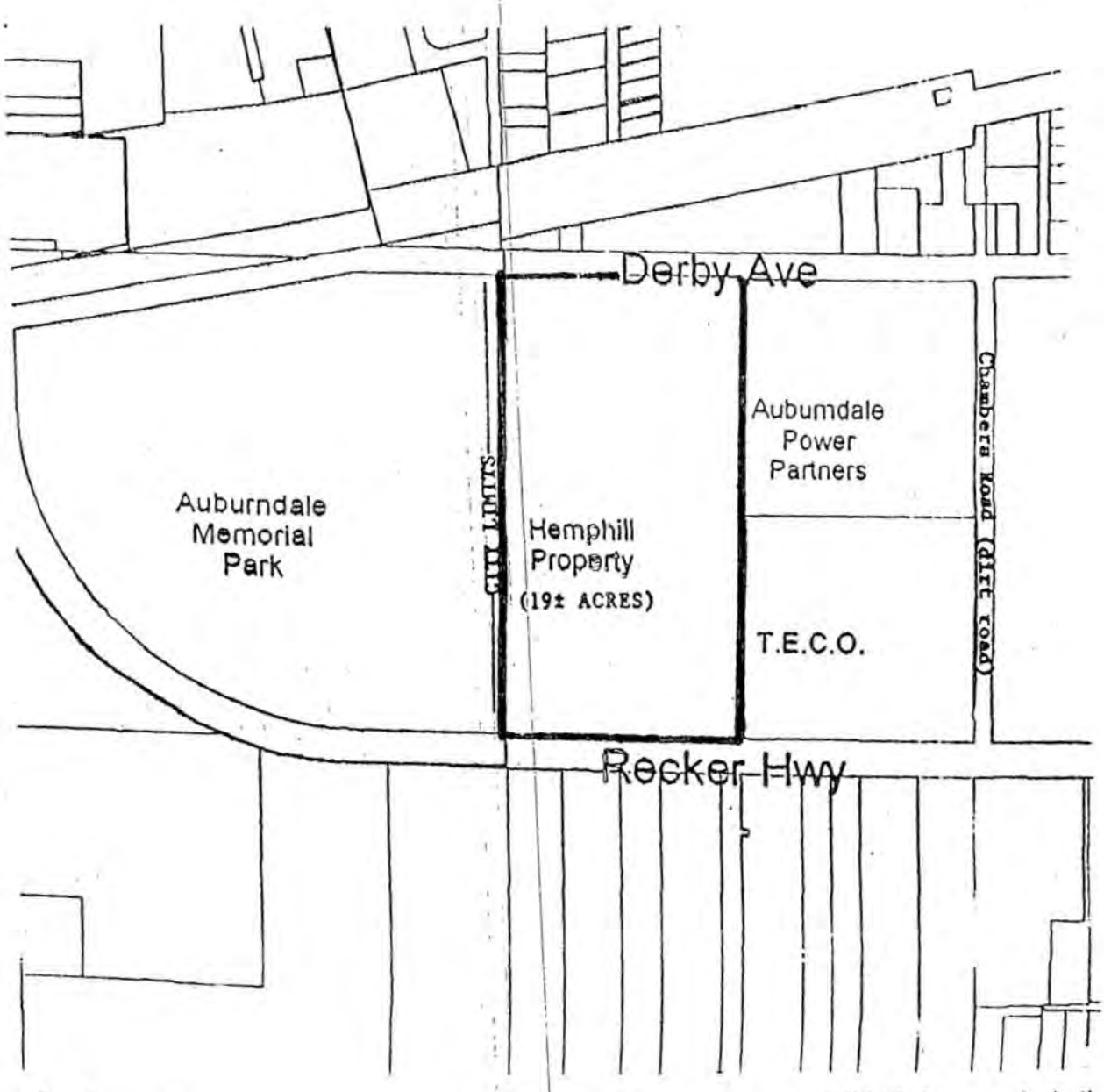
By: _____
CITY ATTORNEY

C:\Auburndale\City Files\City\Planning\Future Land Use Map Amendment--Large Scale\Hemphill\Transmittal Resolution\Adoption Resolution, City Commission Meeting, Monday, February 21, 2000.wpd

Resolution No. 2000-02

EXHIBIT A

HEMPHILL PROPERTY
FUTURE LAND USE CLASSIFICATIONS



10.9 Soil Boring Logs

IMAGE QUALITY

AS YOU REVIEW THE NEXT FEW PAGES, PLEASE NOTE THAT THE ORIGINAL DOCUMENT WAS OF POOR QUALITY.

Golder Associates

Field Boring Log

DEPTH HOLE _____	JOB NO. 973-9570	PROJECT CALDWELL-ALBUQUERQUE			BORING NO. B-1
DEPTH SOIL DRILL _____	GA INSP. JD	DRILLING METHOD MUD ROTARY			SHEET 1 OF 1
DEPTH ROCK CORE _____	WEATHER SUNNY	DRILLING COMPANY HUSS			SURFACE ELEV. _____
NO. DIST. SA. ___ UD. SA. ___	TEMP. 58°	DRILL RIG BK 51	DRILLER _____		DATUM _____
DEPTH WL. 3.1'	HRS. PROD. 2	WT. SAMPLER HAMMER 140	DROP 30		STARTED 0740 (TIME) 11-18-99 (DATE)
TIME WL. 0755	HRS. DELAYED —	WT. CASING HAMMER _____	DROP _____		COMPLETED 0930 (TIME) 11-18-99 (DATE)

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0-5% "SOME" 12-30%
"LITTLE" 5-12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN. (FORCE)	REC. / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		12	1	DO	4-5-7-7	17/24	2	GRAY F SD, TR SI 0-6"
								LT. GRAY F SD 6"-6'
		10	2	DO	5-6-4-3	18/24	4	
5		8	3	DO	4-4-4-10	23/24	6	
		100	4	DO	10-50-50/5	12/17	8	VERY DK BR F SD, SM SI 6-7.5
								VERY PALE BR F SD, LI CL 7.5-9.5
		17	5	DO	12-10-7-8	15/24	10	LT GRAY TO YL BR F S, SM CL 9.5'-10'
10		15	6	DO	5-7-8-6	10/24	12	
		16	7	DO	8-8-8-7	24/24	14	LT GRAY TO YL BR F SD, TR CL
15		14	8	DO	7-7-7-8	15/24	16	LT GRAY F SD, LI CL
20		21	9	DO	9-14-13	15/18	20	WHITE F-SD, LI CL
25		10	10	DO	6-5-5	14/18	25	WHITE F-M SD, TR CL
30		13	11	DO	3-7-6	9/12	30	SAME
35		26	12	DO	12-17-9	6/18		VERY PALE BR F-M SD
40		2	13	DO	1-1-1	15/18		SAT. WHITE F-SD, TR CL
45		5	14	DO	2-2-3	17/18		SAME
50		4	15	DO	1-2-2	18/18		LT GRAY F SD, LI CL
55	SAT. WELL AT 50'	19	16	DO	7-7-12	14/18		GRAY F SD, TR CL, TR PHOSPHATE
	SCREEN TO 1'							

Golder Associates

Field Boring Log

DEPTH HOLE _____	JOB NO. 993-9570	PROJECT CALDINE - AUBURNDALE			BORING NO. B-1
DEPTH SOIL DRILL _____	GA INSP. JB	DRILLING METHOD HSA ROTARY			SHEET 1 OF 1
DEPTH ROCK CORE _____	WEATHER SUNNY	DRILLING COMPANY HJSS			SURFACE ELEV. _____
NO. DIST. SA. ___ UD. SA. ___	TEMP. 58°	DRILL RIG BK 51	DRILLER _____		DATUM _____
DEPTH WL. 3.1'	HRS. PROD. 2	WT. SAMPLER HAMMER 140	DROP 30		STARTED 0740 11-18-99 (TIME DATE)
TIME WL. 0755	HRS. DELAYED —	WT. CASING HAMMER _____	DROP _____		COMPLETED 0930 11-18-99 (TIME DATE)

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C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
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C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
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GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
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LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0 - 5% "SOME" 12 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

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		12	1	DO	4-5-7-7	17/24	2	GRAY F. SD, TR SI 0-6"
								LT. GRAY F SD 6"-6'
		10	2	DO	5-6-4-3	18/24	4	
5		8	3	DO	4-4-4-10	23/24	6	
		100	4	DO	10-50-50/5	12/17	8	VERY DK BR F SD, SM SI 6-7.5
								VERY PALE BR F SD, LI CL 7.5-9.5
		17	5	DO	13-10-7-8	15/24	10	LT GRAY TO DK BR FS, SM CL 9.5'-10'
10		15	6	DO	5-7-8-6	10/24	12	
		16	7	DO	8-9-8-7	24/24	14	LT GRAY TO DK BR F SD, TR CL
15		14	8	DO	7-7-7-8	15/24	16	LT GRAY F SD, LI CL
20		27	9	DO	9-14-13	15/18	20	WHITE F-SD, LI CL
25		10	10	DO	6-5-5	14/18	25	WHITE F-M SD, TR CL
30		13	11	DO	3-7-6	9/18	30	SAME
35		26	12	DO	12-17-9	6/18		VERY PALE BR F-M SD
40		2	13	DO	1-1-1	15/18		SAT. WHITE F-SD, TR CL
45		5	14	DO	2-2-3	17/18		SAME
50		4	15	DO	1-2-2	18/18		LT GRAY F SD, LI CL
55	SET WELL AT 50'	19	16	DO	7-7-12	14/18		GRAY F SD, SOME CL, TR PHOSPHATE
	SCREEN TO 1'							

Golder Associates

Field Boring Log

DEPTH HOLE ____	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE			BORING NO. B-1
DEPTH SOIL DRILL ____	GA INSP. JB	DRILLING METHOD MUD ROTARY			SHEET 1 OF 2
DEPTH ROCK CORE ____	WEATHER SUNNY	DRILLING COMPANY HUSS			SURFACE ELEV. ____
NO. DIST. SA. ✓ UD. SA. ____	TEMP. 74	DRILL RIG CK-51	DRILLER TONY		DATUM ____
DEPTH WL. ____	HRS. PROD. ____	WT. SAMPLER HAMMER 140 #	DROP 30"		STARTED 10:20 (TIME) 11-16-99 (DATE)
TIME WL. ____	HRS. DELAYED ____	WT. CASING HAMMER ____	DROP ____		COMPLETED 14:00 (TIME) 11-16-99 (DATE)

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK
BR	BROWN
C	COARSE
CA	CASING
CL	CLAY
CLY	CLAYEY
F	FINE
FRAG	FRAGMENTS
GL	GRAVEL
LYD	LAYERED
LI	LITTLE
M	MEDIUM
MIC	MICACEOUS
MOT	MOTTLED
NP	NON-PLASTIC
OG	ORANGE
ORG	ORGANIC
PH	PRESSURE-HYDRAULIC
PM	PRESSURE-MANUAL
R	RED
RES	RESIDUAL
RX	ROCK
SA	SAMPLE
SAT	SATURATED
SD	SAND
SI	SILT
SLY	SILTY
SM	SOME
TR	TRACE
WL	WATER LEVEL
WH	WEIGHT OF HAMMER
Y	YELLOW

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		15	1	DO	7-8-7-8	22/24		DK GRAY F SD TR SI 0-6"
		19	2	DO	9-9-10-9	17/24		GRAY F SD TR SI 6"-2'
5		16	3	DO	4-8-8-7	13/24		LT GRAY F-SD 2'-8
		11	4	DO	2-3-8-13	12/24		
		100	5	DI	25-50/5	12/12		DK GR & BR F SD SM SI —
10								
		100	6	DO	45-50/4	9/10		LT GR F SD, LI CL
15								
		49	7	DO	19-21-23	15/18		WHITE F SD, LI CL
20								
		45	8	DO	19-22-23	15/18		VERY PALE BR F SD, LI CL, TR PHOSPHATE
25								
		16	9	DO	6-7-9	13/18		VERY PALE BR F SD, TR CL
30								
		35	10	DO	11-16-19	10/18		LT GRAY F-M SD
35								
		9	11		3-4-5	17/18		WHITE F SD, SM CL (SAT)
40								
		7	12		3-3-4	15/18		"SAME"
45								
		8	13		3-3-5	13/18		"SAME"
50								
		37	14		10-15-22			GRAY F SD, SM CL
55								

Golder Associates

Field Boring Log

DEPTH HOLE ____	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE		BORING NO. B-2	
DEPTH SOIL DRILL ____	GA. INSP. JB	DRILLING METHOD MUD ROTARY		SHEET 1 OF 2	
DEPTH ROCK CORE ____	WEATHER SUNNY	DRILLING COMPANY HUSS		SURFACE ELEV. ____	
NO. DIST. SA. ✓ UD. SA. ____	TEMP. 74	DRILL RIG BK-51	DRILLER TONY	DATUM ____	
DEPTH WL. ____	HRS. PROD. ____	WT. SAMPLER HAMMER 140 lbs	DROP 30"	STARTED 1020 / 11-16-99 (TIME / DATE)	
TIME WL. ____	HRS. DELAYED ____	WT. CASING HAMMER ____	DROP ____	COMPLETED 1400 / 11-16-99 (TIME / DATE)	

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0 - 10% "SOME" 13 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		15	1	DO	7-8-7-8	22/24		DK GRAY F SD SI SI 0-6"
								GRAY F SD TR SI 6"-2'
		19	2	DO	9-9-10-9	17/24		
-5		16	3	DO	4-8-9-7	13/24		LT GRAY F SD 4'-8
		11	4	DO	3-3-8-13	14/24		
		100	5	DO	25-50/5"	12/12		DK GR & BR F SD, SM SI —
-10								
		100	6	DO	45-50/4	9/10		LT GR F SD, LI CL
-15								
		49	7	DO	19-21-23	15/18		WHITE F SD, LI CL
-20								
		45	8	DO	19-22-23	15/18		VERY PALE BR F SD, LI CL, TR PHOSPHATE
-25								
		16	9	DO	6-7-9	13/18		VERY PALE BR F SD, TR CL
-30								
		35	10	DO	11-16-19	10/18		LT GRAY F-M SD
-35								
		9	11		3-4-5	17/18		WHITE F SD, SM CL (SAT)
-40								
		7	12		3-3-4	10/18		"SAME"
-45								
		8	13		3-3-5	18/18		"SAME"
-50								
		37	14		10-15-22			GRAY F SI, SM CL
-55								

Golder Associates

Field Boring Log

DEPTH HOLE ____	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE			BORING NO. B3-2
DEPTH SOIL DRILL ____	GA INSP. ____	DRILLING METHOD ____			SHEET 2 OF 2
DEPTH ROCK CORE ____	WEATHER ____	DRILLING COMPANY HUSS			SURFACE ELEV. ____
NO. DIST. SA. ____ UD. SA. ____	TEMP. ____	DRILL RIG ____	DRILLER ____		DATUM ____
DEPTH WL. ____	HRS. PROD. ____	WT. SAMPLER HAMMER ____	DROP ____		STARTED ____ TIME / DATE
TIME WL. ____	HRS. DELAYED ____	WT. CASING HAMMER ____	DROP ____		COMPLETED ____ /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE	
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES	
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY	
COMPACT	CP	10-30	FIRM	FM	MOLDS	
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS	
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT	
			HARD	H	RESISTS THUMBNAIL	

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
60		100	15	DO	11-50/5"	11/11		LT GRAY F SD & CL, TR PHOSPHATE
	PLACE ROLLER BIT @ 60' HARD DRILLING @ 63'	100	16	DO	50/1"	1/1		LT GRAY CEMENTED F SD, TR CL, TR PHOS
65	VERY HARD DRILLING @ 66'	100	17	DO	25-50/5"	11/11		DK GRAY F-SD, SM CL
70	DRILLING VARIES FROM NORMAL TO HARD TO 90'	54	18	DO	17-20-34	13/13		"SAME"
75		100	19	DO	12-50/2"	8/8		DK GRAY & GRAY F-SD, SM CL, TR PHOSPHATE
80		100	20	DO	49-50/4"	10/10		DK GRAY F-SD, SM CL
85		100	21	DO	50/1"	1/1		WHITE F-SD & CL, SM RX FRAG
90								

Golder Associates

Field Boring Log

DEPTH HOLE	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE		BORING NO. B-2	
DEPTH SOIL DRILL	GA INSP.	DRILLING METHOD		SHEET 2 OF 2	
DEPTH ROCK CORE	WEATHER	DRILLING COMPANY HUSS		SURFACE ELEV.	
NO. DIST. SA. UD. SA.	TEMP.	DRILL RIG	DRILLER	DATUM	
DEPTH WL.	HRS. PROD.	WT. SAMPLER HAMMER	DROP	STARTED TIME / DATE	
TIME WL.	HRS. DELAYED	WT. CASING HAMMER	DROP	COMPLETED /	

SAMPLE TYPES

A.S.	AUGER SAMPLE	BL	BLACK
C.S.	CHUNK SAMPLE	BR	BROWN
D.O.	DRIVE OPEN	C	COARSE
D.S.	DENISON SAMPLE	CA	CASING
P.S.	PITCHER SAMPLE	CL	CLAY
R.C.	ROCK CORE	CLY	CLAYEY
S.T.	SLOTTED TUBE	F	FINE
T.O.	THIN-WALLED, OPEN	FRAG	FRAGMENTS
T.P.	THIN-WALLED, PISTON	GL	GRAVEL
W.S.	WASH SAMPLE	LYD	LAYERED
		LI	LITTLE

ABBREVIATIONS

M	MEDIUM	SA	SAMPLE
MIC	MICACEOUS	SAT	SATURATED
MOT	MOTTLED	SD	SAND
NP	NON-PLASTIC	SI	SILT
OG	ORANGE	SIY	SILTY
ORG	ORGANIC	SM	SOME
PH	PRESSURE-HYDRAULIC	TR	TRACE
PM	PRESSURE-MANUAL	WL	WATER LEVEL
R	RED	WH	WEIGHT OF HAMMER
RES	RESIDUAL	Y	YELLOW
RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 to 5% "SOME" 12 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC. / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
60		100	15	DO	11-50/5"	11/11		LT GRAY F SD & CL, TR PHOSPHATE
	PLACED ROLLER BIT @ 60' HARD DRILLING @ 63'	100	16	DO	50/1"	1/1		LT GRAY CEMENTED F SD, TR CL, TR PHOS
65	VERY HARD DRILLING @ 66'	100	17	DO	25-50/5"	11/11		DK GRAY F-SD, SM CL
70	DRILLING VARIES FROM NORMAL TO HARD TO 90'	54	18	DO	17-20-34	10/12		"SAME"
75								
80		100	19	DO	12-50/2"	8/8		DK GRAY & GRAY F SD, SM CL, TR PHOSPHATE
85		100	20	DO	49-50/4"	10/10		DK GRAY F SD, SM CL
90		100	21	DO	50/1"	1/1		WHITE F SD & CL, SM RX FRAG

Golder Associates

Field Boring Log

DEPTH HOLE 60	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE			BORING NO. B-3
DEPTH SOIL DRILL 60	GA INSP. JB	DRILLING METHOD MUD ROTARY			SHEET 1 OF 2
DEPTH ROCK CORE —	WEATHER SUNNY	DRILLING COMPANY HUSS			SURFACE ELEV.
NO. DIST. SA. — UD. SA. —	TEMP. 78	DRILL RIG BK-51	DRILLER EDDIE		DATUM
DEPTH WL. 14.2	HRS. PROD. 1.5	WT. SAMPLER HAMMER 140	DROP 30		STARTED 1335 (TIME), 11-17-99 (DATE)
TIME WL. —	HRS. DELAYED -0-	WT. CASING HAMMER —	DROP —		COMPLETED 1800 (TIME), 11-17-99 (DATE)

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK
BR	BROWN
C	COARSE
CA	CASING
CL	CLAY
CLY	CLAYEY
F	FINE
FRAG	FRAGMENTS
GL	GRAVEL
LYD	LAYERED
LI	LITTLE
M	MEDIUM
MIC	MICACEOUS
MOT	MOTTLED
NP	NON-PLASTIC
OG	ORANGE
ORG	ORGANIC
PH	PRESSURE-HYDRAULIC
PM	PRESSURE-MANUAL
R	RED
RES	RESIDUAL
RX	ROCK
SA	SAMPLE
SAT	SATURATED
SD	SAND
SI	SILT
SIY	SILTY
SM	SOME
TR	TRACE
WL	WATER LEVEL
WH	WEIGHT OF HAMMER
Y	YELLOW

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0-5% "SOME" 12-30%
"LITTLE" 5-12% "AND" 30-50%

RELATIVE DENSITY	BLOWS	CONSISTENCY	FINGER PRESSURE
VERY LOOSE VLS	0-4	VERY SOFT VS	EXTRUDES
LOOSE LS	4-10	SOFT S	MOLDS EASILY
COMPACT CP	10-30	FIRM FM	MOLDS
DENSE DN	30-50	STIFF ST	THUMB INDENTS
VERY DENSE VDN	50	VERY STIFF VST	THUMBNAIL INDENT
		HARD H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		6	1	DO	4-3-4-2	23/24		DK GRAY F SD, SM SI, 0-6"
								PALE BR F SD 6"
		2	2	DO	2-1-1-2	18/24		
5		4	3	DO	2-2-2-3	16/24		VERY PALE BR F-S 4'-7'
		6	4	DO	2-3-3-5	15/24		R. I YL BR CL, SM FS 7'-10"
		30	5	DO	9-10-20-40	20/24		
10								
		14	6	DO	6-7-7	14/18		R I YL BR F. SD
15								
		33	7	DO	8-16-17	12/18		PALE BR I Y. BR F-M SD, LI CL
20								
		32	8	DO	12-16-16	14/18		WHITE F-M SD, TR CL
25								
		12	9	DO	4-6-6	9/18		LT GRAY F-M SD, TR CL
30								
		24	10	DO	7-10-14	10/18		PALE BR F-M SD
35								
		3	11	DO	2-1-2	16/18		SAT. WHITE F. SD, LI CL
40								
		9	12	DO	3-3-3	18/18		SAME
45								
		9	13	DO	4-6-3	15/18		SAME
50								
		8	14	DO	2-3-5	18/18		LT GRAY F-SD, SM CL
55								

Golder Associates

Field Boring Log

DEPTH HOLE 60	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE		BORING NO. B-3	
DEPTH SOIL DRILL 60	GA INSP. JB	DRILLING METHOD MUD ROTARY		SHEET 1 OF 2	
DEPTH ROCK CORE —	WEATHER PT CLOUDY	DRILLING COMPANY HUSS		SURFACE ELEV.	
NO. DIST. SA. — UD. SA. —	TEMP. 78	DRILL RIG BK-51	DRILLER EDDIE	DATUM	
DEPTH WL. 14.2	HRS. PROD. 1.5	WT. SAMPLER HAMMER 140	DROP 30	STARTED 1335 / 11-17-99 (TIME / DATE)	
TIME WL. —	HRS. DELAYED -0-	WT. CASING HAMMER —	DROP —	COMPLETED 1500 / 11-17-99 (TIME / DATE)	

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0-5% "SOME" 12-30%
"LITTLE" 5-12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE	
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES	
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY	
COMPACT	CP	10-30	FIRM	FM	MOLDS	
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS	
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT	
			HARD	H	RESISTS THUMBNAIL	

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		6	1	DO	4-2-4-2	23/24		DK GRAY F SD, SM SI. 0-6"
								PALE BR F SD 6"
		2	2	DO	2-1-1-2	18/24		
5		4	3	DO	2-2-2-3	16/24		VERY PALE BR F-S 4'-7'
		6	4	DO	2-3-3-5	15/24		R. I YL BR CL, SM FS 7'-10'
		30	5	DO	9-10-20-40	20/24		
10								
		14	6	DO	6-7-7	14/18		R I YL BR F SD
15								
		33	7	DO	8-16-17	12/18		PALE BR I YL BR F-M SD, LI CL
20								
		32	8	DO	12-16-16	14/18		WHITE F-M SD, TR CL
25								
		16	9	DO	4-6-6	9/18		LT GRAY F-M SD, TR CL
30								
		24	10	DO	7-10-14	10/18		PALE BR F-M SD
35								
		3	11	DO	2-1-2	16/18		SAT. WHITE F SD, LI CL
40								
		9	12	DO	3-3-3	18/18		SAME
45								
		9	13	DO	4-6-3	15/18		SAME
50								
		9	14	DO	2-3-5	18/18		LT GRAY F-SD, SM CL
55								

Golder Associates

Field Boring Log

DEPTH HOLE	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE		BORING NO. B-3	
DEPTH SOIL DRILL	GA INSP.	DRILLING METHOD		SHEET 2 OF	
DEPTH ROCK CORE	WEATHER	DRILLING COMPANY HUSS		SURFACE ELEV.	
NO. DIST. SA. UD. SA.	TEMP.	DRILL RIG	DRILLER	DATUM	
DEPTH WL.	HRS. PROD.	WT. SAMPLER HAMMER	DROP	STARTED TIME / DATE	
TIME WL.	HRS. DELAYED	WT. CASING HAMMER	DROP	COMPLETED /	

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50.	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC. / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
60		23	15	DO	5-11-17	18/18		DK GRAY F SS & CL, TR PHOSPHATE
	piezom PZ-2 set to 55' TD., screened to 12' b/s.							

Golder Associates

Field Boring Log

DEPTH HOLE	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE		BORING NO. B-3
DEPTH SOIL DRILL	GA INSP.	DRILLING METHOD		SHEET 2 OF
DEPTH ROCK CORE	WEATHER	DRILLING COMPANY HUSS		SURFACE ELEV.
NO. DIST. SA. UD. SA.	TEMP.	DRILL RIG	DRILLER	DATUM
DEPTH WL.	HRS. PROD.	WT. SAMPLER HAMMER	DROP	STARTED TIME / DATE
TIME WL.	HRS. DELAYED	WT. CASING HAMMER	DROP	COMPLETED /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0-5% "SOME" 12-30%
"LITTLE" 5-12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50+	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. DEPTH	DESCRIPTION	BLOWS/FT		SAMPLES NO.	SAMPLES TYPE	SAMPLES HAMM. BLOWS PER 6 IN (FORCE)	SAMPLES REC./ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
60		29		15	DO	5-11-17	18/18		DK Gray F SS & CL, TR PHOSPHATE
	pizom PZ-2 Set to 55' TD., screened to 12' b/s,								

Golder Associates

Field Boring Log

DEPTH HOLE 40	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE			BORING NO. B-4
DEPTH SOIL DRILL 40	GA INSP. JB	DRILLING METHOD MUD ROTARY			SHEET 1 OF 2
DEPTH ROCK CORE 0	WEATHER SUNNY	DRILLING COMPANY HUSS			SURFACE ELEV.
NO. DIST. SA. ✓ UD. SA.	TEMP. 60	DRILL RIG DK-51	DRILLER EDDIE		DATUM
DEPTH WL.	HRS. PROD. 3	WT. SAMPLER HAMMER 140#	DROP 30"		STARTED 0920 (TIME) 11-17-99 (DATE)
TIME WL.	HRS. DELAYED —	WT. CASING HAMMER	DROP		COMPLETED 1245 (TIME) 11-17-99 (DATE)

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0 - 5% "SOME" 12 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC. / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		5	1	DO	2-2-3-2	19/24		DK GRAY F. SD, LI SI 0-6"
								PALE BR F SD 6"-4
		4	2	DO	2-2-2-2	16/24		
5		9	3	DO	3-3-5-6	12/24		VERY PALE BR F. SD 4"-7.5
		16	4	DO	8-8-8-9	12/24		RED & YL BR CL AND F SD 7.5"-
		28	5	DO	6-10-18-14	15/24		
10								
		9	6	DO	3-3-3	10/18		Y. BR & R. F SD, TR CL
15								
		26	7	DO	8-12-14	14/18		GRAY & Y. BR F-M SD, TR CL
20								
		35	8	DO	12-19-16	12/18		GRAY & Y. BR F-M SD, LI CL
25								
		15	9	DO	5-6-9	9/18		PALE BR. F-M SD.
30								
		29	10	DO	8-11-18	11/18		"SAME"
35								
		3	11	DO	4-1-2	18/18		SAT WHITE F. SD SM CL
40								
		5	12	DO	2-2-3	18/18		" SAME"
45								
		5	13	DO	3-3-2	18/18		" SAME"
50								
		5	14	DO	2-2-3	15/18		SAT LT GRAY F SD & CL
55								

Golder Associates

Field Boring Log

DEPTH HOLE 40	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE			BORING NO. B-4
DEPTH SOIL DRILL 90	GA INSP. JB	DRILLING METHOD MUD ROTARY			SHEET 1 OF 2
DEPTH ROCK CORE 0	WEATHER SUNNY	DRILLING COMPANY HUSS			SURFACE ELEV.
NO. DIST. SA. ✓ UD. SA.	TEMP. 60	DRILL RIG BK-51	DRILLER EDDIE		DATUM
DEPTH WL.	HRS. PROD. 3	WT. SAMPLER HAMMER 140#	DROP 30"		STARTED 0920 TIME 11-17-99 DATE
TIME WL.	HRS. DELAYED —	WT. CASING HAMMER	DROP		COMPLETED 12:25 TIME 11-17-99 DATE

SAMPLE TYPES

A.S.	AUGER SAMPLE	BL	BLACK
C.S.	CHUNK SAMPLE	BR	BROWN
D.O.	DRIVE OPEN	C	COARSE
D.S.	DENISON SAMPLE	CA	CASING
P.S.	PITCHER SAMPLE	CL	CLAY
R.C.	ROCK CORE	CLY	CLAYEY
S.T.	SLOTTED TUBE	F	FINE
T.O.	THIN-WALLED, OPEN	FRAG	FRAGMENTS
T.P.	THIN-WALLED, PISTON	GL	GRAVEL
W.S.	WASH SAMPLE	LYD	LAYERED
		LI	LITTLE

ABBREVIATIONS

M	MEDIUM	SA	SAMPLE
MIC	MICACEOUS	SAT	SATURATED
MOT	MOTTLED	SD	SAND
NP	NON-PLASTIC	SI	SILT
OG	ORANGE	SIY	SILTY
ORG	ORGANIC	SM	SOME
PH	PRESSURE-HYDRAULIC	TR	TRACE
PM	PRESSURE-MANUAL	WL	WATER LEVEL
R	RED	WH	WEIGHT OF HAMMER
RES	RESIDUAL	Y	YELLOW
RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0-5% "SOME" 12-30%
"LITTLE" 5-12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE	
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES	
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY	
COMPACT	CP	10-30	FIRM	FM	MOLDS	
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS	
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT	
			HARD	H	RESISTS THUMBNAIL	

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		5	1	DO	2-2-3-2	19/24		LT GRAY F. SD, LI SI 0-6"
								PALE BR F SD 6"-4'
		4	2	DO	2-2-2-2	16/24		
5		9	3	DO	3-3-5-6	12/24		VERY PALE BR F. SD 4"-7.5'
		16	4	DO	8-8-8-8	12/24		RED & YL BR CL AND F SD 7.5'-
		28	5	DO	6-10-18-14	15/24		
10								
		9	6	DO	3-3-3	10/18		Y. BR & R. F. SD, TR CL
15								
		26	7	DO	8-12-14	14/18		GRAY & Y. BR F-M SD, TR CL
20								
		35	8	DO	12-19-16	12/18		GRAY & Y. BR F-M SD, LI CL
25								
		15	9	DO	5-6-9	9/18		PALE BR. F-M SD.
30								
		29	10	DO	8-11-18	11/18		"SAME"
35								
		3	11	DO	4-1-2	18/18		SAT WHITE F. SD SM CL
40								
		5	12	DO	2-2-3	18/18		"SAME"
45								
		5	13	DO	3-3-2	18/18		"SAME"
50								
		5	14	DO	2-2-3	15/18		SAT LT GRAY F SD & CL
55								

Golder Associates

Field Boring Log

DEPTH HOLE	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE		BORING NO. B-4	
DEPTH SOIL DRILL	GA INSP.	DRILLING METHOD		SHEET 2 OF 2	
DEPTH ROCK CORE	WEATHER	DRILLING COMPANY HUSS		SURFACE ELEV.	
NO. DIST. SA. UD. SA.	TEMP.	DRILL RIG	DRILLER	DATUM	
DEPTH WL.	HRS. PROD.	WT. SAMPLER HAMMER	DROP	STARTED TIME / DATE	
TIME WL.	HRS. DELAYED	WT. CASING HAMMER	DROP	COMPLETED /	

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		16	15	DO	6-8-8	6/18		DK GRAY F SD, SM CL, TR PHOSPHATE
60								
		48	16	DO	8-16-32	18/18		DK GRAY F SD, SM CL, TR PHOSPHATE
65								
		57	17	DO	3-7-50	18/18		"SAME"
70								
		50	18	DO	15-17-33	17/18		LT GRAY & GRAY F SD, SM CL, TR PHOSPHATE
75	PUT ON ROLLER BIT @ 75'							
		64	19	DO	15-22-42	18/19		"SAME"
80	HARD DRILLING @ 82'							
		100	20	DO	50/5"	5/5		LT GRAY F. SD & CL, TR PHOSPHATE
85								
		100		DO	50/3"	2/3'		RX FRAG
90								

Golder Associates

Field Boring Log

DEPTH HOLE	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE		BORING NO. B-4	
DEPTH SOIL DRILL	QA INSP.	DRILLING METHOD		SHEET 2 OF 2	
DEPTH ROCK CORE	WEATHER	DRILLING COMPANY HUSS		SURFACE ELEV.	
NO. DIST. SA. UD. SA.	TEMP.	DRILL RIG	DRILLER	DATUM	
DEPTH WL.	HRS. PROD.	WT. SAMPLER HAMMER	DROP	STARTED TIME / DATE	
TIME WL.	HRS. DELAYED	WT. CASING HAMMER	DROP	COMPLETED /	

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK
BR	BROWN
C	COARSE
CA	CASING
CL	CLAY
CLY	CLAYEY
F	FINE
FRAG	FRAGMENTS
GL	GRAVEL
LYD	LAYERED
LI	LITTLE
M	MEDIUM
MIC	MICACEOUS
MOT	MOTTLED
NP	NON-PLASTIC
OG	ORANGE
ORG	ORGANIC
PH	PRESSURE-HYDRAULIC
PM	PRESSURE-MANUAL
R	RED
RES	RESIDUAL
RX	ROCK
SA	SAMPLE
SAT	SATURATED
SD	SAND
SI	SILT
SIY	SILTY
SM	SOME
TR	TRACE
WL	WATER LEVEL
WH	WEIGHT OF HAMMER
Y	YELLOW

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 5% "SOME" 12 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
60		16	15	DO	6-8-8	6/18		DK GRAY F SD, SM CL, TR PHOSPHATE
65		48	16	DO	8-16-32	18/18		DK GRAY F SD, SM CL, TR PHOSPHATE
70		57	17	DO	3-7-50	18/18		"SAME"
75		50	18	DO	15-17-33	17/18		LT GRAY & GRAY F SD, SM CL, TR PHOSPHATE
80	PUT ON ROLLER BIT @ 75'	64	19	DO	15-22-42	18/19		"SAME"
85	HARD DRILLING @ 82'	100	20	DO	50/5"	5/5		LT GRAY F SD & CL, TR PHOSPHATE
90		100		DO	50/3"	2/3"		RX FRAG

Golder Associates

Field Boring Log

DEPTH HOLE 90	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE			BORING NO. B-5
DEPTH SOIL DRILL 90	GA INSP. JB	DRILLING METHOD MUD ROTARY			SHEET 1 OF 2
DEPTH ROCK CORE —	WEATHER PT CLOUDY	DRILLING COMPANY HUSS			SURFACE ELEV.
NO. DIST. SA. ✓ UD. SA. —	TEMP. 79	DRILL RIG BK-51	DRILLER EDDIE		DATUM
DEPTH WL. 14'	HRS. PROD. 3.5	WT. SAMPLER HAMMER 140	DROP 30"		STARTED 1445 / 11-18-99
TIME WL. —	HRS. DELAYED —	WT. CASING HAMMER	DROP		COMPLETED TIME 1815 DATE 11-19-99

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THINWALLED, OPEN
T.P.	THINWALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIV	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0-5% "SOME" 12-30%
"LITTLE" 5-12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC. / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		4	1	DO	2-2-2-2	24/24		DK GRAY F SD, LI SI 0-6"
								PALE BR F SD 6"-3'
		4	2	DO	1-2-2-2	14/24		VERY PALE F SD 3'-8'
5		4	3	DO	3-2-2-2	14/24		
		5	4	DO	3-2-3-4	16/24		
		7	5	DO	3-4-3-3	12/24		Y. BR TR P SD 9'-10'
10								
		16	6	DO	5-6-10	9/18		PALE BR F-M SD
15								
		30	7	DO	11-14-16	16/18		GRAY & L. BR. F SD & CL
20								
		31	8	DO	12-12-19	14/18		LT GRAY F-M SD, SM CL
25								
		8	9	DO	3-4-4	15/18		WHITE F SD, LI CL
30								
		10	10	DO	4-4-6	14/18		PALE BR F SD, TR CL
35								
		7	11	DO	10-4-3	8/18		WHITE F-M SD, SM CL
40								
		3	12	DO	1-2-1	16/18		SAT. WHITE F. SD, LI CL
45								
		5	13	DO	4-4-1	15/18		"SAME"
50								
		5	14	DO	2-2-3	17/18		LT GRAY F SD, SM CL
55								

Golder Associates

Field Boring Log

DEPTH HOLE 90	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE			BORING NO. B-5
DEPTH SOIL DRILL 90	GA INSP. JB	DRILLING METHOD MUD ROTARY			SHEET 1 OF 2
DEPTH ROCK CORE —	WEATHER PT CLOUDY	DRILLING COMPANY HUSS			SURFACE ELEV.
NO. DIST. SA. ✓ UD. SA. —	TEMP. 79	DRILL RIG BK-51	DRILLER EDDIE		DATUM
DEPTH WL. 14'	HRS. PROD. 3.5	WT. SAMPLER HAMMER 140	DROP 30"		STARTED 1445 / 11-18-99
TIME WL. —	HRS. DELAYED —	WT. CASING HAMMER —	DROP —		COMPLETED TIME 1815 DATE 11-19-99

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 to 5% "SOME" 12 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY	BLOWS	CONSISTENCY	FINGER PRESSURE
VERY LOOSE VLS	0 4	VERY SOFT VS	EXTRUDES
LOOSE LS	4 10	SOFT S	MOLDS EASILY
COMPACT CP	10-30	FIRM FM	MOLDS
DENSE DN	30 50	STIFF ST	THUMB INDENTS
VERY DENSE VDN	50	VERY STIFF VST	THUMBNAIL INDENT
		HARD H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC. / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		4	1	DO	2-2-2-2	12/24		DK GRAY F SD, LI SI 0-6"
								PALE BR F SD 6"-2'
		4	2	DO	1-2-2-2	14/24		VERY PALE F SD 2'-8'
5		4	3	DO	3-2-2-2	14/24		
		5	4	DO	3-2-3-4	16/24		
		7	5	DO	3-4-3-3	12/24		Y BR TR F SD 9'-10'
10								
		16	6	DO	5-6-10	9"/18		PALE BR F-M SD
15								
		30	7	DO	11-14-16	16/18		GRAY F LT BR F SD TR CL
20								
		31	8	DO	12-12-19	14/18		LT GRAY F-M SD, SM CL
25								
		8	9	DO	3-4-4	15/18		WHITE F SD, LI CL
30								
		10	10	DO	4-4-6	14/18		PALE BR F SD, TR CL
35								
		7	11	DO	10-4-3	8/18		WHITE F-M SD, SM CL
40								
		3	12	DO	1-2-1	16/18		SAT. WHITE F. SD, LI CL
45								
		5	13	DO	4-4-1	15/18		"SAME"
50								
		5	14	DO	2-2-3	17/18		LT GRAY F SD, SM CL
55								

Golder Associates

Field Boring Log

DEPTH HOLE _____	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE			BORING NO. B3-5
DEPTH SOIL DRILL _____	GA INSP. _____	DRILLING METHOD _____			SHEET 2 OF 2
DEPTH ROCK CORE _____	WEATHER _____	DRILLING COMPANY HUSS			SURFACE ELEV. _____
NO. DIST. SA. ___ UD. SA. ___	TEMP. _____	DRILL RIG _____	DRILLER _____		DATUM _____
DEPTH WL. _____	HRS. PROD. _____	WT. SAMPLER HAMMER _____	DROP _____		STARTED ____ / ____ (TIME / DATE)
TIME WL. _____	HRS. DELAYED _____	WT. CASING HAMMER _____	DROP _____		COMPLETED ____ / ____

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
O.O.	OPEN OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK
BR	BROWN
C	COARSE
CA	CASING
CL	CLAY
CLY	CLAYEY
F	FINE
FRAG	FRAGMENTS
GL	GRAVEL
LYD	LAYERED
LI	LITTLE
M	MEDIUM
MIC	MICACEOUS
MOT	MOTTLED
NP	NON-PLASTIC
OG	ORANGE
ORG	ORGANIC
PH	PRESSURE-HYDRAULIC
PM	PRESSURE-MANUAL
R	RED
RES	RESIDUAL
RX	ROCK
SA	SAMPLE
SAT	SATURATED
SD	SAND
SI	SILT
SIY	SILTY
SM	SOME
TR	TRACE
WL	WATER LEVEL
WH	WEIGHT OF HAMMER
Y	YELLOW

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0-5% "SOME" 12-30%
"LITTLE" 5-12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
60		19	15	SS	4-8-10	14/18		DK GRAY F SD, SM CL, TR PHOSPHATE
65		36	16	SS	6-9-27	18/18		DK GRAY F SD, SM CL, TR PHOSPHATE 64.5-65.5 DK GRAY F SD & CL 65.5-70.0
70		68	17	SS	15-21-47	18/18		GRAY CL & F SD (STIFF)
75		54	18	SS	25-27-27	18/18		LT GRAY CL & F SD, LI PHOSPHATE
90		72	19	SS	15-22-50	18/18		GRAY CL & F SD, LI PHOSPHATE
85	PUT ON ROLLER BIT HARD DRILLING FROM 92'	100	20	SS	17-47-50/4	16/16		"SAME"
90	GROUTED HOLE & BAGS	100	21	SS	9-21-50/1	11/13		GRAY CL, SM F SD, SM RF FRAG

Golder Associates

Field Boring Log

DEPTH HOLE	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE		BORING NO. B-5	
DEPTH SOIL DRILL	GA INSP.	DRILLING METHOD		SHEET 2 OF 2	
DEPTH ROCK CORE	WEATHER	DRILLING COMPANY HUSS		SURFACE ELEV.	
NO. DIST. SA. UD. SA.	TEMP.	DRILL RIG	DRILLER	DATUM	
DEPTH WL.	HRS. PROD.	WT. SAMPLER HAMMER	DROP	STARTED TIME / DATE	
TIME WL.	HRS. DELAYED	WT. CASING HAMMER	DROP	COMPLETED /	

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK
BR	BROWN
C	COARSE
CA	CASING
CL	CLAY
CLY	CLAYEY
F	FINE
FRAG	FRAGMENTS
GL	GRAVEL
LYD	LAYERED
LI	LITTLE
M	MEDIUM
MIC	MICACEOUS
MOT	MOTTLED
NP	NONPLASTIC
OG	ORANGE
ORG	ORGANIC
PH	PRESSURE HYDRAULIC
PM	PRESSURE MANUAL
R	RED
RES	RESIDUAL
RX	ROCK
SA	SAMPLE
SAT	SATURATED
SD	SAND
SI	SILT
SIY	SILTY
SM	SOME
TR	TRACE
WL	WATER LEVEL
WH	WEIGHT OF HAMMER
Y	YELLOW

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0 to 5% "SOME" 12 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
60		19	15	DO	4-8-10	14/18		DR GRAY F SD, SM CL, TR PHOSPHATE
65		36	16	DO	6-9-27	R/18		DK GRAY F SD, SM CL TR PHOSPHATE 74.5-75.5 DR GRAY F SD & CL 75.5-76.0
70		68	17	DO	15-21-47	18/18		GRAY CL & F. SD (STIFF)
75		54	18	DO	25-27-27	18/18		LT GRAY CL & F. SD, LI PHOSPHATE
80		72	19	DO	15-22-50	18/18		GRAY CL & F. SD, LI PHOSPHATE
85	PUT ON ROLLER BIT HARD DRILLING FROM 82'	100	20	DO	17-47-50/4	16/16		"SAME"
90	GROUTED HOLE & BAGS	100	21	DO	9-21-50/1	11/13		GRAY CL, SM F. SD, SM RX FRAG

Golder Associates

Field Boring Log

DEPTH HOLE 67	JOB NO. 993-5870	PROJECT CALPINE - AUBURNDALE			BORING NO. B-6
DEPTH SOIL DRILL 67	GA INSP. JB	DRILLING METHOD MUD ROTARY			SHEET 1 OF
DEPTH ROCK CORE —	WEATHER PT CLOUDY	DRILLING COMPANY HUSS			SURFACE ELEV.
NO. DIST. SA. ✓ UD. SA. —	TEMP. 67°	DRILL RIG BK-51	DRILLER GABIE		DATUM
DEPTH WL. —	HRS. PROD. 1.75	WT. SAMPLER HAMMER 140	DROP 30"		STARTED 0910 / 11-19-91 (TIME / DATE)
TIME WL. —	HRS. DELAYED —	WT. CASING HAMMER —	DROP —		COMPLETED 0955 / /

SAMPLE TYPES

A.S.	AUGER SAMPLE	BL	BLACK
C.S.	CHUNK SAMPLE	BR	BROWN
D.O.	DRIVE OPEN	C	COARSE
D.S.	DENISON SAMPLE	CA	CASING
P.S.	PITCHER SAMPLE	CL	CLAY
R.C.	ROCK CORE	CLY	CLAYEY
S.T.	SLOTTED TUBE	F	FINE
T.O.	THIN-WALLED, OPEN	FRAG	FRAGMENTS
T.P.	THIN-WALLED, PISTON	GL	GRAVEL
W.S.	WASH SAMPLE	LYD	LAYERED
		LI	LITTLE

ABBREVIATIONS

M	MEDIUM	SA	SAMPLE
MIC	MICACEOUS	SAT	SATURATED
MOT	MOTTLED	SD	SAND
NP	NON-PLASTIC	SI	SILT
OG	ORANGE	SIY	SILTY
ORG	ORGANIC	SM	SOME
PH	PRESSURE-HYDRAULIC	TR	TRACE
PM	PRESSURE-MANUAL	WL	WATER LEVEL
R	RED	WH	WEIGHT OF HAMMER
RES	RESIDUAL	Y	YELLOW
RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. DEPTH	DESCRIPTION	BLOWS/FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC/ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
5		12	1	DO	4-4-8	11/18		VERY PALE BR F. SD
10		16	2	DO	5-8-8	18/18		R. & GRAY CL AND F. SD
15		11	3	DO	6-5-6	11/18		R & GRAY F SD, SM CL
20		19	4	DO	6-8-10	12/18		R T Y. BL F-M SD, LI CL
25		19	5	DO	9-8-10	18/18		WHITE F-M SD.
30		33	6	DO	13-16-17	9/18		WHITE & PALE BR F-M SD
35		39	7	DO	13-16-23	10/18		PALE BR F-M SD
40		27	8	DO	10-9-15	9/18		PALE BR & WHITE F-M SD
45		5	9	DO	2-2-3	16/18		SAT. WHITE F-SD, SM CL
50		3	10	DO	3-2-1	16/18		"SAME"
55		4	11	DO	2-1-3	9/18		SAME

Golder Associates

Field Boring Log

DEPTH HOLE 67	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE			BORING NO. B-6
DEPTH SOIL DRILL 67	GA INSP. JB	DRILLING METHOD MUD ROTARY			SHEET 1 OF
DEPTH ROCK CORE —	WEATHER PT CLOUDY	DRILLING COMPANY HUSS			SURFACE ELEV.
NO. DIST. SA. ✓ UD. SA. —	TEMP. 67°	DRILL RIG BK-51	DRILLER EDDIE		DATUM
DEPTH WL. —	HRS. PROD. 1.75	WT. SAMPLER HAMMER 140	DROP 30"		STARTED 0910 TIME / 11-19-91 DATE
TIME WL. —	HRS. DELAYED —	WT. CASING HAMMER —	DROP —		COMPLETED 0955 TIME / DATE

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 to 5% "SOME" 12 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. DEPTH	DESCRIPTION	BLOWS/FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC/ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
5		12	1	DO	4-4-8	11/18		VERY PALE BR F. SD
10		16	2	DO	5-8-8	18/18		R. & GRAY CL AND F. SD
15		11	3	DO	6-5-6	11/18		R & GRAY F SD, SM CL
20		13	4	DO	6-8-10	12/18		R T Y. BL F-M SD, LI CL
25		19	5	DO	9-8-10	18/18		WHITE F-M SD
30		33	6	DO	13-16-17	9/18		WHITE & PALE BR F-M SD
35		39	7	DO	13-16-23	10/18		PALE BR F-M SD
40		27	8	DO	10-12-15	9/18		PALE BR & WHITE F-M SD
45		5	9	DO	2-2-3	16/18		SAT. WHITE F. SD, SM CL
50		3	10	DO	3-2-1	16/18		"SAME"
55		4	11	DO	2-1-3	9/18		SOME

Golder Associates

Field Boring Log

DEPTH HOLE	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE			BORING NO. B-6
DEPTH SOIL DRILL	GA INSP.	DRILLING METHOD			SHEET OF
DEPTH ROCK CORE	WEATHER	DRILLING COMPANY HUSS			SURFACE ELEV.
NO. DIST. SA. UD. SA.	TEMP.	DRILL RIG	DRILLER		DATUM
DEPTH WL.	HRS. PROD.	WT. SAMPLER HAMMER	DROP		STARTED TIME / DATE
TIME WL.	HRS. DELAYED	WT. CASING HAMMER	DROP		COMPLETED /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0-5% "SOME" 12-30%
"LITTLE" 5-12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC. / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
-860		13		12	DO	3-5-9	14/18		GRAY P SD, LT CL, TR PHOSPHATE
-865		11		13	DO	4-5-6	16/18	65	DK. GRAY P. SD & CL, TR PHOSPHATE
				14	TO		24	67	
-870				14					
20									
25									
30									
35									
40									
45									
50									
55									

Golder Associates

Field Boring Log

DEPTH HOLE ____	JOB NO. 793-9570	PROJECT CALPINE - AUBURNDALE			BORING NO. B-6
DEPTH SOIL DRILL ____	GA INSP. ____	DRILLING METHOD ____			SHEET ____ OF ____
DEPTH ROCK CORE ____	WEATHER ____	DRILLING COMPANY HUSS			SURFACE ELEV. ____
NO. DIST. SA. ____ UD. SA. ____	TEMP. ____	DRILL RIG ____	DRILLER ____		DATUM ____
DEPTH WL. ____	HRS. PROD. ____	WT. SAMPLER HAMMER ____	DROP ____		STARTED ____ / ____ (TIME / DATE)
TIME WL. ____	HRS. DELAYED ____	WT. CASING HAMMER ____	DROP ____		COMPLETED ____ / ____

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OR	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0 - 5% "SOME" 12 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY	BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS 0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS 4-10	SOFT	S	MOLDS EASILY
COMPACT	CP 10-30	FIRM	FM	MOLDS
DENSE	DN 30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN 50	VERY STIFF	VST	THUMBNAIL INDENT
		HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
60		13	12	DO	3-5-9	14/18		GRAY F SD, LT CL, TR PHOSPHATE
65		11	13	DO	4-5-6	16/18	65	DK. GRAY F. SD & CL, TR PHOSPHATE
			14	TO		24	67	
70			1-1					
20								
25								
30								
35								
40								
45								
50								
55								

Golder Associates

Field Boring Log

DEPTH HOLE 65	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE			BORING NO. B-7
DEPTH SOIL DRILL 65	QA INSP. TB	DRILLING METHOD MUD ROTARY			SHEET 1 OF 2
DEPTH ROCK CORE —	WEATHER SUNNY	DRILLING COMPANY HUSS			SURFACE ELEV.
NO. DIST. SA. 1 UD. SA. —	TEMP. 74	DRILL RIG CME-51	DRILLER EDDIE		DATUM
DEPTH WL. —	HRS. PROD. 4.5	WT. SAMPLER HAMMER 140	DROP 30		STARTED 1030 11-19-91
TIME WL. —	HRS. DELAYED 0.5	WT. CASING HAMMER —	DROP —		COMPLETED 2230 11-19-91

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0-5% "SOME" 12-30%
"LITTLE" 5-12% "AND" 30-50%

RELATIVE DENSITY	BLOWS	CONSISTENCY	FINGER PRESSURE
VERY LOOSE VLS	0-4	VERY SOFT VS	EXTRUDES
LOOSE LS	4-10	SOFT S	MOLDS EASILY
COMPACT CP	10-30	FIRM FM	MOLDS
DENSE DN	30-50	STIFF ST	THUMB INDENTS
VERY DENSE VDN	50	VERY STIFF VST	THUMBNAIL INDENT
		HARD H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC. / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		3	1	DO	1-1-2-3	14/24		DK GRN F SD, LI SI 0'-6"
								PALE BR F SD 6"-2'
		4	2	DO	2-2-2-2	16/24		
5		4	3	DO	2-2-2-3	14/24		VERY PALE BR F SD 2'-7.5'
		9	4	DO	4-4-5-6	15/24		R & Y. BR & GRN CL, SM SD
		26	5	DO	5-5-17-19	20/24		
10								
		12	6	DO	5-6-6	12/18		R & Y. BR F SD, LI CL
15								
		13	7	DO	4-7-6	9/18		WHITE F SD, LI CL
20								
		22	8	DO	9-10-12	10/18		WHITE & PALE BR F-M SD
25								
		20	9	DO	6-8-12	10/18		SAME
30								
		50	10	DO	16-21-29	9/18		PALE BR F SD
35								
		9	11	DO	6-5-4	13/18		WHITE F SD, LI CL
40								
		4	12	DO	2-2-2	18/19		SAT. WHITE F SD, SM CL
		4	13		3-1-3	17/18		"SAME"
50								
		9	14		3-3-5	16/18		LT GRAY F SD, TR CL
55								

Golder Associates

Field Boring Log

DEPTH HOLE 65	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE		BORING NO. B-7	
DEPTH SOIL DRILL 65	QA INSP. JB	DRILLING METHOD MUD ROTARY		SHEET 1 OF 2	
DEPTH ROCK CORE —	WEATHER SUNNY	DRILLING COMPANY HUSS		SURFACE ELEV.	
NO. DIST. SA. 1 UD. SA. —	TEMP. 74	DRILL RIG BK-51	DRILLER EDDIE	DATUM	
DEPTH WL. —	HRS. PROD. 4.5	WT. SAMPLER HAMMER 140	DROP 30	STARTED 1030 11-A-99	
TIME WL. —	HRS. DELAYED 0.5	WT. CASING HAMMER —	DROP —	COMPLETED 2300 11-19-99	

SAMPLE TYPES

A.B.	AUGER SAMPLE	BL	BLACK
C.S.	CHUNK SAMPLE	BR	BROWN
D.O.	DRIVE OPEN	C	COARSE
D.S.	DENISON SAMPLE	CA	CASING
P.S.	PITCHER SAMPLE	CL	CLAY
R.C.	ROCK CORE	CLY	CLAYEY
S.T.	SLOTTED TUBE	F	FINE
T.O.	THIN-WALLED, OPEN	FRAG	FRAGMENTS
T.P.	THIN-WALLED, PISTON	GL	GRAVEL
W.S.	WASH SAMPLE	LYD	LAYERED
		LI	LITTLE

ABBREVIATIONS

M	MEDIUM	SA	SAMPLE
MIC	MICACEOUS	SAT	SATURATED
MOT	MOTTLED	SD	SAND
NP	NON-PLASTIC	SI	SILT
OG	ORANGE	SIY	SILTY
OPG	ORGANIC	SM	SOME
PH	PRESSURE-HYDRAULIC	TR	TRACE
PM	PRESSURE-MANUAL	WL	WATER LEVEL
R	RED	WH	WEIGHT OF HAMMER
RES	RESIDUAL	Y	YELLOW
RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 10% "SOME" 12 - 30%
"LITTLE" 13 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC. / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		3	1	DO	1-1-2-3	14/24		DK GRAY F SD, LI SI 0-6"
								PALE BRN F SD 6"-21
		4	2	DO	2-2-2-2	16/24		
								VERY PALE BR F SD 2'-7.5
5		4	3	DO	2-2-2-3	14/24		
		9	4	DO	4-4-5-6	15/24		RSY. BR & GRAY CL, SM SD
		26	5	DO	5-9-17-18	20/24		
10								
		12	6	DO	5-6-6	12/18		RSY. BR F SD, LI CL
15								
		13	7	DO	4-7-6	9/18		WHITE F SD, LI CL
20								
		22	8	DO	8-10-12	10/18		WHTD & PALE BR F-M SD
25								
		20	9	DO	6-8-12	10/18		SAME
30								
		50	10	DO	16-21-29	9/18		PALE BR F SD
35								
		9	11	DO	6-5-4	13/18		WHITE F SD, LI CL
40								
		4	12	DO	2-2-2	18/18		SAT. WHITE F-SD, SM CL
45								
		4	13		3-1-3	17/18		"SAME"
50								
		9	14		3-3-5	16/18		LT GRAY F SA, TR CL
55								

Golder Associates

Field Boring Log

DEPTH HOLE _____ JOB NO. 993-9570 PROJECT CALPINE - AUBURNDALE BORING NO. B-7

DEPTH SOIL DRILL _____ GA INSP. _____ DRILLING METHOD _____ SHEET 2 OF 2

DEPTH ROCK CORE _____ WEATHER _____ DRILLING COMPANY HUSS SURFACE ELEV. _____

NO. DIST. SA. _____ UD. SA. _____ TEMP. _____ DRILL RIG _____ DRILLER _____ DATUM _____

DEPTH WL. _____ HRS. PROD. _____ WT. SAMPLER HAMMER _____ DROP _____ STARTED _____ / _____ (TIME / DATE)

TIME WL. _____ HRS. DELAYED _____ WT. CASING HAMMER _____ DROP _____ COMPLETED _____ / _____

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK
BR	BROWN
C	COARSE
CA	CASING
CL	CLAY
CLY	CLAYEY
F	FINE
FRAG	FRAGMENTS
GL	GRAVEL
LYD	LAYERED
LI	LITTLE
M	MEDIUM
MIC	MICACEOUS
MOT	MOTTLED
NP	NON-PLASTIC
OG	ORANGE
ORG	ORGANIC
PH	PRESSURE-HYDRAULIC
PM	PRESSURE-MANUAL
R	RED
RES	RESIDUAL
RX	ROCK
SA	SAMPLE
SAT	SATURATED
SD	SAND
SI	SILT
SIY	SILTY
SM	SOME
TR	TRACE
WL	WATER LEVEL
WH	WEIGHT OF HAMMER
Y	YELLOW

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY	BLOWS	CONSISTENCY	FINGER PRESSURE
VERY LOOSE VLS	0 4	VERY SOFT VS	EXTRUDES
LOOSE LS	4 10	SOFT S	MOLDS EASILY
COMPACT CP	10-30	FIRM FM	MOLDS
DENSE DN	30-50	STIFF ST	THUMB INDENTS
VERY DENSE VDN	50	VERY STIFF VST	THUMBNAIL INDENT
		HARD H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
60		10	15	DO	3-2-9	16/18	60	LT GRAY F. SD, SM CL
	BELAMEY 0.5 HR DUE TO PUMP BREAKDOWN							
65		9		DO	4-5-7	17/18		DK GRAY F-SD SCL, LT PHOSPHATE
70								
75								
25								
30								
35								
40								
45								
50								
55								

Golder Associates

Field Boring Log

DEPTH HOLE	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE			BORING NO. B3-7
DEPTH SOIL DRILL	GA INSP.	DRILLING METHOD			SHEET 2 OF 2
DEPTH ROCK CORE	WEATHER	DRILLING COMPANY HUSS			SURFACE ELEV.
NO. DIST. SA. ___ UD. SA. ___	TEMP.	DRILL RIG	DRILLER		DATUM
DEPTH WL.	HRS. PROD.	WT. SAMPLER HAMMER	DROP		STARTED / (TIME / DATE)
TIME WL.	HRS. DELAYED	WT. CASING HAMMER	DROP		COMPLETED /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 to 5% "SOME" 12 - 30%
"LITTLE" - 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
~~60~~		10		15	DO	3-2-9	16/18	60	LT GRAY F. SD, SM CL
	DELAYED 0.5 HR DUE TO PUMP BREAKDOWN								
~~65~~		9			DO	4-5-7	17/18		DK GRAY F. SD, SOME CL, LI PHOSPHATE
~~70~~									
~~75~~									
25									
30									
35									
40									
45									
50									
55									

Golder Associates

Field Boring Log

DEPTH HOLE 65	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE			BORING NO. B-8
DEPTH SOIL DRILL 65	GA INSP. JB	DRILLING METHOD MUD ROTARY			SHEET 1 OF 2
DEPTH ROCK CORE —	WEATHER SUNNY	DRILLING COMPANY HUSS			SURFACE ELEV.
NO. DIST. SA. — UD. SA. —	TEMP. 71	DRILL RIG BK-51	DRILLER EDDIE		DATUM
DEPTH WL. 15.7	HRS. PROD. 3	WT. SAMPLER HAMMER 140#	DROP 30"		STARTED TIME 1025 DATE 11-18-99
TIME WL. 1345	HRS. DELAYED 0	WT. CASING HAMMER	DROP		COMPLETED TIME 1330 DATE 11-19-99

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 to 5% "SOME" 12 - 30%
"LITTLE" - 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		5	1	DO	1-3-2-1	15/24		DK GRAY FS, TR SI 0-6"
		2	2	DO	1-1-1-1	16/24		PALE BRO F SD 6"-3'
-5		3	3	DO	1-2-1-3	15/24		VER PALE BR F S 3'-6'
		8	4	DO	3-4-4-5	15/24		WHITE F SD 6'-7.5'
		12	5	DO	5-9-10-17	18/24		P. TYRE CLAY, T F SD 7.5'-11'
-10								
		13	6	DO	2-4-7	11/18		WHITE F. SD, LI CLA
-15								
		23	7	DO	7-11-12	9/18		"SAME"
-20								
		35	8	DO	10-16-19	9/18		WHITE F R. F-M SD
-25								
		48	9	DO	14-16-32	10/18		"SAME"
-30								
		70	10	DO	18-31-39	14/18		PALE BR F-M SD
-35								
		34	11	DO	13-16-18	10/18		"SAME"
-40								
		10	12	DO	4-4-6	12/18		WHITE F SD, LI CL
-45								
		8	13	DO	4-4-4	17/18		"SAME"
-50								
		11	14	DI	4-5-6	15/18	N	"SAME"
-55								

Golder Associates

Field Boring Log

DEPTH HOLE 65	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE			BORING NO. B-8
DEPTH SOIL DRILL 65	GA INSP. JB	DRILLING METHOD MUD ROTARY			SHEET 1 OF 2
DEPTH ROCK CORE —	WEATHER SUNNY	DRILLING COMPANY HUSS			SURFACE ELEV.
NO. DIST. SA. — UD. SA. —	TEMP. 71	DRILL RIG BK-51	DRILLER EDDIE		DATUM
DEPTH WL. 15.7	HRS. PROD. 3	WT. SAMPLER HAMMER 140#	DROP 30"		STARTED 1035 / 11-18-99
TIME WL. 1045	HRS. DELAYED 0	WT. CASING HAMMER	DROP		COMPLETED 1330 / 11-19-99 (TIME / DATE)

SAMPLE TYPES

A.S.	AUGER SAMPLE	BL	BLACK
C.S.	CHUNK SAMPLE	BR	BROWN
D.O.	DRIVE OPEN	C	COARSE
D.S.	DENISON SAMPLE	CA	CASING
P.S.	PITCHER SAMPLE	CL	CLAY
R.C.	ROCK CORE	CLY	CLAYEY
S.T.	SLOTTED TUBE	F	FINE
T.O.	THIN-WALLED, OPEN	FRAG	FRAGMENTS
T.P.	THIN-WALLED, PISTON	GL	GRAVEL
W.S.	WASH SAMPLE	LYD	LAYERED
		LI	LITTLE

ABBREVIATIONS

M	MEDIUM	SA	SAMPLE
MIC	MICACEOUS	SAT	SATURATED
MOT	MOTTLED	SD	SAND
NP	NON-PLASTIC	SI	SILT
OG	ORANGE	SIY	SILTY
ORG	ORGANIC	SM	SOME
PH	PRESSURE-HYDRAULIC	TR	TRACE
PM	PRESSURE-MANUAL	WL	WATER LEVEL
R	RED	WH	WEIGHT OF HAMMER
RES	RESIDUAL	Y	YELLOW
RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0-5% "SOME" 12-30%
"LITTLE" 5-12% "AND" 30-50%

RELATIVE DENSITY	BLOWS	CONSISTENCY	FINGER PRESSURE
VERY LOOSE VLS	0-4	VERY SOFT VS	EXTRUDES
LOOSE LS	4-10	SOFT S	MOLDS EASILY
COMPACT CP	10-30	FIRM FM	MOLDS
DENSE DN	30-50	STIFF ST	THUMB INDENTS
VERY DENSE VDN	50	VERY STIFF VST	THUMBNAIL INDENT
		HARD H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		5	1	DO	1-3-2-1	15/24		DK GRY F S, LI SI 0-6"
								PALE BRO F SD 6"-3'
		2	2	DO	1-1-1-1	16/24		VER PALE BR F S 3'-6'
5		3	3	DO	1-2-1-3	15/24		
		8	4	DO	3-4-4-5	15/24		WHITE F SD 6'-7.5'
								PALE BR CLAY, F SD 7.5'-11'
		12	5	DO	5-9-10-17	10/24		
10								
		13	6	DO	2-6-7	11/18		WHITE F. SD, LI CLA
15								
		23	7	DO	7-11-12	9/18		"SAME"
20								
		35	8	DO	10-16-19	9/18		WHITE F R. F-M SD.
25								
		48	9	DO	14-16-32	10/18		"SAME"
30								
		70	10	DO	18-31-39	14/18		PALE BR F-M SD
35								
		34	11	DO	13-16-18	10/18		"SAME"
40								
		10	12	DO	4-4-6	10/18		WHITE F. SD, LI CL
45								
		8	13	DO	4-4-4	17/18		"SAME"
50								
		11	14	DO	4-5-6	15/18		"SAME"
55								

Golder Associates

Field Boring Log

DEPTH HOLE	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE		BORING NO. B-8	
DEPTH SOIL DRILL	GA INSP.	DRILLING METHOD		SHEET 2 OF 2	
DEPTH ROCK CORE	WEATHER	DRILLING COMPANY HUSS		SURFACE ELEV.	
NO. DIST. SA. UD. SA.	TEMP.	DRILL RIG	DRILLER	DATUM	
DEPTH WL.	HRS. PROD.	WT. SAMPLER HAMMER	DROP	STARTED TIME / DATE	
TIME WL.	HRS. DELAYED	WT. CASING HAMMER	DROP	COMPLETED /	

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THINWALLED, OPEN
T.P.	THINWALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC. / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		10	15	SS	4-3-7	13/18		LT GRAY F. SD, SM CL
-60	SET WELL 60' TO 8' SCREEN, 1 IS' OF RISER	17	16	SS	6-7-10	9/18		DL GRAY F SD, AND CL, TR PHOSPHATE
-65	~~PZ-3~~ PZ-4							

Golder Associates

Field Boring Log

DEPTH HOLE	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE			BORING NO. B-9
DEPTH SOIL DRILL	GA INSP.	DRILLING METHOD			SHEET 2 OF 2
DEPTH ROCK CORE	WEATHER	DRILLING COMPANY HUSS			SURFACE ELEV.
NO. DIST. SA. UD. SA.	TEMP.	DRILL RIG	DRILLER		DATUM
DEPTH WL.	HRS. PROD.	WT. SAMPLER HAMMER	DROP		STARTED TIME / DATE
TIME WL.	HRS. DELAYED	WT. CASING HAMMER	DROP		COMPLETED /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC. / ATT.	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		10	15	DO	4-3-7	13/18		LT GRAY F. SD, SM CL
60	SET WELL 60' TO 5' SCREEN, 1 IS' OF RISER	17	16	DO	6-7-10	9/18		DK GRAY F. SD, AND CL, TR PHOSPHATE
65	~~PZ-3~~ PZ-4							



Golder Associates

Field Boring Log

DEPTH HOLE 80	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE			BORING NO. B-9
DEPTH SOIL DRILL 80	GA INSP. JB/ALD	DRILLING METHOD MUD ROTARY			SHEET 1 OF
DEPTH ROCK CORE —	WEATHER SUNNY	DRILLING COMPANY HUSS			SURFACE ELEV.
NO. DIST. SA. ✓ UD. SA. —	TEMP. 65°	DRILL RIG BK 51 - TRACK	DRILLER TONY		DATUM
DEPTH WL. —	HRS. PROD. 2.5	WT. SAMPLER HAMMER 140#	DROP 30"		STARTED TIME 9:40 DATE 11-15-99
TIME WL. —	HRS. DELAYED -0-	WT. CASING HAMMER —	DROP —		COMPLETED TIME 12:15 DATE 11-15-99

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM
BR	BROWN	MIC	MICACEOUS
C	COARSE	MOT	MOTTLED
CA	CASING	NP	NON-PLASTIC
CL	CLAY	OG	ORANGE
CLY	CLAYEY	ORG	ORGANIC
F	FINE	PH	PRESSURE-HYDRAULIC
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL
GL	GRAVEL	R	RED
LYD	LAYERED	RES	RESIDUAL
LI	LITTLE	RX	ROCK
SA	SAMPLE
SAT	SATURATED
SD	SAND
SI	SILT
SLY	SILTY
SM	SOME
TR	TRACE
WL	WATER LEVEL
WH	WEIGHT OF HAMMER
Y	YELLOW

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0-5% "SOME" 12-30%
"LITTLE" 5-12% "AND" 30-50%

RELATIVE DENSITY	BLOWS	CONSISTENCY	FINGER PRESSURE
VERY LOOSE VLS	0-4	VERY SOFT VS	EXTRUDES
LOOSE LS	4-10	SOFT S	MOLDS EASILY
COMPACT CP	10-30	FIRM FM	MOLDS
DENSE DN	30-50	STIFF ST	THUMB INDENTS
VERY DENSE VDN	50	VERY STIFF VST	THUMBNAIL INDENT
		HARD H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6-IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		14	1	DO	5-7-7-4	13/24	0/2	DK. GRAY F. SD, SM SI 0-6"
								PALE BROWN F SD 6"-2'
		8	2	DO	3-4-4-4	15/24	2/4	BROWN F. SD 2'-3'
5								PALE BROWN F SD 3'-4'
		14	3	DO	5-6-8-10	23/24	4/6	BROWN F. SD 4'-6"
	GW APPARENT @ 6'							
	MOTTLING @ 7.5'	13	4	DO	7-6-7-10	12/24	6/8	GRAY F. SD AND CL 6'-7.5'
								YE. BROWN & RED CL, SM SD 7.5'-10'
		32	5	DO	11-15-17-17	19/24	8/10	
10								
		21	6	DO	8-9-12	12/18	14.5/16	RED & LT GRAY F SD
15								
		20	7	DO	7-9-11	12/18	16.5/20	WHITE F-M SD
20								
		26	8	DO	8-11-15	11/18	24.5/26	SAME
25								
		50	9	DO	15-22-28	10/18	29.5/31	SAME
30								
		79	10	DO	23-32-47	11/18	34.5/36	LT BROWN F-M SD
35								
		24	11	DO	10-10-12	10/18	39.5/41	PALE BROWN & WHITE F-M SD
40								
		6	12	DO	4-2-4	18/18	44.5/46	WHITE F. SD, SM CL (SAT)
45								
		11	13	DO	4-5-6	13/19	49.5/51	SAME
50								
		15	14	DO	5-6-9		54.5/56	SAME
55								

Golder Associates

Field Boring Log

DEPTH HOLE 80	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE		BORING NO. B-9	
DEPTH SOIL DRILL 80	GA INSP. JB/ALS	DRILLING METHOD MUD ROTARY		SHEET 1 OF	
DEPTH ROCK CORE —	WEATHER SUNNY	DRILLING COMPANY HUSS		SURFACE ELEV.	
NO. DIST. SA. ✓ UD. SA. —	TEMP. 65°	DRILL RIG BK 51 - TRACK	DRILLER TONY	DATUM	
DEPTH WL. —	HRS. PROD. 2.5	WT. SAMPLER HAMMER 140#	DROP 30"	STARTED TIME 9:40 DATE 11-15-99	
TIME WL. —	HRS. DELAYED -0-	WT. CASING HAMMER —	DROP —	COMPLETED TIME 12:15 DATE 11-15-99	

SAMPLE TYPES

A.S.	AUGER SAMPLE	BL	BLACK
C.S.	CHUNK SAMPLE	BR	BROWN
D.O.	DRIVE OPEN	C	COARSE
D.S.	DENISON SAMPLE	CA	CASING
P.S.	PITCHER SAMPLE	CL	CLAY
R.C.	ROCK CORE	CLY	CLAYEY
S.T.	SLOTTED TUBE	F	FINE
T.O.	THIN-WALLED, OPEN	FRAG	FRAGMENTS
T.P.	THIN-WALLED, PISTON	GL	GRAVEL
W.S.	WASH SAMPLE	LYD	LAYERED
		LI	LITTLE

ABBREVIATIONS

M	MEDIUM	SA	SAMPLE
MIC	MICACEOUS	SAT	SATURATED
MOT	MOTTLED	SD	SAND
NP	NON-PLASTIC	SI	SILT
OG	ORANGE	SLY	SILTY
ORG	ORGANIC	SM	SOME
PH	PRESSURE-HYDRAULIC	TR	TRACE
PM	PRESSURE-MANUAL	WL	WATER LEVEL
R	RED	WH	WEIGHT OF HAMMER
RES	RESIDUAL	Y	YELLOW
RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 to 5% "SOME" 12 - 30%
"LITTLE" - 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC. / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		14		1	DO	5-7-7-4	13/24	0/2	DK. GRAY F. SD, SM SI 0-6"
									PALE BROWN F SD 6"-2'
		8		2	DO	3-4-4-4	15/24	2/4	BROWN F. SD 2'-3'
									PALE BROWN F SD 3'-4'
-5		14		3	DO	5-6-8-10	23/24	4/6	BROWN F. SD 4'-6"
	GW APPARENT @ 6'								
	MOTTLING @ 7.5'	13		4	DO	7-6-7-10	12/24	6/8	GRAY F. SD AND CL 6'-7.5'
									YE. BROWN & RED CL, SM SD 7.5'-10'
		32		5	DO	10-15-17-17	19/24	8/10	
-10									
		21		6	DO	8-9-12	12/18	14.5/16	RED & LT GRAY F SD
-15									
		20		7	DO	7-9-11	12/18	16.5/20	WHITE F-M SD
-20									
		26		8	DO	8-11-15	11/18	24.5/26	SAME
-25									
		50		9	DO	15-22-28	10/18	29.5/31	SAME
-30									
		79		10	DO	23-32-47	11/18	34.5/36	LT BROWN F-M SD
-35									
		24		11	DO	10-10-12	10/18	39.5/41	PALE BROWN & WHITE F-M SD
-40									
		6		12	DO	4-2-4	18/18	WS/46	WHITE F. SD, SM CL (SAT)
-45									
		11		13	DO	4-5-6	13/18	49.5/51	SAME
-50									
		15		14	DO	5-6-9		54.5/56	SAME
-55									

Golder Associates

Field Boring Log

DEPTH HOLE ____	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE		BORING NO. B-9	
DEPTH SOIL DRILL ____	GA INSP. JB/AW	DRILLING METHOD MUD ROTARY		SHEET 2 OF 2	
DEPTH ROCK CORE ____	WEATHER SUNNY	DRILLING COMPANY HUSS		SURFACE ELEV. ____	
NO. DIST. SA. ____ UD. SA. ____	TEMP. ____	DRILL RIG BK 51	DRILLER TONY	DATUM ____	
DEPTH WL. ____	HRS. PROD. ____	WT. SAMPLER HAMMER 140#	DROP 30"	STARTED ____ TIME / DATE	
TIME WL. ____	HRS. DELAYED ____	WT. CASING HAMMER ____	DROP ____	COMPLETED ____ /	

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DAVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0-5% "SOME" 12-30%
"LITTLE" 5-12% "AND" 30-50%

RELATIVE DENSITY	BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE LS	4-10	SOFT	S	MOLDS EASILY
COMPACT CP	10-30	FIRM	FM	MOLDS
DENSE DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
		HARD	H	RESISTS THUMBNAIL

ELEV./DEPTH	DESCRIPTION	BLOWS/FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC./ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
60		23	15	DO	5-10-13	18/18	58.5 61	LT GRAY F. SD, SM CL (SAT)
65		20	16	DO	8-9-11	17/18	63.5 66	DK GRAY FS, SM CL, TR. phosphate
70		88	17	DO	24-38-50	18/18	69.5 71	GRAY F. SD & CL. TR PHOSPHATE
75	DRILLING HARD @ 72'	100	18	DO	43-50/2	3/3	74.5 76	DK GRAY F. SD & CLA. TR PHOSPHATE 74.5-75' FRAC. LIMEROCK 75.0-75.2'
80	BIT ON ROLLER BIT @ 75.'		19	DO	SPOON/REF.	/3	79.5 81	
85								
90								
	82' TD, 5' screen PZ-3							

Golder Associates

Field Boring Log

DEPTH HOLE	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE		BORING NO. B-9	
DEPTH SOIL DRILL	GA INSP. JB/AW	DRILLING METHOD MUD ROTARY		SHEET 2 OF 2	
DEPTH ROCK CORE	WEATHER SUNNY	DRILLING COMPANY HUSS		SURFACE ELEV.	
NO. DIST. SA. UD. SA.	TEMP.	DRILL RIG BK 51	DRILLER TONY	DATUM	
DEPTH WL.	HRS. PROD.	WT. SAMPLER HAMMER 140#	DROP 30"	STARTED TIME / DATE	
TIME WL.	HRS. DELAYED	WT. CASING HAMMER	DROP	COMPLETED /	

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DAVIS OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
U	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
60		23	15	DO	5-10-13	18/18	58.5 61	LT GRAY F. SD, SM CL (SAT)
65		20	16	DO	8-9-11	17/18	63.5 66	DK GRAY FS, SM CL, TR. phosphate
70		88	17	DO	24-38-50	18/18	69.5 71	GRAY F. SD & CL. TR PHOSPHATE
75	DRILLING HARD @ 72'	100	18	DO	43-50/2	8/8	74.5 76	DK GRAY F. SD & CLA TR PHOSPHATE 74.5-75' FRAC. LIMEROCK 75.0-75.2'
80	BIT ON ROLLER BIT @ 75.'		19	DO	SPOON REF.		79.5 81	
85								
90								
	82' TD, 5' screen PZ-3							

Golder Associates

Field Boring Log

DEPTH HOLE 65	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE			BORING NO. B-10
DEPTH SOIL DRILL 65	GA INSP. JB	DRILLING METHOD MUD ROTARY			SHEET 1 OF 2
DEPTH ROCK CORE —	WEATHER SUNNY	DRILLING COMPANY HUSS			SURFACE ELEV.
NO. DIST. SA. ✓ UD. SA. —	TEMP. 79	DRILL RIG BL-51	DRILLER EDDIE		DATUM
DEPTH WL. —	HRS. PROD. 1.5	WT. SAMPLER HAMMER 140#	DROP 30"		STARTED TIME 1255 DATE 11-19-99
TIME WL. —	HRS. DELAYED —	WT. CASING HAMMER —	DROP —		COMPLETED TIME 1430 DATE 11-19-99

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK
BR	BROWN
C	COARSE
CA	CASING
CL	CLAY
CLY	CLAYEY
F	FINE
FRAG	FRAGMENTS
GL	GRAVEL
LYD	LAYERED
LI	LITTLE
M	MEDIUM
MIC	MICACEOUS
MOT	MOTTLED
NP	NON-PLASTIC
OG	ORANGE
ORG	ORGANIC
PH	PRESSURE-HYDRAULIC
PM	PRESSURE-MANUAL
R	RED
RES	RESIDUAL
RX	ROCK
SA	SAMPLE
SAT	SATURATED
SD	SAND
SI	SILT
SIY	SILTY
SM	SOME
TR	TRACE
WL	WATER LEVEL
WH	WEIGHT OF HAMMER
Y	YELLOW

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 to 5% "SOME" 12 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
5		8	1	DO	1-2-6	14/18		PALE BR F. SD
10		19	2	DO	6-9-10	19/18		B. S Y. BR. CL, SM SD
15		13	3	DO	4-5-9	9/18		WHITE F. SD
20		14	4	DO	6-7-7	10/18		"SAME"
25		22	5	DO	10-10-12	9/18		WHITE & PALE BR F-M SD
30		58	6	DO	10-21-29	12/18		"SAME"
35		39	7	DO	13-15-23	11/18		PALE BL F-M SD
40		23	8	DO	8-10-13	10/18		"SAME"
45		5	9	DO	2-3-2	14/18		SAT. WHITE F. SD, LI CL
50		10	10	DO	4-3-7	16/18		"SAME"
55			11	DO	0-2-4	14/18		LT GRAY F. SD, & CL

Golder Associates

Field Boring Log

DEPTH HOLE 65	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE			BORING NO. B-10
DEPTH SOIL DRILL 65	GA INSP. JB	DRILLING METHOD HUD ROTARY			SHEET 1 OF 2
DEPTH ROCK CORE —	WEATHER SUNNY	DRILLING COMPANY HUSS			SURFACE ELEV.
NO. DIST. SA. ✓ UD. SA. —	TEMP. 79	DRILL RIG BL-51	DRILLER EDDIE		DATUM
DEPTH WL. —	HRS. PROD. 1.5	WT. SAMPLER HAMMER 140#	DROP 30"		STARTED TIME 1255 DATE 11-19-99
TIME WL. —	HRS. DELAYED —	WT. CASING HAMMER —	DROP —		COMPLETED TIME 1430 DATE 11-19-99

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK
BR	BROWN
C	COARSE
CA	CASING
CL	CLAY
CLY	CLAYEY
F	FINE
FRAG	FRAGMENTS
GL	GRAVEL
LYD	LAYERED
LI	LITTLE
M	MEDIUM
MIC	MICACEOUS
MOT	MOTTLED
NP	NON-PLASTIC
OG	ORANGE
ORG	ORGANIC
PH	PRESSURE-HYDRAULIC
PM	PRESSURE-MANUAL
R	RED
RES	RESIDUAL
RX	ROCK
SA	SAMPLE
SAT	SATURATED
SD	SAND
SI	SILT
SIY	SILTY
SM	SOME
TR	TRACE
WL	WATER LEVEL
WH	WEIGHT OF HAMMER
Y	YELLOW

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 1% "SOME" 12 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
5		8	1	DO	1-2-6	14/18		PALE BR F. SD
10		19	2	DO	6-9-10	18/18		R. S Y. BR. CL, SM SD
15		13	3	DO	4-5-9	9/18		WHITE F. SD
20		14	4	DO	6-7-7	10/18		"SAME"
25		22	5	DO	10-10-12	9/18		WHITE & PALE BR F-M SD
30		52	6	DO	10-21-29	10/18		"SAME"
35		38	7	DO	13-15-23	11/18		PALE BL F-M SD
40		23	8	DO	8-10-13	10/18		"SAME"
45		5	9	DO	2-3-2	14/18		SAT. WHITE F. SD, LI CL
50		10	10	DO	4-3-7	16/18		"SAME"
55			11	DO	3-2-4	14/18		LT GRAY F. SD, & CL

Golder Associates

Field Boring Log

DEPTH HOLE	JOB NO. 993-9570	PROJECT CALPINE AUBURNDALE		BORING NO. B-10	
DEPTH SOIL DRILL	GA INSP.	DRILLING METHOD		SHEET	OF
DEPTH ROCK CORE	WEATHER	DRILLING COMPANY		SURFACE ELEV.	
NO. DIST. SA.	UD. SA.	TEMP.	DRILL RIG	DRILLER	DATUM
DEPTH WL.	HRS. PROD.	WT. SAMPLER HAMMER	DROP	STARTED TIME / DATE	
TIME WL.	HRS. DELAYED	WT. CASING HAMMER	DROP	COMPLETED /	

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
O.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE	
VERY LOOSE	VLS	0 +	VERY SOFT	VS	EXTRUDES	
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY	
COMPACT	CP	10-30	FIRM	FM	MOLDS	
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS	
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT	
			HARD	H	RESISTS THUMBNAIL	

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC. / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
60		11	12	DO	3-4-7	15/18		LT GRAY F. SD. SM CL
		15	13	DO	4-5-10	17/18		DK GRAY F. SD & CL, TR PHOSPHATE
70								

Golder Associates

Field Boring Log

DEPTH HOLE _____	JOB NO. 993-9570	PROJECT CALDINE AUBURNDALE			BORING NO. B-10
DEPTH SOIL DRILL _____	GA INSP. _____	DRILLING METHOD _____			SHEET _____ OF _____
DEPTH ROCK CORE _____	WEATHER _____	DRILLING COMPANY _____			SURFACE ELEV. _____
NO. DIST. SA. _____ UD. SA. _____	TEMP. _____	DRILL RIG _____	DRILLER _____		DATUM _____
DEPTH WL. _____	HRS. PROD. _____	WT. SAMPLER HAMMER _____	DROP _____		STARTED _____ / _____ (TIME / DATE)
TIME WL. _____	HRS. DELAYED _____	WT. CASING HAMMER _____	DROP _____		COMPLETED _____ / _____

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 to 5% "SOME" 12 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
60		11	12	DO	3-4-7	15/18		LT Grey F. SD. Sm CL
		15	13	DO	4-5-10	17/18		Dk Grey F. Sd & Cl, TR PHOSPHATE
65								
70								

Golder Associates

Field Boring Log

DEPTH HOLE	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE			BORING NO. B-11
DEPTH SOIL DRILL	GA INSP. BM	DRILLING METHOD Mud Rotary			SHEET 1 OF 2
DEPTH ROCK CORE	WEATHER Sunny	DRILLING COMPANY Huss			SURFACE ELEV.
NO. DIST. SA. ✓ UD. SA.	TEMP. 75°F	DRILL RIG DK-51	DRILLER Eddie		DATUM
DEPTH WL.	HRS. PROD.	WT. SAMPLER HAMMER 140	DROP 30"		STARTED / (TIME / DATE)
TIME WL.	HRS. DELAYED	WT. CASING HAMMER	DROP		COMPLETED /

SAMPLE TYPES

A.S.	AUGER SAMPLE	BL	BLACK
C.S.	CHUNK SAMPLE	BR	BROWN
D.O.	DRIVE OPEN	C	COARSE
D.S.	DENISON SAMPLE	CA	CASING
P.S.	PITCHER SAMPLE	CL	CLAY
R.C.	ROCK CORE	CLY	CLAYEY
S.T.	SLOTTED TUBE	F	FINE
T.O.	THIN-WALLED, OPEN	FRAG	FRAGMENTS
T.P.	THIN-WALLED, PISTON	GL	GRAVEL
W.S.	WASH SAMPLE	LYD	LAYERED
		LI	LITTLE

ABBREVIATIONS

M	MEDIUM	SA	SAMPLE
MIC	MICACEOUS	SAT	SATURATED
MOT	MOTTLED	SD	SAND
NP	NON-PLASTIC	SI	SILT
OG	ORANGE	SIY	SILTY
ORG	ORGANIC	SM	SOME
PH	PRESSURE-HYDRAULIC	TR	TRACE
PM	PRESSURE-MANUAL	WL	WATER LEVEL
R	RED	WH	WEIGHT OF HAMMER
RES	RESIDUAL	Y	YELLOW
RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 to 5% "SOME" 12 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY	BLOWS	CONSISTENCY	FINGER PRESSURE
VERY LOOSE VLS	0-4	VERY SOFT VS	EXTRUDES
LOOSE LS	4-10	SOFT S	MOLDS EASILY
COMPACT CP	10-30	FIRM FM	MOLDS
DENSE DN	30-50	STIFF ST	THUMB INDENTS
VERY DENSE VDN	50	VERY STIFF VST	THUMBNAIL INDENT
		HARD H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC. / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		2	1		1,1,1,2	22/24		Brown F.S.
		3	2		1,1,2,2	23/24		"
-5		7	3		2,2,5,6	22/24		Pale Brown F.S.
		11	4		4,5,6,6	23/24		"
		20	5		6,7,13,15	22/24		Reddish Orange Clay w/ F.S.
-10		16	6		6,8,8	12/18		
-15		19	7		9,10,9	10/18		White F.S.
-20		30	8		9,14,16	8/18		"
-25		36	9		8,16,20	7/18		"
-30		45	10		15,23,22	8/18		"
-35		20	11		10,9,11	9/18		Pale Brown F.S.
-40		5	12		2,2,3	14/18		White F.S.
-45		6	13		2,3,3	12/18		"
-50		6	14		3,3,3	12/18		"
-55		16	15		4,5,11	14/18		"

Golder Associates

Field Boring Log

DEPTH HOLE	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE			BORING NO. B-11
DEPTH SOIL DRILL	GA INSP. BM	DRILLING METHOD Mud Rotary			SHEET 1 OF 2
DEPTH ROCK CORE	WEATHER Sunny	DRILLING COMPANY HUSS			SURFACE ELEV.
NO. DIST. SA. ✓ UD. SA.	TEMP. 75°F	DRILL RIG DK-51	DRILLER Eddie		DATUM
DEPTH WL.	HRS. PROD.	WT. SAMPLER HAMMER 140	DROP 30"		STARTED TIME / DATE
TIME WL.	HRS. DELAYED	WT. CASING HAMMER	DROP		COMPLETED /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DAVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0-5% "SOME" 12-30%
"LITTLE" 5-12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	SAMPLES TYPE	SAMPLES HAMM. BLOWS PER 6 IN (FORCE)	SAMPLES REC. / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		2		1		1,1,1,2	22/24		Brown F.S.
		3		2		1.1.2.2	23/24		"
-5		7		3		2,2,5,6	22/24		Pale Brown F.S.
		11		4		4,5,6,6	23/24		"
		20		5		6,7,13,15	23/24		Reddish Orange CLAY W/ F.S.
-10		16		6		6,8,8	12/18		
-15		19		7		9,10,9	19/18		White F.S.
-20		30		8		9,14,16	8/18		"
-25		36		9		8,16,20	7/18		"
-30		45		10		15,23,22	8/18		"
-35		20		11		10,9,11	9/18		Pale Brown F.S.
-40		5		12		2,2,3	14/18		White F.S.
-45		6		13		2,3,3	12/18		"
-50		6		14		3,3,3	12/18		"
-55		16		15		4,5,11	14/18		"

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Field Boring Log

DEPTH HOLE	JOB NO.	PROJECT			BORING NO. B-11
DEPTH SOIL DRILL	GA INSP.	DRILLING METHOD			SHEET 2 OF 2
DEPTH ROCK CORE	WEATHER	DRILLING COMPANY			SURFACE ELEV.
NO. DIST. SA. ___ UD. SA. ___	TEMP.	DRILL RIG	DRILLER		DATUM
DEPTH WL.	HRS. PROD.	WT. SAMPLER HAMMER	DROP		STARTED ___ / ___ (TIME / DATE)
TIME WL.	HRS. DELAYED	WT. CASING HAMMER	DROP		COMPLETED ___ / ___

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK
BR	BROWN
C	COARSE
CA	CASING
CL	CLAY
CLY	CLAYEY
F	FINE
FRAG	FRAGMENTS
GL	GRAVEL
LYD	LAYERED
LI	LITTLE
M	MEDIUM
MIC	MICACEOUS
MOT	MOTTLED
NP	NON-PLASTIC
OG	ORANGE
ORG	ORGANIC
PH	PRESSURE-HYDRAULIC
PM	PRESSURE-MANUAL
R	RED
RES	RESIDUAL
RX	ROCK
SA	SAMPLE
SAT	SATURATED
SD	SAND
SI	SILT
SIY	SILTY
SM	SOME
TR	TRACE
WL	WATER LEVEL
WH	WEIGHT OF HAMMER
Y	YELLOW

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 5% "SOME" 12 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	SAMPLES TYPE	SAMPLES HAMM. BLOWS PER 6 IN (FORCE)	SAMPLES REC. / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		20	16		5,7,13			Gray Clay + F.S.
60								
		59	17		6,9,50/5"			DK. Gray Clay w/ F.S. + Rock Frgms.
65								

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Field Boring Log

DEPTH HOLE	JOB NO.	PROJECT			BORING NO. B-11
DEPTH SOIL DRILL	GA INSP.	DRILLING METHOD			SHEET 2 OF 2
DEPTH ROCK CORE	WEATHER	DRILLING COMPANY			SURFACE ELEV.
NO. DIST. SA. ___ UD. SA. ___	TEMP.	DRILL RIG	DRILLER		DATUM
DEPTH WL.	HRS. PROD.	WT. SAMPLER HAMMER	DROP		STARTED TIME / DATE
TIME WL.	HRS. DELAYED	WT. CASING HAMMER	DROP		COMPLETED /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM
BR	BROWN	MIC	MICACEOUS
C	COARSE	MOT	MOTTLED
CA	CASING	NP	NON-PLASTIC
CL	CLAY	OG	ORANGE
CLY	CLAYEY	ORG	ORGANIC
F	FINE	PH	PRESSURE-HYDRAULIC
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL
GL	GRAVEL	R	RED
LYD	LAYERED	RES	RESIDUAL
LI	LITTLE	RX	ROCK
SA	SAMPLE		
SAT	SATURATED		
SD	SAND		
SI	SILT		
SIY	SILTY		
SM	SOME		
TR	TRACE		
WL	WATER LEVEL		
WH	WEIGHT OF HAMMER		
Y	YELLOW		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	SAMPLES TYPE	SAMPLES HAMM. BLOWS PER 6 IN (FORCE)	SAMPLES REC. / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		20	16		5,7,13			Gray Clay & F.S.
60								
		59	17		6,9,50/5"			DK. Gray Clay w/ F.S. & Rock Fragme
65								

Golder Associates

Field Boring Log

DEPTH HOLE 65	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE		BORING NO. B-12	
DEPTH SOIL DRILL 65	GA INSP. JB	DRILLING METHOD MUD ROTARY		SHEET 1 OF 2	
DEPTH ROCK CORE —	WEATHER SUNNY	DRILLING COMPANY HUSS		SURFACE ELEV.	
NO. DIST. SA. ✓ UD. SA. —	TEMP. 78	DRILL RIG BK-51	DRILLER EDDIE	DATUM	
DEPTH WL.	HRS. PROD. 1.5	WT. SAMPLER HAMMER 140#	DROP 30"	STARTED 1450 (TIME) 11-19-99 (DATE)	
TIME WL.	HRS. DELAYED —	WT. CASING HAMMER	DROP	COMPLETED 1620 (TIME) 11-19-99 (DATE)	

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0-5% "SOME" 12-30%
"LITTLE" 5-12% "AND" 30-50%

RELATIVE DENSITY	BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE LS	4-10	SOFT	S	MOLDS EASILY
COMPACT CP	10-30	FIRM	FM	MOLDS
DENSE DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
		HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		4	1	DO	2-2-3-2	14/24		DL GRY F SD, LT SI @ 0.4' PALE BROWN F. SD 1'-3'
		4	2	DO	2-2-2-2	14/24		VERY PALE BR F SD 3'-7'
-5		5	3	DO	2-2-3-3	16/24		
		7	4	DO	2-3-4-6	20/24		R, Y BR & GRY CL, SM FS 7'-10'
		26	5	DO	7-12-14-19	24/24		~~R, Y BR & GRY CL, SM F S 7'-~~
-10								
-15		13	6	DO	4-5-8	10/18		PALE BR & L F SD
-20		11	7	DO	5-5-6	9/18		SAME
-25		21	8	DO	8-9-12	9/18		WHITE F SD
-30		32	9	DO	9-12-20	10/18		PALE BR & WHITE F-M SD
-35		64	10	DO	17-25-39	9/18		PALE BR F-M SD
-40		17	11	DO	9-6-11	10/18		PALE BL & WHITE F-M SD
-45		7	12	DO	3-3-4	16/18		SAT WHITE F-S, LI CL
-50		11	13	DO	5-5-6	17/18		"SAME"
-55		16	14	DO	5-8-9	16/18		LT GRY F SD, LI CL

Golder Associates

Field Boring Log

DEPTH HOLE 65	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE			BORING NO. B-12
DEPTH SOIL DRILL 65	GA INSP. JB	DRILLING METHOD MUD ROTARY			SHEET 1 OF 2
DEPTH ROCK CORE —	WEATHER SUNNY	DRILLING COMPANY HUSS			SURFACE ELEV.
NO. DIST. SA. ✓ UD. SA. —	TEMP. 78	DRILL RIG BK-51	DRILLER EDDIE		DATUM
DEPTH WL.	HRS. PROD. 1.5	WT. SAMPLER HAMMER 140#	DROP 30"		STARTED 1450 (TIME) 11-19-99 (DATE)
TIME WL.	HRS. DELAYED —	WT. CASING HAMMER	DROP		COMPLETED 1620 (TIME) 11-19-99 (DATE)

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0-5% "SOME" 12-30%
"LITTLE" 5-12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		4	1	DO	2-2-2-2	14/24		DL GRAY F SD, LT SI 0-4" BRN BROWN F. SD 4'-3'
		4	2	DO	2-2-2-2	14/24		VERY PALE BR F SD 3'-7'
5		5	3	DO	2-2-3-3	16/24		
		7	4	DO	2-3-4-6	20/24		R, Y BR & GRAY CL, SM FS 7'-10'
		26	5	DO	7-12-14-19	24/24		~~R, Y BR & GRAY CL, SI F S 7'-~~
10								
		13	6	DO	4-5-8	10/18		PALE BR & L F SD
15								
		11	7	DO	5-5-6	8/18		SAME
20								
		21	8	DO	8-9-12	9/18		WHITE F SD
25								
		32	9	DO	9-12-20	10/18		PALE BR & WHITE F-M SD
30								
		64	10	DO	17-25-39	9/18		PALE BR F-M SD
35								
		17	11	DO	9-6-11	10/18		PALE BL & WHITE F-M SD
40								
		7	12	DO	3-3-4	14/18		SAT. WHITE F-S, LI CL
45								
		11	13	DO	5-5-6	17/18		"SAME"
50								
		16	14	DO	5-8-9	16/18		LT GRY F SD, LI CL
55								

Golder Associates

Field Boring Log

DEPTH HOLE	JOB NO. 993-9525	PROJECT CALDINE-AUBURNDALE			BORING NO. B-12
DEPTH SOIL DRILL	GA INSP.	DRILLING METHOD			SHEET 2 OF 2
DEPTH ROCK CORE	WEATHER	DRILLING COMPANY			SURFACE ELEV.
NO. DIST. SA. ___ UD. SA. ___	TEMP.	DRILL RIG	DRILLER		DATUM
DEPTH WL.	HRS. PROD.	WT. SAMPLER HAMMER	DROP		STARTED ___ / ___ (TIME / DATE)
TIME WL.	HRS. DELAYED	WT. CASING HAMMER	DROP		COMPLETED ___ / ___

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM
BR	BROWN	MIC	MICACEOUS
C	COARSE	MOT	MOTTLED
CA	CASING	NP	NON-PLASTIC
CL	CLAY	OG	ORANGE
CLY	CLAYEY	ORG	ORGANIC
F	FINE	PH	PRESSURE-HYDRAULIC
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL
GL	GRAVEL	R	RED
LYD	LAYERED	RES	RESIDUAL
LI	LITTLE	RX	ROCK
SA	SAMPLE		
SAT	SATURATED		
SD	SAND		
SI	SILT		
SIY	SILTY		
SM	SOME		
TR	TRACE		
WL	WATER LEVEL		
WH	WEIGHT OF HAMMER		
Y	YELLOW		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0-5% "SOME" 12-30%
"LITTLE" 5-12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	SAMPLES TYPE	SAMPLES HAMM. BLOWS PER 6 IN (FORCE)	SAMPLES REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
60		29	15	SS	6-10-19	17/18		LT GRAY F SD, SM CL, TR PHOSPHATE
65		39	16	SS	12-14-24	18/18		DK GRAY F SD T CL, TR PHOSPHATE

Golder Associates

Field Boring Log

DEPTH HOLE	JOB NO. 993-9525	PROJECT CALPINE AUBURN SALE			BORING NO. B-12
DEPTH SOIL DRILL	QA INSP.	DRILLING METHOD			SHEET 2 OF 2
DEPTH ROCK CORE	WEATHER	DRILLING COMPANY			SURFACE ELEV.
NO. DIST. SA. ___ UD. SA. ___	TEMP.	DRILL RIG		DRILLER	DATUM
DEPTH WL.	HRS. PROD.	WT. SAMPLER HAMMER		DROP	STARTED ___ / ___ (TIME / DATE)
TIME WL.	HRS. DELAYED	WT. CASING HAMMER		DROP	COMPLETED ___ / ___

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK
BR	BROWN
C	COARSE
CA	CASING
CL	CLAY
CLY	CLAYEY
F	FINE
FRAG	FRAGMENTS
GL	GRAVEL
LYD	LAYERED
LI	LITTLE
M	MEDIUM
MIC	MICACEOUS
MOT	MOTTLED
NP	NON-PLASTIC
OG	ORANGE
ORG	ORGANIC
PH	PRESSURE-HYDRAULIC
PM	PRESSURE-MANUAL
R	RED
RES	RESIDUAL
RX	ROCK
SA	SAMPLE
SAT	SATURATED
SD	SAND
SI	SILT
SLT	SILTY
SM	SOME
TR	TRACE
WL	WATER LEVEL
WH	WEIGHT OF HAMMER
Y	YELLOW

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 5% "SOME" 12 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0 4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4 10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	SAMPLES TYPE	SAMPLES HAMM. BLOWS PER 6 IN (FORCE)	SAMPLES REC. / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
60		29	15	DO	6-10-19	17/18		LT GRAY F SD, SM CL, TR PHOSPHATE
65		39	16	DO	12-14-24	18		DK GRAY F SD, T CL, TR PHOSPHATE

Golder Associates

Field Boring Log

DEPTH HOLE ____	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE			BORING NO. B-13
DEPTH SOIL DRILL ____	GA INSP. JB/AW	DRILLING METHOD MUD ROTARY			SHEET 1 OF ____
DEPTH ROCK CORE ____	WEATHER SUNNY	DRILLING COMPANY HUSS			SURFACE ELEV. ____
NO. DIST. SA. 1 UD. SA. ____	TEMP. 60	DRILL RIG BK-51	DRILLER TONY		DATUM ____
DEPTH WL. ____	HRS. PROD. ____	WT. SAMPLER HAMMER 140	DROP 30"		STARTED 0725 (TIME) 11-16-99 (DATE)
TIME WL. ____	HRS. DELAYED ____	WT. CASING HAMMER ____	DROP ____		COMPLETED 0940 (TIME) 11-16-99 (DATE)

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK
BR	BROWN
C	COARSE
CA	CASING
CL	CLAY
CLY	CLAYEY
F	FINE
FRAG	FRAGMENTS
GL	GRAVEL
LYD	LAYERED
LI	LITTLE
M	MEDIUM
MIC	MICACEOUS
MOT	MOTTLED
NP	NON-PLASTIC
OG	ORANGE
ORG	ORGANIC
PH	PRESSURE-HYDRAULIC
PM	PRESSURE-MANUAL
R	RED
RES	RESIDUAL
RX	ROCK
SA	SAMPLE
SAT	SATURATED
SD	SAND
SI	SILT
SLY	SILTY
SM	SOME
TR	TRACE
WL	WATER LEVEL
WH	WEIGHT OF HAMMER
Y	YELLOW

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE"	0-5%	"SOME"	12-30%
"LITTLE"	5-12%	"AND"	30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC. / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		6	1	DO	5-4-2-2	23/24	2	DK GRY F SD SM SI 0-6"
								PALE BROWN F. SD 6"-4'
		5	2	DO	3-2-3-3	12/24	4	
5		8	3	DO	4-4-4-4	15/24	6	VERY PALE BROWN F SD 4'-7'
		13	4	DO	6-6-7-7	18/24	8	YELLOW BR CL & F SD 7'-8'
		34	5	DO	12-15-19-25	23/24	10	RED, YELLOW BROWN & GRAY CL, SM SD
10								
		22	6	DO	14-12-10	14/18	1	RED & LT GRAY F. SD, SM CL
15								
		17	7	DO	9-8-9	12/18		WHITE F. SD
20								
		32	8	DO	14-14-13	11/19		WHITE F-M SD
25								
		35	9	DO	16-16-19	11/19		"SAME"
30								
		95	10	DO	32-45-50/4	10/16		LT BROWN F-M SD
35								
		97	11	DO	27-47-50/4	10/16		"SAME"
40								
		20	12	DO	13-13-7	11/19		WHITE F-M SD
45								
		11	13	DO	5-5-6	18/18		SAT. WHITE F. SD, SM CL
50								
		17	14	DO	9-8-9	18/19		WHITE F. SD, LI CL
55								

Golder Associates

Field Boring Log

DEPTH HOLE	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE		BORING NO. B-13	
DEPTH SOIL DRILL	GA INSP. JB/AW	DRILLING METHOD MUD ROTARY		SHEET 1 OF	
DEPTH ROCK CORE	WEATHER SUNNY	DRILLING COMPANY HUSS		SURFACE ELEV.	
NO. DIST. SA. ✓ UD. SA.	TEMP. 60	DRILL RIG BK-51	DRILLER TONY	DATUM	
DEPTH WL.	HRS. PROD.	WT. SAMPLER HAMMER 140	DROP 30"	STARTED 0725 (TIME) 11-16-99 (DATE)	
TIME WL.	HRS. DELAYED	WT. CASING HAMMER	DROP	COMPLETED 0940 (TIME) 11-16-99 (DATE)	

SAMPLE TYPES

A.S.	AUGER SAMPLE	BL	BLACK
C.S.	CHUNK SAMPLE	BR	BROWN
D.O.	DRIVE OPEN	C	COARSE
D.S.	DENISON SAMPLE	CA	CASING
P.S.	PITCHER SAMPLE	CL	CLAY
R.C.	ROCK CORE	CLY	CLAYEY
S.T.	SLOTTED TUBE	F	FINE
T.O.	THIN-WALLED, OPEN	FRAG	FRAGMENTS
T.P.	THIN-WALLED, PISTON	GL	GRAVEL
W.S.	WASH SAMPLE	LYD	LAYERED
		LI	LITTLE

ABBREVIATIONS

M	MEDIUM	SA	SAMPLE
MIC	MICACEOUS	SAT	SATURATED
MOT	MOTTLED	SD	SAND
NP	NON-PLASTIC	SI	SILT
OG	ORANGE	SLY	SILTY
ORG	ORGANIC	SM	SOME
PH	PRESSURE-HYDRAULIC	TR	TRACE
PM	PRESSURE-MANUAL	WL	WATER LEVEL
R	RED	WH	WEIGHT OF HAMMER
RES	RESIDUAL	Y	YELLOW
RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0-5% "SOME" 12-30%
"LITTLE" 5-12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC. / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		6	1	DO	5-4-2-2	23/24	2	DK GRAY F SD SM SI 0-6"
								PALE BROWN F SD 6"-4'
		5	2	DO	3-2-33	12/24	4	
5		8	3	DO	4-4-4-4	5/24	6	VERY PALE BROWN F SD 4'-7'
		13	4	DO	6-6-7-7	18/24	8	YELLOW BR CL & FS 7'-8'
		34	5	DO	12-15-19-25	23/24	10	RED, YELLOW BROWN & GRAY CL, SM SD
10								
		22	6	DO	14-12-10	14/18	15	RED & LT GRAY F. SD, SM CL
15								
		17	7	DO	9-8-9	12/18		WHITE F. SD
20								
		32	8	DO	14-14-13	11/18		WHITE F-M SD
25								
		35	9	DO	16-16-19	11/18		"SAME"
30								
		95	10	DO	32-45-50/4	10/16		LT BROWN F-M SD
35								
		97	11	DO	27-47-50/4	10/16		"SAME"
40								
		20	12	DO	18-13-7	11/18		WHITE F-M SD
45								
		11	13	DO	5-5-6	18/18		SAT. WHITE F. SD, SM CL
50								
		17	14	DO	9-8-9	18/18		WHITE F. SD, LI CL
55								

Golder Associates

Field Boring Log

DEPTH HOLE _____	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE			BORING NO. B-13
DEPTH SOIL DRILL _____	GA INSP. _____	DRILLING METHOD _____			SHEET 2 OF _____
DEPTH ROCK CORE _____	WEATHER _____	DRILLING COMPANY HUSS			SURFACE ELEV. _____
NO. DIST. SA. ___ UD. SA. ___	TEMP. _____	DRILL RIG _____	DRILLER _____		DATUM _____
DEPTH WL. _____	HRS. PROD. _____	WT. SAMPLER HAMMER _____	DROP _____		STARTED _____ TIME / DATE
TIME WL. _____	HRS. DELAYED _____	WT. CASING HAMMER _____	DROP _____		COMPLETED _____ /

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0-5% "SOME" 12-30%
"LITTLE" 5-12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
60		22		15	SO	6-9-13	18/18		GRAY F-SD, SM CL, TR PHOSPHATE
65		42		16	SO	11-17-25	18/18		DK GRAY F-SD, SM CL, TR PHOSPHATE
70		25		17	SO	9-10-15	18/18		"SAME"
	PLACED ROLLER BIT @ 71' HARD DRILLING @ 72'								
75		77				27-27-50/5"	17/17		GRAY F-SD, SAND CL, LI PHOSPHATE ROCK FRAG IN SPOON HOLE SPOON REFUSAL LAST 1"

Golder Associates

Field Boring Log

DEPTH HOLE	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE		BORING NO. B-13	
DEPTH SOIL DRILL	GA INSP.	DRILLING METHOD		SHEET 2 OF	
DEPTH ROCK CORE	WEATHER	DRILLING COMPANY HUSS		SURFACE ELEV.	
NO. DIST. SA. UD. SA.	TEMP.	DRILL RIG	DRILLER	DATUM	
DEPTH WL.	HRS. PROD.	WT. SAMPLER HAMMER	DROP	STARTED / TIME DATE	
TIME WL.	HRS. DELAYED	WT. CASING HAMMER	DROP	COMPLETED /	

SAMPLE TYPES

A.S.	AUGER SAMPLE	BL	BLACK
C.S.	CHUNK SAMPLE	BR	BROWN
D.O.	DRIVE OPEN	C	COARSE
D.S.	DENISON SAMPLE	CA	CASING
P.S.	PITCHER SAMPLE	CL	CLAY
R.C.	ROCK CORE	CLY	CLAYEY
S.T.	SLOTTED TUBE	F	FINE
T.O.	THIN-WALLED, OPEN	FRAG	FRAGMENTS
T.P.	THIN-WALLED, PISTON	GL	GRAVEL
W.S.	WASH SAMPLE	LYD	LAYERED
		LI	LITTLE

ABBREVIATIONS

M	MEDIUM	SA	SAMPLE
MIC	MICACEOUS	SAT	SATURATED
MOT	MOTTLED	SD	SAND
NP	NON-PLASTIC	SI	SILT
OG	ORANGE	SIY	SILTY
ORG	ORGANIC	SM	SOME
PH	PRESSURE-HYDRAULIC	TR	TRACE
PM	PRESSURE-MANUAL	WL	WATER LEVEL
R	RED	WH	WEIGHT OF HAMMER
RES	RESIDUAL	Y	YELLOW
RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0-5% "SOME" 12-30%
"LITTLE" 5-12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT		SAMPLES NO.	TYPE	HAMM. BLOWS PER 6 IN (FORCE)	REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
60		22		15	DO	6-9-13	18/18		GRAY F-SD, SM CL, TR PHOSPHATE
65		42		16	DO	11-17-25	18/18		DK GRAY F-SD, SM CL, TR PHOSPHATE
70		25		17	DO	9-10-15	18/18		"SAME"
	PLUGS ROLLER BIT @ 71' HARD DRILLING @ 72'								
75		77				27-27-50/5"	17/17		GRAY F-SD, SAND CL, LI PHOSPHATE ROCK FRAG IN SPOON HOLE SPOON REFUSAL LAST 1"

Golder Associates

Field Boring Log

DEPTH HOLE	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE		BORING NO. B-14	
DEPTH SOIL DRILL	GA INSP. BM	DRILLING METHOD Mud Rotary		SHEET 1 OF 2	
DEPTH ROCK CORE	WEATHER	DRILLING COMPANY Huss		SURFACE ELEV.	
NO. DIST. SA. UD. SA.	TEMP. 80°F	DRILL RIG BK-51	DRILLER Eddie	DATUM	
DEPTH WL.	HRS. PROD.	WT. SAMPLER HAMMER 140	DROP 30"	STARTED / (TIME / DATE)	
TIME WL.	HRS. DELAYED	WT. CASING HAMMER	DROP	COMPLETED /	

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" - 0 - 5% "SOME" 12 - 30%
"LITTLE" - 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	SAMPLES TYPE	SAMPLES HAMM. BLOWS PER 6 IN (FORCE)	SAMPLES REC. / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		4	1		3,2,2,3	8/24		DK. Gray F.S. 0-6"
								Pale Brown F.S. 6"-4'
		4	2		3,2,2,2	5/24		"
5		8	3		2,3,5,6	8/24		"
		13	4		6,6,7,8	13/24		Brown F.S.
		23	5		10,10,13,8	23/24		Reddish orange Clay w/ F.S.
10		14	6		6,7,7,7	10/18		
15		12	7		5,5,7,7	10/18		White F.S.
20		31	8		15,18,13	5/18		"
25		53	9		13,18,35	7/18		"
30		54	10		15,24,30	6/18		"
35		21	11		8,11,10	7/18		Lt. Brown F.S.
40		8	12		2,3,5	12/18		"
45		10	13		3,4,6	12/18		White F.S.
50		9	14		6,4,5	10/18		"
55		12	15		4,5,7	13/18		"

Golder Associates

Field Boring Log

DEPTH HOLE ____	JOB NO. 993-9570	PROJECT CALPINE - AUBURNDALE			BORING NO. B-14
DEPTH SOIL DRILL ____	GA INSP. BM	DRILLING METHOD Mud Rotary			SHEET 1 OF 5
DEPTH ROCK CORE ____	WEATHER ____	DRILLING COMPANY HUSS			SURFACE ELEV. ____
NO. DIST. SA. ____ UD. SA. ____	TEMP. 80°F	DRILL RIG BK-51	DRILLER Eddie		DATUM ____
DEPTH WL. ____	HRS. PROD. ____	WT. SAMPLER HAMMER 140	DROP 30"		STARTED ____ / ____ (TIME / DATE)
TIME WL. ____	HRS. DELAYED ____	WT. CASING HAMMER ____	DROP ____		COMPLETED ____ / ____

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DAVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK	M	MEDIUM	SA	SAMPLE
BR	BROWN	MIC	MICACEOUS	SAT	SATURATED
C	COARSE	MOT	MOTTLED	SD	SAND
CA	CASING	NP	NON-PLASTIC	SI	SILT
CL	CLAY	OG	ORANGE	SIY	SILTY
CLY	CLAYEY	ORG	ORGANIC	SM	SOME
F	FINE	PH	PRESSURE-HYDRAULIC	TR	TRACE
FRAG	FRAGMENTS	PM	PRESSURE-MANUAL	WL	WATER LEVEL
GL	GRAVEL	R	RED	WH	WEIGHT OF HAMMER
LYD	LAYERED	RES	RESIDUAL	Y	YELLOW
LI	LITTLE	RX	ROCK		

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0-5% "SOME" 12-30%
"LITTLE" 5-12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	SAMPLES TYPE	SAMPLES HAMM. BLOWS PER 6 IN (FORCE)	SAMPLES REC. / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
		4	1		3,2,2,3	8/24		Dk. Gray F.S. 0-6"
		4	2		3,2,2,2	5/24		Pale Brown F.S. 6"-4'
5		8	3		2,3,5,6	8/24	5	"
		13	4		6,6,7,8	13/24		Brown F.S.
		23	5		10,10,13,8	23/24		Reddish orange Clay w/ F.S.
10		14	6		6,7,7	10/18	10	
15		12	7		5,5,7	10/18	15	White F.S.
20		31	8		15,18,13	5/18	20	"
25		53	9		13,18,35	7/18	25	"
30		54	10		15,24,30	6/18	30	"
35		21	11		8,11,10	7/18	35	Lt. Brown F.S.
40		8	12		2,3,5	12/18	40	"
45		10	13		3,4,6	12/18	45	White F.S.
50		9	14		6,4,5	10/18	50	"
55		12	15		4,5,7	13/18	55	"

Golder Associates

Field Boring Log

DEPTH HOLE _____	JOB NO. _____	PROJECT _____		BORING NO. B-14
DEPTH SOIL DRILL _____	GA INSP. _____	DRILLING METHOD _____		SHEET 2 OF 2
DEPTH ROCK CORE _____	WEATHER _____	DRILLING COMPANY _____		SURFACE ELEV. _____
NO. DIST. SA. ___ UD. SA. ___	TEMP. _____	DRILL RIG _____	DRILLER _____	DATUM _____
DEPTH WL. _____	HRS. PROD. _____	WT. SAMPLER HAMMER _____	DROP _____	STARTED ___/___ (Time / Date)
TIME WL. _____	HRS. DELAYED _____	WT. CASING HAMMER _____	DROP _____	COMPLETED ___/___

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

ABBREVIATIONS

BL	BLACK
BR	BROWN
C	COARSE
CA	CASING
CL	CLAY
CLY	CLAYEY
F	FINE
FRAG	FRAGMENTS
GL	GRAVEL
LYD	LAYERED
LI	LITTLE
M	MEDIUM
MIC	MICACEOUS
MOT	MOTTLED
NP	NON-PLASTIC
OG	ORANGE
ORG	ORGANIC
PH	PRESSURE-HYDRAULIC
PM	PRESSURE-MANUAL
R	RED
RES	RESIDUAL
RX	ROCK
SA	SAMPLE
SAT	SATURATED
SD	SAND
SI	SILT
SIY	SILTY
SM	SOME
TR	TRACE
WL	WATER LEVEL
WH	WEIGHT OF HAMMER
Y	YELLOW

SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0 - 5% "SOME" 12 - 30%
"LITTLE" 5 - 12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	SAMPLES TYPE	SAMPLES HAMM. BLOWS PER 6 IN (FORCE)	SAMPLES REC / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
60		25	16		9, 10, 15	18/18		DK. Gray F.S. w/ Some Clay
65		50+	17		9, 50/4"	10/18		DK. Gray Clay w/ Some F.S.

Golder Associates

Field Boring Log

DEPTH HOLE _____ JOB NO. _____ PROJECT _____ BORING NO. B-14

DEPTH SOIL DRILL _____ GA INSP. _____ DRILLING METHOD _____ SHEET 2 OF 2

DEPTH ROCK CORE _____ WEATHER _____ DRILLING COMPANY _____ SURFACE ELEV. _____

NO. DIST. SA. _____ UD. SA. _____ TEMP. _____ DRILL RIG _____ DRILLER _____ DATUM _____

DEPTH WL. _____ HRS. PROD. _____ WT. SAMPLER HAMMER _____ DROP _____ STARTED _____ / _____ (TIME / DATE)

TIME WL. _____ HRS. DELAYED _____ WT. CASING HAMMER _____ DROP _____ COMPLETED _____ / _____

SAMPLE TYPES

A.S.	AUGER SAMPLE
C.S.	CHUNK SAMPLE
D.O.	DRIVE OPEN
D.S.	DENISON SAMPLE
P.S.	PITCHER SAMPLE
R.C.	ROCK CORE
S.T.	SLOTTED TUBE
T.O.	THIN-WALLED, OPEN
T.P.	THIN-WALLED, PISTON
W.S.	WASH SAMPLE

BL	BLACK
BR	BROWN
C	COARSE
CA	CASING
CL	CLAY
CLY	CLAYEY
F	FINE
FRAG	FRAGMENTS
GL	GRAVEL
LYD	LAYERED
LI	LITTLE

ABBREVIATIONS

M	MEDIUM
MIC	MICACEOUS
MOT	MOTTLED
NP	NON-PLASTIC
OG	ORANGE
ORG	ORGANIC
PH	PRESSURE-HYDRAULIC
PM	PRESSURE-MANUAL
R	RED
RES	RESIDUAL
RX	ROCK

SA	SAMPLE
SAT	SATURATED
SD	SAND
SI	SILT
SIY	SILTY
SM	SOME
TR	TRACE
WL	WATER LEVEL
WH	WEIGHT OF HAMMER
Y	YELLOW

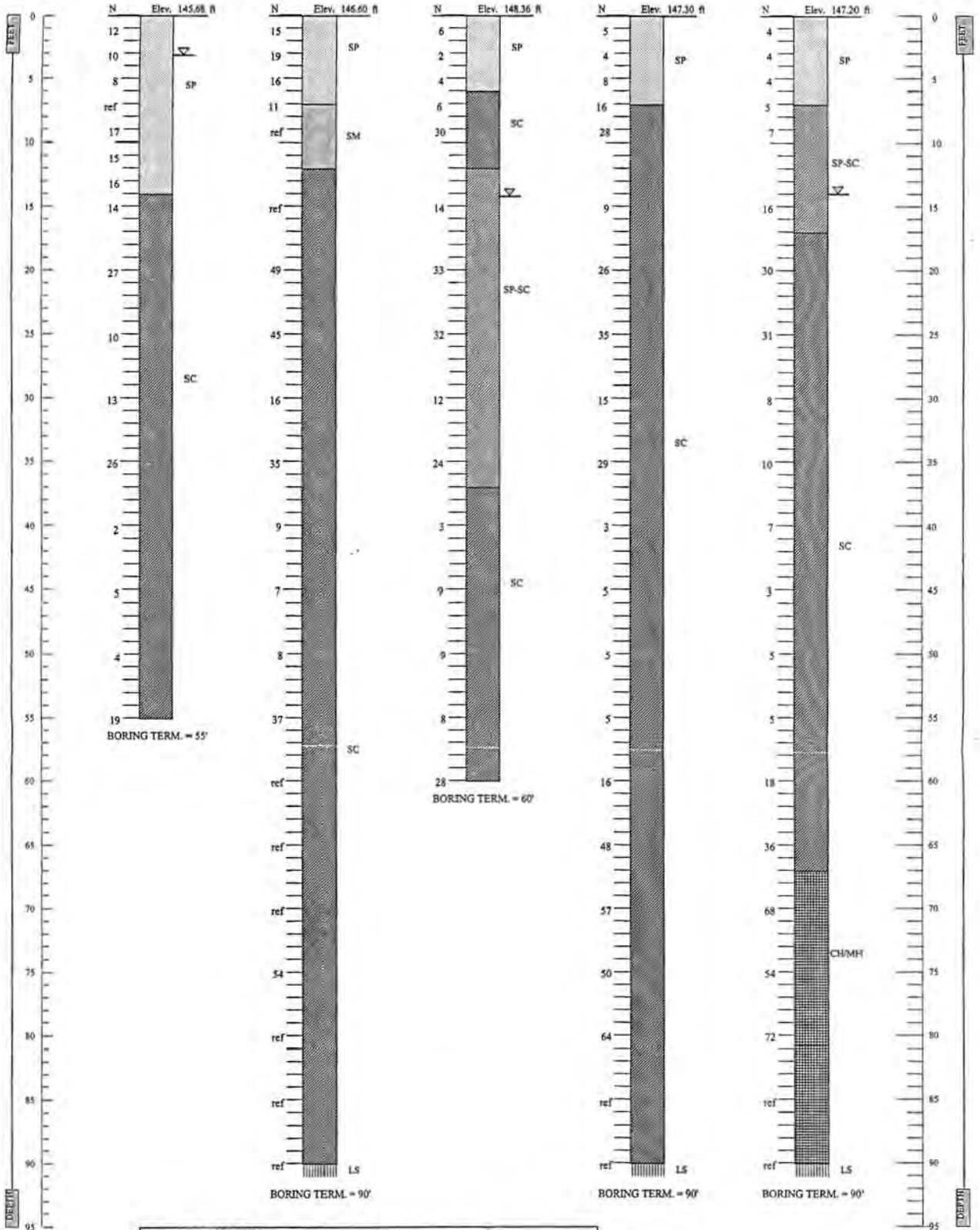
SOIL DESCRIPTION - RANGE OF PROPORTION

"TRACE" 0-5% "SOME" 12-30%
"LITTLE" 5-12% "AND" 30-50%

RELATIVE DENSITY		BLOWS	CONSISTENCY		FINGER PRESSURE
VERY LOOSE	VLS	0-4	VERY SOFT	VS	EXTRUDES
LOOSE	LS	4-10	SOFT	S	MOLDS EASILY
COMPACT	CP	10-30	FIRM	FM	MOLDS
DENSE	DN	30-50	STIFF	ST	THUMB INDENTS
VERY DENSE	VDN	50	VERY STIFF	VST	THUMBNAIL INDENT
			HARD	H	RESISTS THUMBNAIL

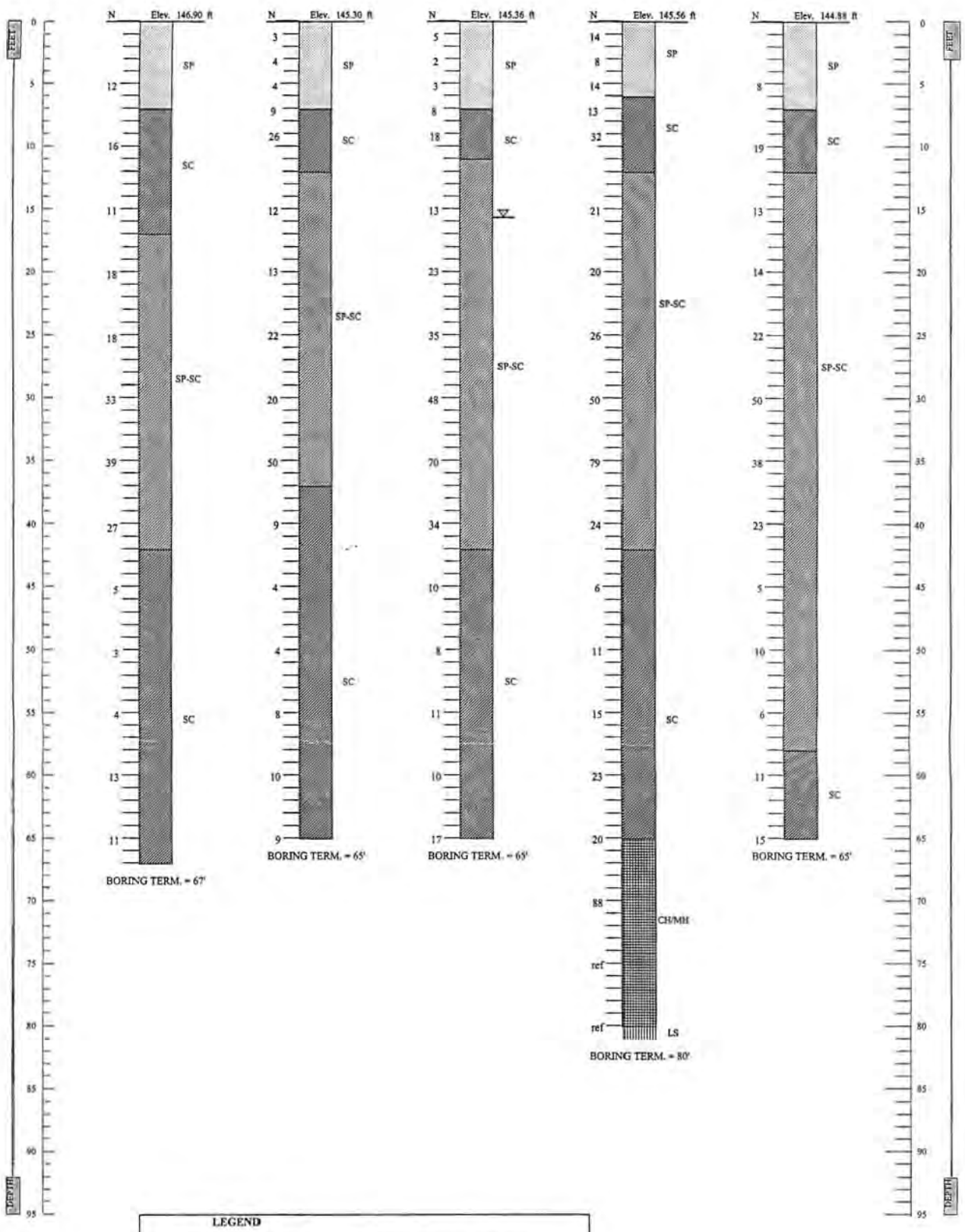
ELEV. / DEPTH	DESCRIPTION	BLOWS / FT	SAMPLES NO.	SAMPLES TYPE	SAMPLES HAMM. BLOWS PER 6 IN (FORCE)	SAMPLES REC. / ATT	DEPTH	SAMPLE DESCRIPTION AND BORING NOTES
60		25	16		9, 10, 15	18/18		DK. Gray F.S. W/ Some Clay
65		50+	17		9, 50/4"	10/18		DK. Gray Clay W/ Some F.S.

10.10 Geologic Boring Log Profiles



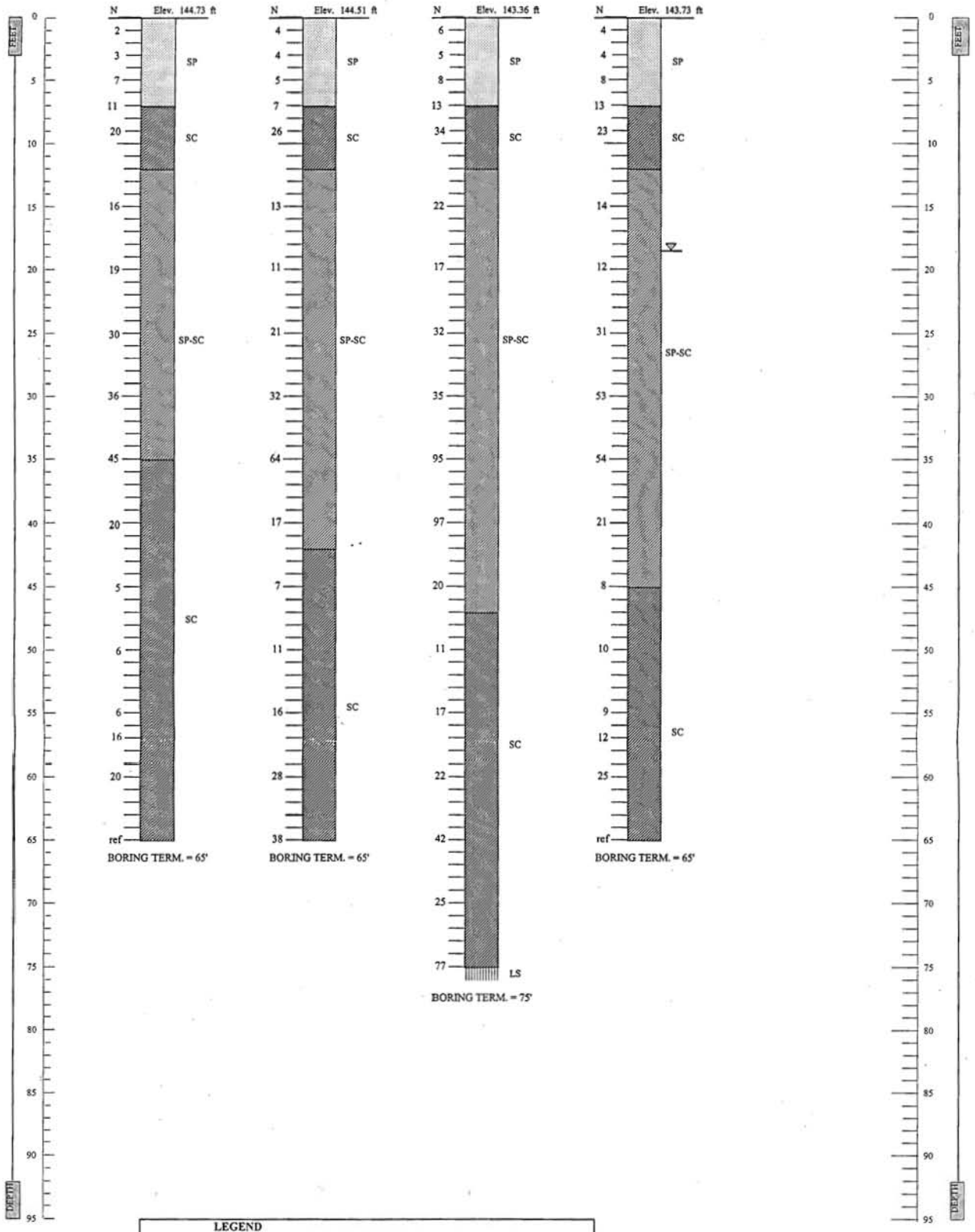
LEGEND

	Fine SAND (SP) with occasional trace to little clay and silt
	Fine silty SAND (SM)
	Fine SAND with little clay (SP-SC)
	Fine clayey SAND (SC)
	Sandy CLAY (CH/MH)
	Fractured LIMESTONE encountered at end of boring (LS)
N	Standard Penetration Resistance (blows per foot)
ref	Refusal; >50 Blows per 6 Inch Penetration into Soil
SP	Unified Soil Classification System Designation



LEGEND

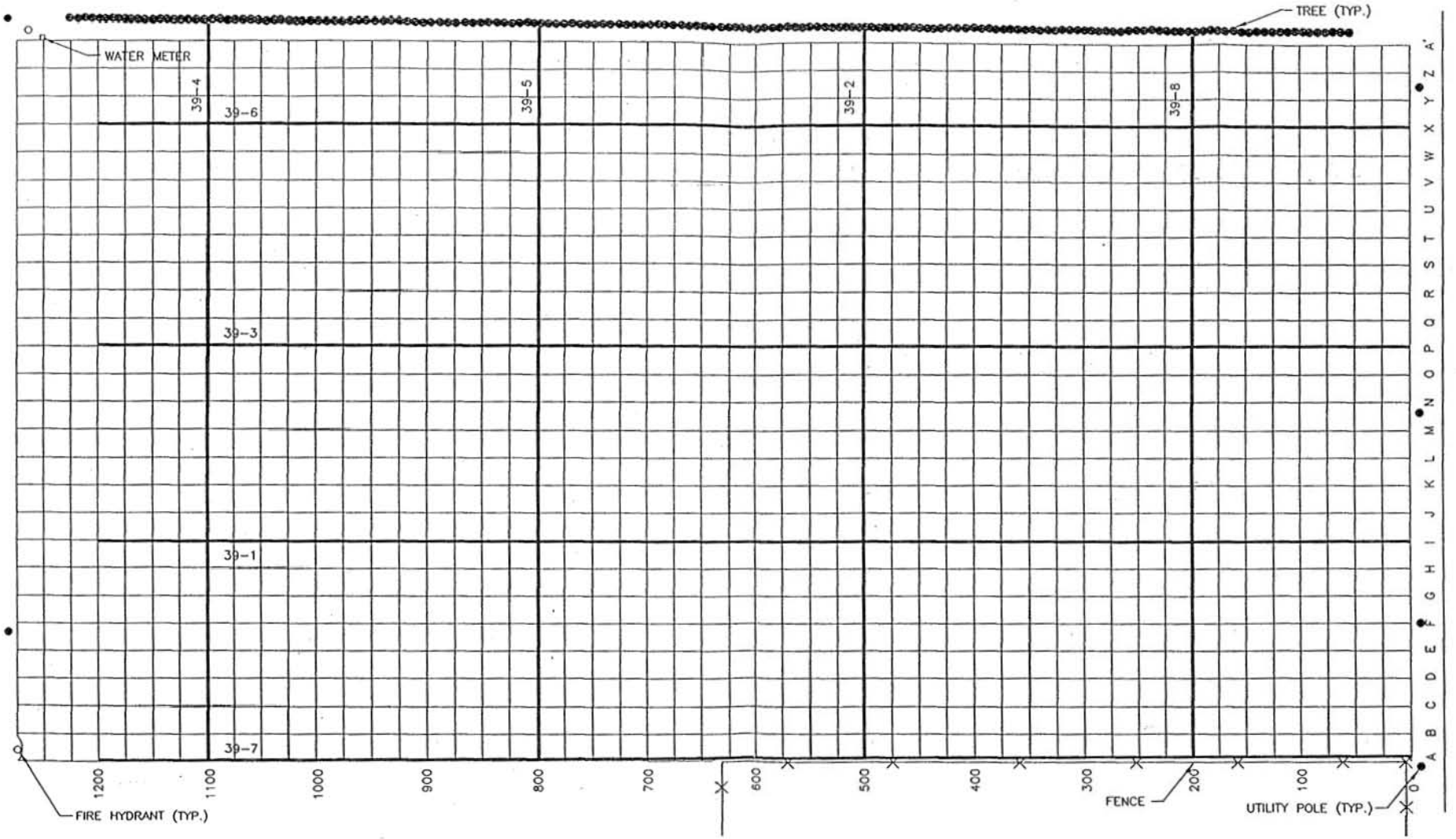
	Fine SAND (SP) with occasional trace to little clay and silt
	Fine silty SAND (SM)
	Fine SAND with little clay (SP-SC)
	Fine clayey SAND (SC)
	Sandy CLAY (CH/MH)
	Fractured LIMESTONE encountered at end of boring (LS)
N	Standard Penetration Resistance (blows per foot)



LEGEND

- Fine SAND (SP) with occasional trace to little clay and silt
- Fine silty SAND (SM)
- Fine SAND with little clay (SP-SC)
- Fine clayey SAND (SC)
- Sandy CLAY (CH/MH)
- Fractured LIMESTONE encountered at end of boring (LS)
- N — Standard Penetration Resistance (blows per foot)

10.11 Geophysical Survey Results



EXPLANATION

APPROXIMATE LOCATION OF GPR TRANSECT LINES

APPROXIMATE LOCATION OF SEISMIC LINES

N

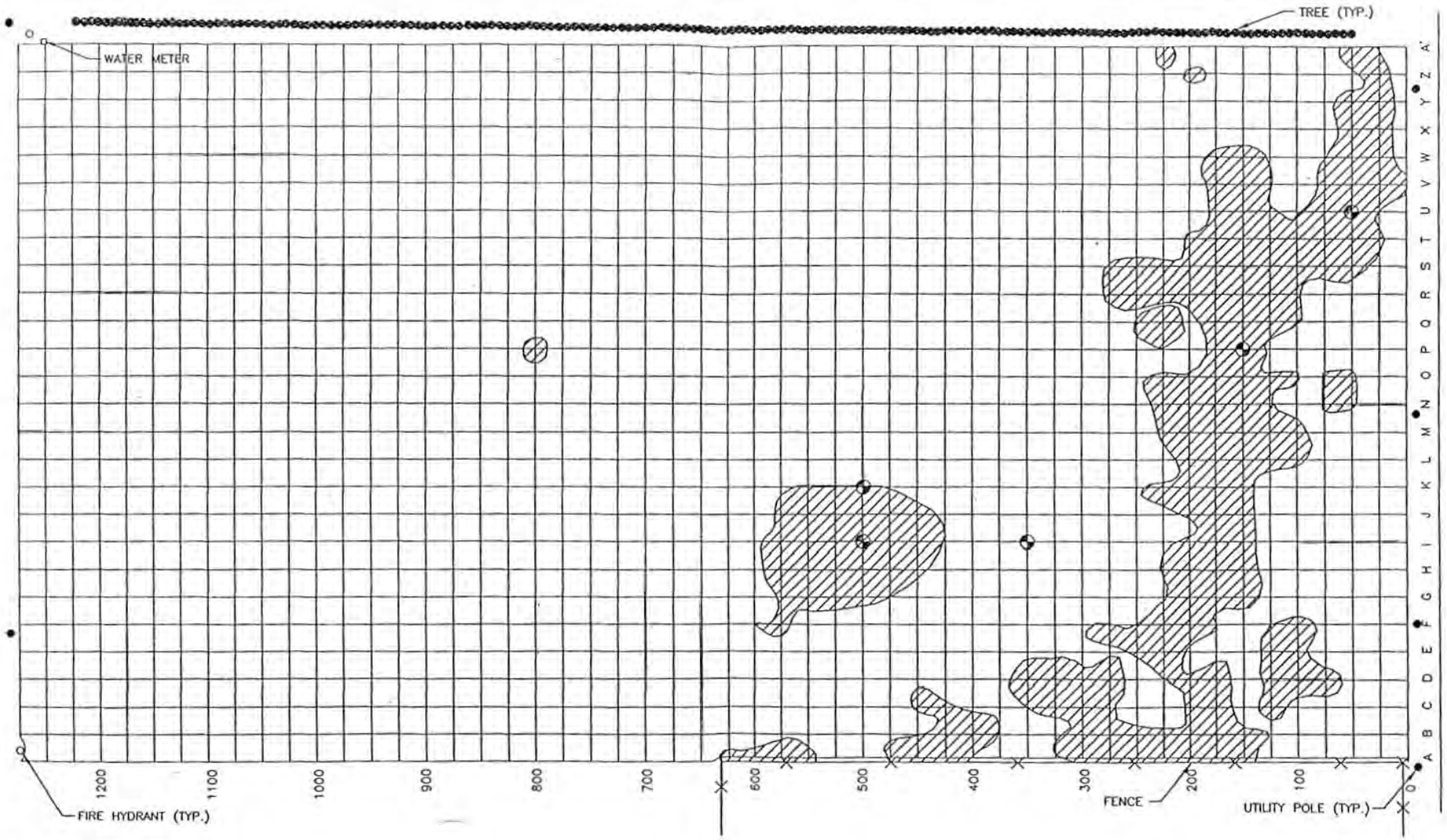
0 100'

GOLDER ASSOCIATES, INC. TAMPA, FLORIDA

SDII GLOBAL CORPORATION

SITE PLAN SHOWING APPROXIMATE LOCATION OF GPR TRA LINES AND SEISMIC LINES AUBURNDALE SITE AUBURNDALE, FLORIDA

Designed By:	CT	Proj. No.	1011339
Checked By:	TLD	DWG	1339-2
Drawn By:	JMW	Date:	11/01/99



EXPLANATION

APPROXIMATE LOCATION OF GPR TRANSECT LINES

APPROXIMATE LOCATION OF SUBSURFACE ANOMALIES

RECOMMENDED BORING LOCATION

N

0 100'

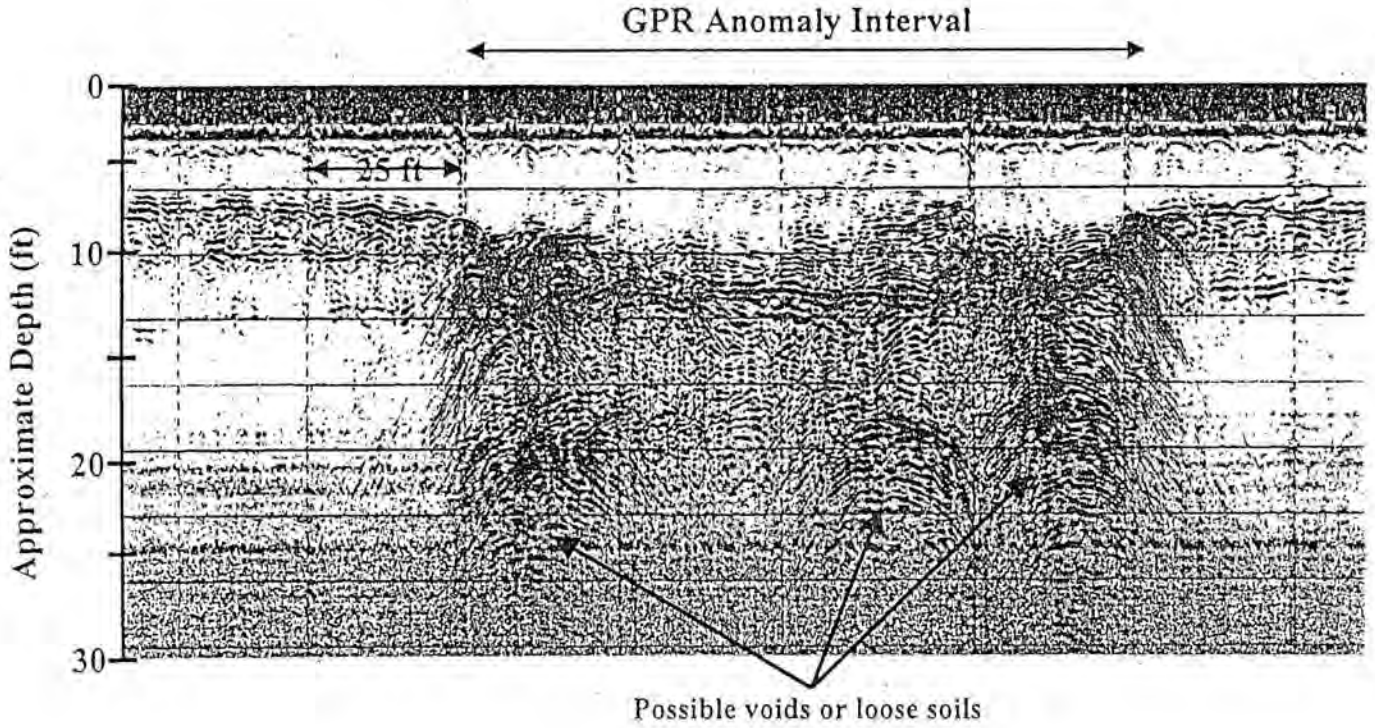
GOLDER ASSOCIATES, INC. TAMPA, FLORIDA

SDII GLOBAL CORPORATION

SITE PLAN SHOWING GPR SUBSURFACE ANOMALIES
AUBURNDALE SITE
AUBURNDALE, FLORIDA

Designed By:	CT	Proj. No.	1011339
Checked By:	TLD	DWG	1339-4
Drawn By:	JMW	Date:	11/01/99

10.12 Landscape Plan



GOLDER ASSOCIATES, INC. TAMPA, FLORIDA	SDII GLOBAL CORPORATION	EXAMPLE GPR DATA ANOMALY AUBURNDALE SITE AUBURNDALE, FLORIDA			
		DESIGNED BY: CT CHECKED BY: TLD DRAWN BY: JMW	PROJECT NO.: 1011339 DRAWING NO.: 1339-3 DATE: 11/01/99	FIGURE 2	

OVERSIZE DOCUMENT WAS REMOVED AND INSERTED INTO OCULUS SEPARATELY.

10.13 Seasonal and Annual Cooling Tower Impact

SACTI Model Input and Output

```
fort3
plumes.out
fort8
  CALPINE OSPRAY SITE LMDCT, 1987-91 TAMPA MET DATA
  2  1  1  0   10000.0   10000.0 10  0  1  0  0
  10.7          189.0
  27.1          189.0
  43.6          189.0
  60.0          189.0
  76.5          189.0
  10.7          202.7
  27.1          202.7
  43.6          202.7
  60.0          202.7
  76.5          202.7
  3       90.0       45.0       0.0
  3  3  2  1  1  1  2  3  3  3  2  1  1  1  2  3
                82.3       25.6       90.0
     43.60     195,9
 CALPINE OSPRAY LMDCT --  SACTI DRIFT EMISSION SPECTRUM
 7             176.54     .0014       2.17
      10.0     0.5000
     100.0     0.2500
     150.0     0.1200
     250.0     0.0910
     400.0     0.0315
     500.0     0.0048
    1000.0     0.0027
```

EPRI PLUME AND DRIFT ANALYSIS SYSTEM PREPROCESSOR CODE, PRE-RELEASE VERSION 09-01-90
CASE STUDY: CALPINE FL - LINEAR MECHANICAL DRAFT COOLING TOWER -SACTI, TPA MET 1987-91

INPUT INFORMATION

SURFACE TAPE TYPE:	CD144
TOWER TYPE:	LINEAR MECHANICAL DRAFT
TOWER HEIGHT (M):	16.76
TOWER DIAMETER (M):	26.97
TOWER HEAT (KW):	388200.00
TOWER AIR FLOW (KG/S):	6432.10
SITE LATITUDE:	28.05
SITE LONGITUDE:	81.80
SITE TIME ZONE:	EASTERN
ROUGHNESS HEIGHT (CM):	30.00
REFERENCE HEIGHT (M):	6.70
RECORD STOPPING SWITCH:	0
RECORD SKIPPING FACTOR:	1
HOURLY RECORD PRINT LOG:	NOT SELECTED
BI-DAILY MIXING HEIGHT TAPE:	SELECTED
MIXING HEIGHT TYPE:	RURAL
FOGGING/ICING OPTION:	SELECTED
DRIFT OPTION:	SELECTED

MONTHLY CLEARNESS INDEX

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
.610	.610	.620	.620	.630	.590	.560	.550	.560	.600	.640	.600

TOTAL DAILY SOLAR ENERGY DEPOSITION
(LONG-TERM AVERAGE FOR MONTH)

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
13.67	16.35	19.95	22.79	24.88	23.96	22.29	20.70	18.99	16.94	14.93	12.63

1 WIND SPEED FREQUENCY TABLE

CALPINE FL - LINEAR MECHANICAL DRAFT COOLING TOWER -SACTI, TPA MET 1987-91

WIND SPEED RANGE (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	SUM
	WIND FROM																
	WIND HEADED																
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	
0 TO 1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1 TO 2	0.004	0.003	0.008	0.014	0.014	0.007	0.004	0.002	0.004	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.075
2 TO 3	0.013	0.010	0.027	0.045	0.040	0.029	0.016	0.011	0.015	0.008	0.009	0.009	0.010	0.010	0.014	0.007	0.275
3 TO 4	0.016	0.011	0.024	0.040	0.032	0.026	0.017	0.012	0.013	0.010	0.011	0.014	0.019	0.010	0.013	0.008	0.276
4 TO 5	0.011	0.007	0.015	0.023	0.026	0.014	0.015	0.009	0.010	0.007	0.006	0.011	0.022	0.007	0.008	0.006	0.198
5 TO 6	0.006	0.004	0.009	0.011	0.012	0.008	0.007	0.004	0.006	0.004	0.003	0.004	0.014	0.006	0.006	0.004	0.107
6 TO 7	0.003	0.002	0.003	0.004	0.007	0.002	0.001	0.001	0.003	0.003	0.001	0.000	0.006	0.003	0.004	0.002	0.047
7 TO 8	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.015
8 TO 9	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.005
9 TO 10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
10 TO 11	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
11 TO 12	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
12 TO 13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
13 TO 14	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
14 TO 15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
15 TO 20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20 TO 25	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
25 TO 30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30 TO OVER	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE	3.72871	VARIANCE	2.04234	STD DEV	1.42911
STD ERR	0.01115	SKEWNESS	1.20995	KURTOSIS	1.63384

1 **********RELATIVE HUMIDITY FREQUENCY TABLE**********

CALPINE FL - LINEAR MECHANICAL DRAFT COOLING TOWER -SACTI, TPA MET 1987-91

RELATIVE HUMIDITY RANGE(%)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
	WIND HEADED																
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	SUM
0 TO 10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10 TO 20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
20 TO 30	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005
30 TO 40	0.003	0.002	0.002	0.002	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.021
40 TO 50	0.005	0.004	0.005	0.009	0.011	0.004	0.003	0.003	0.002	0.001	0.002	0.003	0.006	0.003	0.003	0.003	0.067
50 TO 60	0.007	0.005	0.010	0.014	0.015	0.007	0.005	0.004	0.005	0.004	0.005	0.008	0.019	0.006	0.006	0.003	0.123
60 TO 70	0.009	0.006	0.008	0.016	0.017	0.009	0.007	0.004	0.007	0.008	0.006	0.010	0.022	0.010	0.009	0.006	0.155
70 TO 80	0.010	0.006	0.013	0.020	0.021	0.017	0.011	0.008	0.010	0.008	0.007	0.008	0.014	0.010	0.013	0.007	0.182
80 TO 90	0.009	0.007	0.018	0.028	0.024	0.020	0.015	0.008	0.012	0.006	0.007	0.006	0.009	0.008	0.009	0.005	0.191
90 TO 100	0.009	0.007	0.026	0.045	0.039	0.025	0.017	0.010	0.015	0.007	0.005	0.003	0.004	0.004	0.007	0.004	0.229
100 TO OVER	0.001	0.000	0.002	0.005	0.005	0.003	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.027

AVERAGE 75.13139 VARIANCE 308.88251 STD DEV 17.57505
STD ERR 0.13707 SKEWNESS 1.06934 KURTOSIS 1.17959

1 **********DEW POINT TEMPERATURE FREQUENCY TABLE**********

CALPINE FL - LINEAR MECHANICAL DRAFT COOLING TOWER -SACTI, TPA MET 1987-91

DEW POINT TEMP RANGE (C)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
	WIND HEADED																
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	SUM
-45 TO -40	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-40 TO -35	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-35 TO -30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-30 TO -25	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-25 TO -20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-20 TO -15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-15 TO -10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
-10 TO -5	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
-5 TO 0	0.002	0.003	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011
0 TO 5	0.006	0.004	0.004	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.001	0.024
5 TO 10	0.012	0.008	0.011	0.012	0.006	0.002	0.000	0.000	0.000	0.000	0.001	0.001	0.003	0.004	0.006	0.006	0.073
10 TO 15	0.011	0.008	0.020	0.029	0.023	0.009	0.005	0.004	0.002	0.002	0.001	0.002	0.005	0.006	0.010	0.007	0.146
15 TO 20	0.010	0.007	0.021	0.041	0.042	0.025	0.020	0.015	0.020	0.012	0.010	0.008	0.018	0.008	0.012	0.007	0.276
20 TO 25	0.012	0.007	0.025	0.054	0.061	0.050	0.035	0.018	0.030	0.020	0.021	0.029	0.048	0.022	0.019	0.009	0.461
25 TO 30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.005
30 TO 35	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
35 TO 40	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
40 TO 45	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
45 TO OVER	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE 17.72020 VARIANCE 35.30037 STD DEV 5.94141
STD ERR 0.04634 SKEWNESS 1.09556 KURTOSIS 1.23627

1 **********DRY BULB TEMPERATURE FREQUENCY TABLE**********

CALPINE FL - LINEAR MECHANICAL DRAFT COOLING TOWER -SACTI, TPA MET 1987-91

DRY BULB TEMP RANGE (C)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
	WIND HEADED																
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	SUM
-45 TO -40	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-40 TO -35	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-35 TO -30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-30 TO -25	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-25 TO -20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-20 TO -15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-15 TO -10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-10 TO -5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-5 TO 0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0 TO 5	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
5 TO 10	0.005	0.006	0.006	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022
10 TO 15	0.012	0.008	0.016	0.013	0.006	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.006	0.005	0.073
15 TO 20	0.014	0.010	0.021	0.033	0.023	0.011	0.006	0.005	0.005	0.003	0.003	0.002	0.004	0.007	0.013	0.008	0.167
20 TO 25	0.011	0.007	0.025	0.054	0.058	0.038	0.025	0.016	0.025	0.013	0.009	0.007	0.014	0.009	0.013	0.008	0.333
25 TO 30	0.007	0.004	0.012	0.027	0.038	0.030	0.024	0.015	0.019	0.014	0.015	0.017	0.031	0.015	0.013	0.007	0.289
30 TO 35	0.004	0.003	0.005	0.009	0.008	0.005	0.004	0.003	0.004	0.005	0.007	0.013	0.027	0.007	0.004	0.003	0.113

35	TO 40	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
40	TO 45	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
45	TO OVER	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE	23.14021	VARIANCE	35.46363	STD DEV	5.95513
STD ERR	0.04645	SKEWNESS	1.08113	KURTOSIS	1.21126

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STABILITY FREQUENCY TABLE

CALPINE FL - LINEAR MECHANICAL DRAFT COOLING TOWER -SACTI, TPA MET 1987-91

STABILITY CLASS	WIND FROM N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
	WIND HEADED S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	SUM
1	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.011
2	0.004	0.003	0.005	0.007	0.007	0.005	0.006	0.005	0.005	0.006	0.007	0.011	0.012	0.004	0.002	0.002	0.089
3	0.008	0.005	0.009	0.018	0.019	0.013	0.012	0.009	0.010	0.006	0.007	0.011	0.028	0.007	0.004	0.005	0.171
4	0.018	0.011	0.025	0.037	0.039	0.020	0.019	0.010	0.019	0.014	0.008	0.007	0.024	0.017	0.019	0.011	0.298
5	0.012	0.010	0.021	0.031	0.032	0.021	0.013	0.008	0.010	0.005	0.005	0.005	0.006	0.007	0.011	0.007	0.204
6	0.011	0.008	0.022	0.038	0.030	0.022	0.009	0.006	0.008	0.003	0.005	0.004	0.005	0.007	0.012	0.005	0.195
7	0.002	0.001	0.004	0.008	0.007	0.003	0.001	0.001	0.001	0.000	0.001	0.000	0.001	0.001	0.001	0.001	0.032

AVERAGE	4.30876	VARIANCE	1.80381	STD DEV	1.34306
STD ERR	0.01047	SKEWNESS	1.12111	KURTOSIS	1.32332

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K FREQUENCY TABLE

CALPINE FL - LINEAR MECHANICAL DRAFT COOLING TOWER -SACTI, TPA MET 1987-91

K (UA/VE) RANGE	WIND FROM N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
	WIND HEADED S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	SUM
0.0 TO 0.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.1 TO 0.2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.2 TO 0.3	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.015
0.3 TO 0.4	0.002	0.001	0.002	0.002	0.003	0.002	0.002	0.001	0.002	0.001	0.002	0.002	0.002	0.001	0.001	0.001	0.024
0.4 TO 0.5	0.005	0.004	0.010	0.017	0.016	0.010	0.005	0.004	0.005	0.004	0.004	0.005	0.005	0.004	0.003	0.003	0.104
0.5 TO 0.6	0.007	0.005	0.016	0.027	0.024	0.018	0.010	0.007	0.008	0.006	0.007	0.008	0.009	0.006	0.008	0.004	0.170
0.6 TO 0.7	0.003	0.002	0.005	0.010	0.010	0.009	0.006	0.004	0.004	0.002	0.003	0.005	0.006	0.003	0.003	0.001	0.076
0.7 TO 0.8	0.005	0.005	0.010	0.017	0.013	0.009	0.006	0.005	0.007	0.004	0.003	0.005	0.011	0.003	0.005	0.003	0.110
0.8 TO 0.9	0.010	0.006	0.014	0.024	0.020	0.015	0.009	0.006	0.008	0.005	0.006	0.006	0.011	0.007	0.009	0.005	0.160
0.9 TO 1.0	0.005	0.003	0.008	0.013	0.014	0.008	0.007	0.004	0.005	0.003	0.002	0.004	0.009	0.004	0.004	0.003	0.095
1.0 TO 1.2	0.007	0.006	0.010	0.015	0.015	0.009	0.008	0.005	0.007	0.003	0.003	0.003	0.013	0.005	0.007	0.005	0.120
1.2 TO 1.4	0.005	0.003	0.006	0.006	0.007	0.004	0.003	0.001	0.002	0.002	0.001	0.001	0.004	0.003	0.004	0.002	0.053
1.4 TO 1.6	0.003	0.003	0.004	0.005	0.009	0.002	0.002	0.001	0.003	0.003	0.001	0.000	0.004	0.003	0.004	0.003	0.049
1.6 TO 1.8	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.013
1.8 TO 2.0	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.005
2.0 TO 2.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.003
2.5 TO 3.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
3.0 TO OVER	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE	0.82670	VARIANCE	0.11035	STD DEV	0.33219
STD ERR	0.00259	SKEWNESS	1.23810	KURTOSIS	1.74444

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VSTAR FREQUENCY TABLE

CALPINE FL - LINEAR MECHANICAL DRAFT COOLING TOWER -SACTI, TPA MET 1987-91

VSTAR RANGE	WIND FROM N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
	WIND HEADED S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	SUM
0 TO 1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1 TO 2	0.033	0.020	0.041	0.072	0.080	0.053	0.039	0.026	0.033	0.026	0.027	0.036	0.070	0.035	0.036	0.022	0.648
2 TO 3	0.007	0.006	0.012	0.016	0.013	0.010	0.008	0.004	0.004	0.002	0.002	0.001	0.002	0.003	0.004	0.004	0.096
3 TO 4	0.003	0.003	0.008	0.012	0.011	0.010	0.005	0.004	0.004	0.002	0.001	0.001	0.001	0.001	0.002	0.001	0.070
4 TO 5	0.002	0.003	0.005	0.009	0.006	0.002	0.001	0.001	0.002	0.001	0.001	0.000	0.000	0.001	0.002	0.001	0.037
5 TO 6	0.002	0.001	0.004	0.004	0.002	0.001	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.001	0.001	0.022
6 TO 7	0.001	0.001	0.002	0.003	0.003	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.015
7 TO 8	0.001	0.000	0.002	0.003	0.002	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.013
8 TO 9	0.001	0.000	0.004	0.006	0.006	0.003	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.023
9 TO 10	0.000	0.000	0.001	0.002	0.002	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.010
10 TO 11	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.013
11 TO 12	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005
12 TO 13	0.000	0.000	0.001	0.001	0.001	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007

13	TO	14	0.000	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005
14	TO	15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
15	TO	20	0.001	0.000	0.001	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007
20	TO	25	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
25	TO	30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
30	TO	OVER	0.001	0.000	0.002	0.005	0.005	0.003	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.027

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AVERAGE 3.70389 VARIANCE 35.16309 STD DEV 5.92985
STD ERR 0.04625 SKEWNESS 3.85790 KURTOSIS 17.87093

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1 **********PLUME LENGTH PARAMETER FREQUENCY TABLE**********

CALPINE FL - LINEAR MECHANICAL DRAFT COOLING TOWER -SACTI, TPA MET 1987-91

PLUME LENGTH RANGE (M)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
	**********WIND FROM**********																
	**********WIND HEADED**********																
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	SUM
0.0 TO 0.2	0.024	0.014	0.028	0.052	0.063	0.039	0.029	0.020	0.025	0.022	0.023	0.032	0.065	0.029	0.027	0.017	0.508
0.2 TO 0.4	0.002	0.001	0.001	0.004	0.003	0.003	0.002	0.001	0.002	0.001	0.001	0.000	0.001	0.001	0.002	0.001	0.026
0.4 TO 0.6	0.001	0.001	0.002	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.021
0.6 TO 0.8	0.001	0.001	0.002	0.003	0.003	0.002	0.001	0.001	0.002	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.022
0.8 TO 1.0	0.001	0.001	0.002	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.021
1.0 TO 1.2	0.002	0.001	0.002	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.001	0.001	0.001	0.001	0.022
1.2 TO 1.4	0.001	0.001	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.014
1.4 TO 1.6	0.001	0.000	0.001	0.002	0.002	0.001	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.013
1.6 TO 1.8	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.013
1.8 TO 2.0	0.001	0.001	0.001	0.002	0.002	0.001	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.013
2.0 TO 2.2	0.001	0.001	0.001	0.002	0.002	0.001	0.002	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.001	0.016
2.2 TO 2.4	0.001	0.001	0.002	0.003	0.002	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.014
2.4 TO 2.6	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.012
2.6 TO 2.8	0.001	0.001	0.001	0.002	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009
2.8 TO 3.0	0.001	0.000	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007
3.0 TO 3.2	0.001	0.001	0.001	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006
3.2 TO 3.4	0.000	0.000	0.002	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.008
3.4 TO 3.6	0.001	0.000	0.002	0.001	0.001	0.001	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008
3.6 TO 3.8	0.001	0.000	0.000	0.001	0.002	0.001	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008
3.8 TO 4.0	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004
4.0 TO 4.2	0.000	0.001	0.001	0.002	0.001	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010
4.2 TO 4.4	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006
4.4 TO 4.6	0.000	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006
4.6 TO 4.8	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009
4.8 TO 5.0	0.000	0.000	0.001	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009
5.0 TO 5.2	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005
5.2 TO 5.4	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005
5.4 TO 5.6	0.000	0.000	0.001	0.002	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008
5.6 TO 5.8	0.000	0.000	0.001	0.001	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006
5.8 TO 6.0	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005
6.0 TO 6.2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
6.2 TO 6.4	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005
6.4 TO 6.6	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004
6.6 TO 6.8	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
6.8 TO 7.0	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004
7.0 TO 7.2	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
7.2 TO 7.4	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
7.4 TO 7.6	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
7.6 TO 7.8	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
7.8 TO 8.0	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
8.0 TO 8.2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
8.2 TO 8.4	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
8.4 TO 8.6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
8.6 TO 8.8	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
8.8 TO 9.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9.0 TO 9.2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
9.2 TO 9.4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
9.4 TO 9.6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
9.6 TO 9.8	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004
9.8 TO 10.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001

1 **********PLUME LENGTH PARAMETER FREQUENCY TABLE**********

CALPINE FL - LINEAR MECHANICAL DRAFT COOLING TOWER -SACTI, TPA MET 1987-91

PLUME LENGTH RANGE (M)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
	**********WIND FROM**********																
	**********WIND HEADED**********																
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	SUM
10.0 TO 10.4	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006
10.4 TO 10.8	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002

10.8 TO 11.2	0.000	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
11.2 TO 11.6	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005
11.6 TO 12.0	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
12.0 TO 12.4	0.000	0.000	0.000	0.001	0.002	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007
12.4 TO 12.8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
12.8 TO 13.2	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004
13.2 TO 13.6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
13.6 TO 14.0	0.000	0.000	0.000	0.001	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006
14.0 TO 14.4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
14.4 TO 14.8	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004
14.8 TO 15.2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
15.2 TO 15.6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
15.6 TO 16.0	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004
16.0 TO 16.4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
16.4 TO 16.8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
16.8 TO 17.2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
17.2 TO 17.6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
17.6 TO 18.0	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
18.0 TO 18.4	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
18.4 TO 18.8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
18.8 TO 19.2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
19.2 TO 19.6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
19.6 TO 20.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
20.0 TO 21.0	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004
21.0 TO 22.0	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004
22.0 TO 23.0	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
23.0 TO 24.0	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
24.0 TO 25.0	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
25.0 TO 26.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
26.0 TO 27.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
27.0 TO 28.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
28.0 TO 29.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
29.0 TO 30.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
30.0 TO 31.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
31.0 TO 32.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
32.0 TO 33.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
33.0 TO 34.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
34.0 TO 35.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
35.0 TO 36.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
36.0 TO 37.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
37.0 TO 38.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
38.0 TO 39.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
39.0 TO 40.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
40.0 TO OVER	0.001	0.000	0.002	0.005	0.005	0.003	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.027

AVERAGE	3.32183	VARIANCE 37.60563	STD DEV 6.13234
STD ERR	0.04783	SKEWNESS 2.88395	KURTOSIS 9.44814

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PLUMEHEIGHT PARAMETER FREQUENCY TABLE

CALPINE FL - LINEAR MECHANICAL DRAFT COOLING TOWER -SACTI, TPA MET 1987-91

PLUME HEIGHT RANGE (M)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
	WIND FROM															
	WIND HEADED															
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	SUM
0.0 TO 0.1	0.025	0.014	0.028	0.053	0.064	0.039	0.030	0.020	0.025	0.022	0.023	0.032	0.066	0.029	0.028	0.017	0.516
0.1 TO 0.2	0.003	0.002	0.003	0.006	0.003	0.004	0.003	0.002	0.003	0.001	0.002	0.001	0.001	0.002	0.003	0.002	0.040
0.2 TO 0.3	0.003	0.002	0.004	0.004	0.004	0.004	0.003	0.001	0.002	0.001	0.000	0.001	0.002	0.002	0.002	0.001	0.036
0.3 TO 0.4	0.002	0.002	0.003	0.005	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.035
0.4 TO 0.5	0.002	0.003	0.003	0.005	0.004	0.003	0.002	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.032
0.5 TO 0.6	0.002	0.001	0.003	0.005	0.004	0.002	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.001	0.002	0.001	0.025
0.6 TO 0.7	0.002	0.002	0.003	0.004	0.003	0.003	0.002	0.002	0.002	0.000	0.001	0.000	0.001	0.001	0.001	0.001	0.027
0.7 TO 0.8	0.002	0.001	0.003	0.003	0.004	0.003	0.002	0.001	0.001	0.001	0.000	0.000	0.001	0.000	0.001	0.001	0.024
0.8 TO 0.9	0.001	0.001	0.003	0.004	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.001	0.001	0.000	0.021
0.9 TO 1.0	0.001	0.001	0.002	0.003	0.002	0.001	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.016
1.0 TO 1.1	0.001	0.001	0.002	0.002	0.003	0.002	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.016
1.1 TO 1.2	0.001	0.001	0.002	0.003	0.002	0.002	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.014
1.2 TO 1.3	0.001	0.001	0.002	0.003	0.003	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.016
1.3 TO 1.4	0.001	0.001	0.002	0.004	0.002	0.002	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.016
1.4 TO 1.5	0.000	0.000	0.002	0.003	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011
1.5 TO 1.6	0.001	0.000	0.001	0.003	0.002	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.012
1.6 TO 1.7	0.000	0.000	0.001	0.002	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009
1.7 TO 1.8	0.001	0.000	0.001	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008
1.8 TO 1.9	0.000	0.001	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006
1.9 TO 2.0	0.001	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005
2.0 TO 2.1	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006

2.1	TO 2.2	0.000	0.000	0.001	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004
2.2	TO 2.3	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006
2.3	TO 2.4	0.000	0.000	0.001	0.002	0.002	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008
2.4	TO 2.5	0.000	0.000	0.001	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007
2.5	TO 2.6	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006
2.6	TO 2.7	0.000	0.000	0.001	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006
2.7	TO 2.8	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006
2.8	TO 2.9	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
2.9	TO 3.0	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004
3.0	TO 3.1	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
3.1	TO 3.2	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005
3.2	TO 3.3	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
3.3	TO 3.4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
3.4	TO 3.5	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
3.5	TO 3.6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
3.6	TO 3.7	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
3.7	TO 3.8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
3.8	TO 3.9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
3.9	TO 4.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
4.0	TO 4.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
4.1	TO 4.2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
4.2	TO 4.3	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
4.3	TO 4.4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4.4	TO 4.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
4.5	TO 4.6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4.6	TO 4.7	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4.7	TO 4.8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4.8	TO 4.9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4.9	TO 5.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

1 **********PLUME HEIGHT PARAMETER FREQUENCY TABLE**********

CALPINE FL - LINEAR MECHANICAL DRAFT COOLING TOWER -SACTI, TPA MET 1987-91

PLUME HEIGHT RANGE (M)		N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
		**********							WIND FROM									**********
		**********							WIND HEADED									**********
		S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	SUM
5.0	TO 5.2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5.2	TO 5.4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
5.4	TO 5.6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5.6	TO 5.8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5.8	TO 6.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6.0	TO 6.2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6.2	TO 6.4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6.4	TO 6.6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6.6	TO 6.8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6.8	TO 7.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7.0	TO 7.2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7.2	TO 7.4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7.4	TO 7.6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7.6	TO 7.8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7.8	TO 8.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8.0	TO 8.2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8.2	TO 8.4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8.4	TO 8.6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8.6	TO 8.8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8.8	TO 9.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9.0	TO 9.2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9.2	TO 9.4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9.4	TO 9.6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9.6	TO 9.8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9.8	TO 10.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10.0	TO 10.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
10.5	TO 11.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
11.0	TO 11.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
11.5	TO 12.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
12.0	TO 12.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
12.5	TO 13.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
13.0	TO 13.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
13.5	TO 14.0	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
14.0	TO 14.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
14.5	TO 15.0	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
15.0	TO 15.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
15.5	TO 16.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
16.0	TO 16.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
16.5	TO 17.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
17.0	TO 17.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
17.5	TO 18.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001

18.0 TO 18.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
18.5 TO 19.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
19.0 TO 19.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
19.5 TO 20.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20.0 TO OVER	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

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AVERAGE 0.92357 VARIANCE 5.25334 STD DEV 2.29202
STD ERR 0.01788 SKEWNESS 5.00748 KURTOSIS 29.57238

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1 **********PLUME LENGTH-K-STABILITY FREQUENCY TABLE**********
CALPINE FL - LINEAR MECHANICAL DRAFT COOLING TOWER -SACTI, TPA MET 1987-91
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PLUME LENGTH RANGE (M)	STABILITY CATEGORY 1 K1	K2	K3	STABILITY CATEGORY 2 K1	K2	K3	STABILITY CATEGORY 3 K1	K2	K3
0.0 TO 0.2	0.230	0.025	0.000	0.098	0.117	0.003	0.034	0.000	0.000
0.2 TO 0.4	0.002	0.000	0.000	0.009	0.007	0.000	0.007	0.000	0.000
0.4 TO 0.6	0.002	0.000	0.000	0.007	0.005	0.000	0.006	0.000	0.000
0.6 TO 0.8	0.002	0.000	0.000	0.007	0.006	0.000	0.007	0.000	0.000
0.8 TO 1.0	0.001	0.000	0.000	0.008	0.005	0.000	0.007	0.000	0.000
1.0 TO 1.2	0.001	0.000	0.000	0.009	0.006	0.000	0.006	0.000	0.000
1.2 TO 1.4	0.001	0.000	0.000	0.005	0.004	0.000	0.004	0.000	0.000
1.4 TO 1.6	0.001	0.000	0.000	0.005	0.004	0.000	0.003	0.000	0.000
1.6 TO 1.8	0.001	0.000	0.000	0.005	0.003	0.000	0.005	0.000	0.000
1.8 TO 2.0	0.000	0.000	0.000	0.005	0.003	0.000	0.005	0.000	0.000
2.0 TO 2.2	0.000	0.000	0.000	0.005	0.004	0.000	0.006	0.000	0.000
2.2 TO 2.4	0.000	0.000	0.000	0.005	0.003	0.000	0.006	0.000	0.000
2.4 TO 2.6	0.000	0.000	0.000	0.005	0.002	0.000	0.004	0.000	0.000
2.6 TO 2.8	0.000	0.000	0.000	0.003	0.002	0.000	0.004	0.000	0.000
2.8 TO 3.0	0.000	0.000	0.000	0.002	0.002	0.000	0.003	0.000	0.000
3.0 TO 3.2	0.000	0.000	0.000	0.002	0.001	0.000	0.002	0.000	0.000
3.2 TO 3.4	0.000	0.000	0.000	0.004	0.002	0.000	0.003	0.000	0.000
3.4 TO 3.6	0.000	0.000	0.000	0.003	0.002	0.000	0.003	0.000	0.000
3.6 TO 3.8	0.000	0.000	0.000	0.003	0.002	0.000	0.003	0.000	0.000
3.8 TO 4.0	0.000	0.000	0.000	0.001	0.001	0.000	0.002	0.000	0.000
4.0 TO 4.2	0.000	0.000	0.000	0.004	0.002	0.000	0.005	0.000	0.000
4.2 TO 4.4	0.000	0.000	0.000	0.002	0.001	0.000	0.002	0.000	0.000
4.4 TO 4.6	0.000	0.000	0.000	0.002	0.001	0.000	0.003	0.000	0.000
4.6 TO 4.8	0.000	0.000	0.000	0.003	0.002	0.000	0.005	0.000	0.000
4.8 TO 5.0	0.000	0.000	0.000	0.003	0.001	0.000	0.005	0.000	0.000
5.0 TO 5.2	0.000	0.000	0.000	0.002	0.001	0.000	0.001	0.000	0.000
5.2 TO 5.4	0.000	0.000	0.000	0.002	0.001	0.000	0.002	0.000	0.000
5.4 TO 5.6	0.000	0.000	0.000	0.003	0.001	0.000	0.004	0.000	0.000
5.6 TO 5.8	0.000	0.000	0.000	0.003	0.001	0.000	0.003	0.000	0.000
5.8 TO 6.0	0.000	0.000	0.000	0.002	0.000	0.000	0.002	0.000	0.000
6.0 TO 6.2	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000
6.2 TO 6.4	0.000	0.000	0.000	0.002	0.001	0.000	0.002	0.000	0.000
6.4 TO 6.6	0.000	0.000	0.000	0.002	0.000	0.000	0.002	0.000	0.000
6.6 TO 6.8	0.000	0.000	0.000	0.001	0.001	0.000	0.001	0.000	0.000
6.8 TO 7.0	0.000	0.000	0.000	0.001	0.001	0.000	0.002	0.000	0.000
7.0 TO 7.2	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000
7.2 TO 7.4	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000
7.4 TO 7.6	0.000	0.000	0.000	0.001	0.000	0.000	0.002	0.000	0.000
7.6 TO 7.8	0.000	0.000	0.000	0.001	0.001	0.000	0.001	0.000	0.000
7.8 TO 8.0	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000
8.0 TO 8.2	0.000	0.000	0.000	0.001	0.001	0.000	0.001	0.000	0.000
8.2 TO 8.4	0.000	0.000	0.000	0.001	0.000	0.000	0.002	0.000	0.000
8.4 TO 8.6	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000
8.6 TO 8.8	0.000	0.000	0.000	0.001	0.000	0.000	0.002	0.000	0.000
8.8 TO 9.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9.0 TO 9.2	0.000	0.000	0.000	0.001	0.001	0.000	0.001	0.000	0.000
9.2 TO 9.4	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000
9.4 TO 9.6	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000
9.6 TO 9.8	0.000	0.000	0.000	0.001	0.001	0.000	0.002	0.000	0.000
9.8 TO 10.0	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000

1 **********PLUME LENGTH-K-STABILITY FREQUENCY TABLE**********
CALPINE FL - LINEAR MECHANICAL DRAFT COOLING TOWER -SACTI, TPA MET 1987-91
****

PLUME LENGTH RANGE (M)	STABILITY CATEGORY 1 K1	K2	K3	STABILITY CATEGORY 2 K1	K2	K3	STABILITY CATEGORY 3 K1	K2	K3

10.0 TO 10.4	0.000	0.000	0.000	0.001	0.001	0.000	0.003	0.000	0.000	
10.4 TO 10.8	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	
10.8 TO 11.2	0.000	0.000	0.000	0.001	0.001	0.000	0.002	0.000	0.000	
11.2 TO 11.6	0.000	0.000	0.000	0.002	0.000	0.000	0.003	0.000	0.000	
11.6 TO 12.0	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	
12.0 TO 12.4	0.000	0.000	0.000	0.002	0.000	0.000	0.005	0.000	0.000	
12.4 TO 12.8	0.000	0.000	0.000	0.001	0.001	0.000	0.001	0.000	0.000	
12.8 TO 13.2	0.000	0.000	0.000	0.001	0.000	0.000	0.002	0.000	0.000	
13.2 TO 13.6	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	
13.6 TO 14.0	0.000	0.000	0.000	0.002	0.000	0.000	0.004	0.000	0.000	
14.0 TO 14.4	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	
14.4 TO 14.8	0.000	0.000	0.000	0.002	0.000	0.000	0.002	0.000	0.000	
14.8 TO 15.2	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	
15.2 TO 15.6	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	
15.6 TO 16.0	0.000	0.000	0.000	0.002	0.001	0.000	0.002	0.000	0.000	
16.0 TO 16.4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
16.4 TO 16.8	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	
16.8 TO 17.2	0.000	0.000	0.000	0.002	0.000	0.000	0.001	0.000	0.000	
17.2 TO 17.6	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	
17.6 TO 18.0	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	
18.0 TO 18.4	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	
18.4 TO 18.8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
18.8 TO 19.2	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	
19.2 TO 19.6	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	
19.6 TO 20.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
20.0 TO 21.0	0.000	0.000	0.000	0.002	0.001	0.000	0.002	0.000	0.000	
21.0 TO 22.0	0.000	0.000	0.000	0.002	0.001	0.000	0.001	0.000	0.000	
22.0 TO 23.0	0.000	0.000	0.000	0.002	0.000	0.000	0.001	0.000	0.000	
23.0 TO 24.0	0.000	0.000	0.000	0.001	0.001	0.000	0.001	0.000	0.000	
24.0 TO 25.0	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	
25.0 TO 26.0	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	
26.0 TO 27.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
27.0 TO 28.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
28.0 TO 29.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
29.0 TO 30.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
30.0 TO 31.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
31.0 TO 32.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
32.0 TO 33.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
33.0 TO 34.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
34.0 TO 35.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
35.0 TO 36.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
36.0 TO 37.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
37.0 TO 38.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
38.0 TO 39.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
39.0 TO 40.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
40.0 TO OVER	0.000	0.000	0.000	0.015	0.002	0.000	0.009	0.000	0.000	

1 CAT NUM TYPE UH WX DBT DTDZ DPT VE TE MXHT PLGT FREQ REFERENCE HEIGHT=

1	FOG	10.0	0.25	263.1	-0.010	262.6	9.5	292.3	500.	177.99	0.0000
2	FOG	15.0	0.25	263.1	-0.010	262.6	9.5	292.3	500.	222.88	0.0000
3	FOG	12.0	0.25	263.1	-0.010	261.1	9.5	292.2	500.	60.46	0.0000
4	FOG	17.0	0.25	263.1	-0.010	261.1	9.5	292.2	500.	64.30	0.0000
5	FOG	15.0	0.25	263.1	-0.010	258.6	9.5	291.9	500.	26.34	0.0000
6	FOG	12.5	0.25	273.1	-0.010	272.4	9.7	296.5	500.	83.29	0.0000
7	FOG	16.5	0.25	273.1	-0.010	269.4	9.7	296.0	500.	11.50	0.0000
8	FOG	15.0	0.25	283.1	-0.010	282.4	9.9	301.1	500.	39.28	0.0001
9	FOG	16.5	0.25	283.1	-0.010	279.4	9.9	300.3	500.	2.49	0.0000
10	FOG	15.5	0.25	293.1	-0.010	291.1	10.1	305.8	500.	1.59	0.0002
11	PLUME	3.6	0.15	301.8	-0.018	292.6	10.2	307.7	1212.	0.01	0.2303
12	PLUME	3.1	0.25	299.0	-0.010	292.5	10.2	307.2	1463.	0.01	0.0982
13	PLUME	2.5	0.30	298.4	0.030	293.4	10.2	307.5	1638.	0.01	0.0343
14	PLUME	5.8	0.15	299.7	-0.018	289.3	10.2	306.2	1205.	0.01	0.0251
15	PLUME	5.6	0.25	298.0	-0.010	289.7	10.1	306.1	1400.	0.01	0.1173
16	PLUME	4.9	0.30	300.1	0.030	294.0	10.2	308.0	1712.	0.01	0.0001
17	PLUME	9.7	0.25	294.2	-0.010	284.9	10.1	304.0	979.	0.00	0.0028
18	PLUME	3.3	0.15	296.4	-0.018	292.5	10.2	306.8	781.	0.22	0.0023
19	PLUME	2.9	0.25	297.1	-0.010	293.6	10.2	307.3	1233.	0.18	0.0095
20	PLUME	2.5	0.30	296.5	0.030	292.6	10.2	306.9	1580.	0.14	0.0073
21	PLUME	5.7	0.15	295.4	-0.018	291.5	10.1	306.3	324.	0.30	0.0001
22	PLUME	5.4	0.25	293.8	-0.010	288.6	10.1	305.0	1241.	0.14	0.0070
23	PLUME	8.7	0.25	283.7	-0.010	273.7	9.8	299.3	359.	0.33	0.0001
24	PLUME	3.3	0.15	295.2	-0.018	291.0	10.1	306.1	718.	0.23	0.0021
25	PLUME	2.9	0.25	295.3	-0.010	291.3	10.1	306.2	1353.	0.27	0.0072
26	PLUME	2.3	0.30	296.3	0.030	292.6	10.2	306.8	1553.	0.29	0.0063
27	PLUME	6.4	0.15	291.5	-0.018	284.8	10.0	303.4	1308.	0.03	0.0001

28	PLUME	5.3	0.25	292.4	-0.010	286.9	10.1	304.2	1169.	0.26	0.0054
29	PLUME	8.7	0.25	284.8	-0.010	277.0	9.9	300.2	913.	0.57	0.0001
30	PLUME	3.3	0.25	294.9	-0.010	291.0	10.1	306.0	1256.	0.48	0.0217
31	PLUME	3.3	0.25	294.9	-0.010	291.4	10.1	306.1	1134.	0.70	0.0308
32	PLUME	3.6	0.25	293.5	-0.010	289.8	10.1	305.3	1278.	0.93	0.0316
33	PLUME	3.3	0.25	293.4	-0.010	290.1	10.1	305.4	1203.	1.34	0.0251
34	PLUME	3.2	0.25	293.7	-0.010	290.8	10.1	305.7	1248.	1.70	0.0288
35	PLUME	3.1	0.30	293.2	0.030	290.5	10.1	305.5	1308.	2.07	0.0286
36	PLUME	3.2	0.25	292.2	-0.010	289.6	10.1	305.0	1205.	2.66	0.0287
37	PLUME	3.0	0.25	292.5	-0.010	290.3	10.1	305.3	1183.	3.29	0.0284
38	PLUME	2.9	0.25	293.5	-0.010	291.7	10.1	306.0	1241.	4.08	0.0289
39	PLUME	3.1	0.25	292.8	-0.010	291.2	10.1	305.7	1225.	5.08	0.0290
40	PLUME	3.1	0.25	291.3	-0.010	289.8	10.1	304.9	1217.	6.75	0.0293
41	PLUME	2.8	0.30	290.7	0.030	289.5	10.1	304.7	1167.	8.70	0.0290
42	PLUME	2.6	0.30	292.8	0.030	292.0	10.1	306.0	1176.	12.14	0.0282
43	PLUME	3.0	0.25	292.1	-0.010	291.5	10.1	305.7	1123.	17.19	0.0288
44	PLUME	3.2	0.25	290.8	-0.010	290.4	10.1	305.1	997.	34.46	0.0358
45	PLUME	2.8	0.30	292.5	0.030	292.5	10.1	306.1	1177.	147.24	0.0119

MET RECORDS READ :	43824
RECORDS DISCARDED:	26304
CALM RECORDS:	1080
TOTAL TO NEW FILE:	17520

1

EPRI SEASONAL/ANNUAL TABLES PROGRAM, VERSION 11-01-90

CALPINE OSPRAY SITE LMDCT, 1987-91 TAMPA MET DATA

SUMMARY OF PLUME PREDICTIONS WHEN WIND IS FROM 90.0 DEGREES EAST OF NORTH

CAT NO.	PLUME LENGTH	PLUME HEIGHT	PLUME RADIUS
11	23.70	17.3	7.60
12	23.40	17.6	10.10
13	21.90	19.4	11.60
14	26.70	12.9	7.40
15	46.30	17.6	8.30
16	21.80	11.3	8.30
17	157.20	27.3	11.50
18	22.80	18.5	12.10
19	22.80	18.3	12.10
20	21.80	19.5	12.30
21	73.80	29.3	14.10
22	113.30	37.3	13.30
23	265.80	43.7	15.90
24	22.80	18.5	12.10
25	22.90	18.3	12.10
26	21.10	20.2	12.70
27	172.40	49.4	18.00
28	122.90	40.1	14.20
29	305.50	48.1	16.70
30	24.00	17.0	11.20
31	23.90	17.0	11.40
32	24.50	16.3	10.80
33	23.80	17.2	11.50
34	23.60	17.4	11.40
35	23.90	17.0	11.30
36	23.50	17.5	11.60
37	23.20	17.9	11.80
38	22.70	18.6	12.10
39	23.30	17.8	11.80
40	40.40	27.9	21.00
41	22.20	19.0	12.10
42	71.40	44.2	64.90

* A PLUS SIGN INDICATES THAT THE VISIBLE PLUME DID NOT END WITHIN A CENTERLINE DISTANCE OF 10000.0 METERS

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EPRI SEASONAL/ANNUAL TABLES PROGRAM, VERSION 11-01-90

CALPINE OSPRAY SITE LMDCT, 1987-91 TAMPA MET DATA

SUMMARY OF PLUME PREDICTIONS WHEN WIND IS FROM 45.0 DEGREES EAST OF NORTH

CAT NO.	PLUME LENGTH	PLUME HEIGHT	PLUME RADIUS
11	14.50	12.7	5.50
12	14.20	12.9	6.70
13	17.50	16.1	8.10
14	21.80	11.0	5.20
15	36.40	15.1	7.10
16	17.10	9.2	5.50
17	147.20	26.1	11.90
18	13.60	13.1	7.00
19	13.50	13.1	7.00
20	17.40	16.1	8.30
21	26.30	13.2	9.50
22	93.60	32.7	13.10
23	255.80	42.1	15.90
24	13.60	13.2	7.00
25	13.60	13.1	7.00
26	16.80	16.7	8.40

27	152.60	45.2	17.80
28	103.20	35.5	14.00
29	285.60	45.3	17.00
30	14.80	12.3	6.70
31	14.70	12.4	6.70
32	15.20	11.8	6.50
33	14.60	12.5	6.70
34	14.50	12.6	6.70
35	14.60	12.4	6.70
36	14.40	12.7	6.70
37	13.90	12.8	6.80
38	13.50	13.2	6.90
39	18.40	15.7	12.90
40	13.60	13.0	6.80
41	22.00	18.5	16.70
42	51.70	36.5	50.40

* A PLUS SIGN INDICATES THAT THE VISIBLE PLUME DID NOT END WITHIN A CENTERLINE DISTANCE OF 10000.0 METERS

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EPRI SEASONAL/ANNUAL TABLES PROGRAM, VERSION 11-01-90

CALPINE OSPRAY SITE LMDCT, 1987-91 TAMPA MET DATA

SUMMARY OF PLUME PREDICTIONS WHEN WIND IS FROM 0.0 DEGREES EAST OF NORTH

CAT NO.	PLUME LENGTH	PLUME HEIGHT	PLUME RADIUS
11	19.00	15.5	11.60
12	18.70	15.7	16.00
13	21.80	19.6	18.50
14	26.80	11.8	5.20
15	61.00	19.9	12.90
16	21.90	10.3	5.90
17	118.00	19.1	13.10
18	17.90	16.9	16.90
19	17.80	16.9	16.80
20	21.70	19.7	18.60
21	161.60	49.0	21.00
22	153.30	41.6	19.10
23	18.70	6.2	4.10
24	17.80	16.9	16.90
25	17.90	16.8	16.70
26	21.00	20.4	19.40
27	163.50	42.8	19.50
28	153.20	42.1	19.40
29	18.70	6.2	4.10
30	19.30	15.1	16.20
31	19.20	15.2	16.30
32	19.80	14.5	15.70
33	19.10	15.3	16.30
34	19.00	15.5	16.50
35	19.20	15.2	16.20
36	18.90	15.6	16.50
37	18.40	16.2	16.20
38	17.70	17.0	16.80
39	18.70	15.9	16.70
40	17.90	16.8	16.30
41	196.30	93.1	43.70
42	207.60	92.2	126.00

* A PLUS SIGN INDICATES THAT THE VISIBLE PLUME DID NOT END WITHIN A CENTERLINE DISTANCE OF 10000.0 METERS

1 ********** FREQUENCY PERCENTAGE BY CATEGORY AND WIND DIRECTION **********

CALPINE OSPRAY SITE LMDCT, 1987-91 TAMPA MET DATA

SEASON=ANNUAL

********** WIND FROM **********

CATEGORY NUMBER	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
********** PLUME HEADED **********																
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	SUM
11	0.96	0.63	1.17	1.97	2.14	1.63	1.51	1.17	1.26	1.14	1.27	2.12	3.20	0.87	0.50	0.47	22.01
12	0.48	0.26	0.55	1.21	1.16	0.80	0.54	0.35	0.41	0.31	0.38	0.52	1.00	0.77	0.87	0.34	9.94

13	0.43	0.19	0.49	0.73	1.11	0.70	0.29	0.06	0.14	0.14	0.50	0.35	0.51	0.50	0.75	0.31	7.21
14	0.10	0.04	0.15	0.22	0.26	0.13	0.13	0.12	0.09	0.06	0.07	0.08	0.59	0.12	0.09	0.13	2.36
15	0.53	0.31	0.58	1.23	1.97	0.82	0.51	0.22	0.58	0.51	0.29	0.25	1.21	0.69	0.80	0.51	11.01
16	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
17	0.01	0.01	0.00	0.02	0.02	0.01	0.00	0.01	0.02	0.02	0.01	0.01	0.02	0.09	0.02	0.02	0.26
18	0.00	0.01	0.00	0.04	0.03	0.03	0.03	0.01	0.01	0.01	0.01	0.00	0.02	0.01	0.01	0.01	0.21
19	0.05	0.03	0.06	0.11	0.12	0.12	0.09	0.06	0.06	0.03	0.04	0.01	0.05	0.03	0.03	0.01	0.91
20	0.04	0.06	0.05	0.20	0.09	0.12	0.02	0.06	0.06	0.03	0.09	0.03	0.02	0.04	0.10	0.03	1.03
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
22	0.07	0.02	0.05	0.09	0.07	0.05	0.02	0.02	0.04	0.03	0.01	0.01	0.05	0.02	0.07	0.04	0.66
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01
24	0.01	0.01	0.02	0.03	0.01	0.03	0.01	0.02	0.01	0.00	0.01	0.02	0.01	0.00	0.00	0.01	0.19
25	0.02	0.02	0.08	0.12	0.10	0.07	0.03	0.01	0.04	0.03	0.02	0.01	0.03	0.03	0.03	0.01	0.68
26	0.02	0.04	0.04	0.08	0.12	0.10	0.06	0.01	0.03	0.01	0.03	0.01	0.02	0.06	0.06	0.01	0.72
27	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
28	0.05	0.03	0.09	0.05	0.01	0.02	0.07	0.02	0.02	0.02	0.00	0.01	0.00	0.03	0.03	0.04	0.50
29	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
30	0.13	0.08	0.19	0.25	0.27	0.22	0.11	0.08	0.18	0.04	0.04	0.06	0.11	0.09	0.14	0.10	2.08
31	0.17	0.15	0.25	0.37	0.33	0.31	0.21	0.14	0.18	0.13	0.06	0.09	0.10	0.13	0.17	0.11	2.89
32	0.22	0.15	0.33	0.45	0.37	0.29	0.27	0.15	0.14	0.05	0.03	0.06	0.10	0.09	0.21	0.09	2.96
33	0.21	0.12	0.22	0.41	0.28	0.19	0.17	0.05	0.14	0.07	0.06	0.03	0.05	0.09	0.17	0.10	2.35
34	0.17	0.13	0.25	0.41	0.39	0.27	0.23	0.13	0.13	0.08	0.06	0.03	0.08	0.07	0.13	0.14	2.71
35	0.22	0.15	0.32	0.54	0.37	0.29	0.19	0.13	0.09	0.02	0.03	0.03	0.05	0.07	0.09	0.11	2.68
36	0.18	0.20	0.47	0.39	0.35	0.27	0.20	0.09	0.13	0.07	0.05	0.02	0.03	0.08	0.12	0.05	2.69
37	0.17	0.19	0.37	0.43	0.45	0.34	0.15	0.19	0.22	0.04	0.05	0.04	0.05	0.06	0.11	0.05	2.89
38	0.15	0.09	0.32	0.64	0.37	0.46	0.21	0.12	0.12	0.06	0.05	0.05	0.07	0.04	0.08	0.07	2.91
39	0.17	0.16	0.36	0.55	0.58	0.25	0.15	0.06	0.08	0.08	0.03	0.04	0.03	0.06	0.12	0.06	2.79
40	0.20	0.19	0.45	0.57	0.35	0.14	0.11	0.14	0.23	0.05	0.07	0.03	0.03	0.04	0.07	0.07	2.75
41	0.14	0.15	0.41	0.57	0.46	0.29	0.14	0.11	0.11	0.09	0.03	0.01	0.03	0.05	0.06	0.06	2.72
42	0.14	0.09	0.38	0.61	0.61	0.23	0.17	0.06	0.07	0.06	0.02	0.02	0.04	0.03	0.07	0.06	2.65
TOTALS	5.05	3.52	7.62	12.31	12.39	8.18	5.63	3.61	4.55	3.19	3.30	3.91	7.49	4.19	4.91	2.99	92.83

1 ********** STABILITY CLASS BY WIND DIRECTION **********

CALPINE OSPRAY SITE LMDCT, 1987-91 TAMPA MET DATA

SEASON=ANNUAL

STABILITY CLASS	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
	********** PLUME HEADED **********																
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	STAG.
1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.03	0.03	0.01	0.00	0.00	0.01	0.02
2	0.07	0.08	0.06	0.05	0.05	0.06	0.10	0.13	0.09	0.16	0.20	0.28	0.15	0.08	0.04	0.05	0.02
3	0.14	0.12	0.11	0.13	0.14	0.15	0.20	0.22	0.19	0.18	0.20	0.28	0.37	0.17	0.09	0.15	0.03
4	0.32	0.29	0.29	0.26	0.29	0.23	0.31	0.27	0.36	0.40	0.24	0.18	0.31	0.39	0.38	0.37	0.04
5	0.22	0.25	0.24	0.22	0.23	0.25	0.22	0.20	0.18	0.13	0.15	0.13	0.08	0.16	0.23	0.24	0.08
6	0.20	0.22	0.25	0.28	0.22	0.26	0.15	0.14	0.16	0.10	0.15	0.10	0.06	0.17	0.23	0.15	0.27
7	0.03	0.04	0.04	0.06	0.05	0.04	0.01	0.02	0.01	0.01	0.02	0.00	0.01	0.03	0.03	0.02	0.54

********** WIND SPEED DISTRIBUTION BY DIRECTION AT REFERENCE HEIGHT OF 200. METERS **********

CALPINE OSPRAY SITE LMDCT, 1987-91 TAMPA MET DATA

SEASON=ANNUAL

WIND RANGE	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
	********** PLUME HEADED **********																
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	STAG.
1	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.00	0.00	0.02	1.00
2	0.27	0.29	0.34	0.35	0.34	0.36	0.30	0.35	0.31	0.32	0.42	0.43	0.25	0.30	0.24	0.23	0.00
3	0.71	0.70	0.66	0.64	0.65	0.64	0.68	0.64	0.67	0.67	0.56	0.55	0.74	0.70	0.75	0.75	0.00

********** COMBINED FACTORS BY WIND DIRECTION **********

CALPINE OSPRAY SITE LMDCT, 1987-91 TAMPA MET DATA

SEASON=ANNUAL

COMBINED CLASS*	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
	********** PLUME HEADED **********																
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	STAG.
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.07
2	0.06	0.06	0.06	0.06	0.07	0.08	0.09	0.13	0.09	0.12	0.18	0.25	0.13	0.07	0.03	0.05	0.00
3	0.16	0.14	0.12	0.12	0.13	0.14	0.21	0.24	0.19	0.24	0.24	0.32	0.39	0.18	0.10	0.16	0.00
4	0.01	0.01	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.12
5	0.15	0.16	0.18	0.17	0.18	0.17	0.16	0.16	0.17	0.17	0.17	0.14	0.10	0.16	0.15	0.14	0.00
6	0.38	0.38	0.35	0.31	0.34	0.30	0.36	0.30	0.37	0.35	0.22	0.17	0.29	0.39	0.46	0.46	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.81

8	0.06	0.07	0.10	0.12	0.09	0.10	0.05	0.06	0.05	0.03	0.07	0.04	0.02	0.06	0.06	0.04	0.00
9	0.17	0.18	0.19	0.21	0.18	0.19	0.11	0.10	0.11	0.07	0.10	0.06	0.05	0.14	0.19	0.13	0.00

* COMBINED CLASSES ARE DEFINED AS FOLLOWS:
1=UNSTABLE, LOW WIND 2=UNSTABLE, MODERATE WIND 3=UNSTABLE, HIGH WIND
4=NEUTRAL, LOW WIND 5=NEUTRAL MODERATE WIND 6=NEUTRAL, HIGH WIND
7=STABLE, LOW WIND 8=STABLE, MODERATE WIND 9=STABLE, HIGH WIND

1 ********** PLUME LENGTH FREQUENCY TABLE **********
CALPINE OSPRAY SITE LMDCT, 1987-91 TAMPA MET DATA
SEASON=ANNUAL

DISTANCE FROM TOWER (M)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	ALL
	********** PLUME HEADED **********																
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	SUM
100.	5.05	3.52	7.62	12.31	12.39	8.18	5.63	3.61	4.55	3.19	3.30	3.91	7.49	4.19	4.91	2.99	92.83
200.	0.42	0.30	0.09	0.17	0.10	0.07	0.07	0.22	0.26	0.22	0.01	0.02	0.07	0.15	0.05	0.22	2.43
300.	0.14	0.09	0.00	0.00	0.00	0.00	0.00	0.06	0.07	0.06	0.00	0.00	0.00	0.01	0.00	0.06	0.49
400.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
500.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
600.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
700.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
800.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
900.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1000.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1100.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1200.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1300.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1400.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1500.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1600.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1700.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1800.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1900.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2000.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2100.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2200.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2300.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2400.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2500.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2600.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2700.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2800.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2900.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3000.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3100.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3200.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3300.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3400.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3500.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3600.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3700.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3800.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3900.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4000.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4100.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4200.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4300.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4400.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4500.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4600.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4700.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4800.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4900.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5000.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

1 ********** PLUME LENGTH FREQUENCY TABLE **********
CALPINE OSPRAY SITE LMDCT, 1987-91 TAMPA MET DATA
SEASON=ANNUAL

DISTANCE FROM TOWER (M)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	ALL
	********** PLUME HEADED **********																
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	SUM

5100.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5200.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5300.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5400.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5500.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5600.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5700.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5800.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5900.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6000.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6100.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6200.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6300.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6400.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6500.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6600.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6700.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6800.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6900.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7000.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7100.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7200.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7300.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7400.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7500.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7600.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7700.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7800.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7900.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8000.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8100.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8200.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8300.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8400.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8500.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8600.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8700.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8800.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8900.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9000.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9100.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9200.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9300.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9400.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9500.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9600.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9700.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9800.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9900.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10000.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

1 ********** PLUME HEIGHT FREQUENCY TABLE **********

CALPINE OSPRAY SITE LMDCT, 1987-91 TAMPA MET DATA
SEASON=ANNUAL

HEIGHT FROM TOWER (M)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	ALL
	********** WIND FROM **********																
	********** PLUME HEADED **********																
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	SUM
10.	5.05	3.52	7.62	12.31	12.39	8.18	5.63	3.61	4.55	3.19	3.30	3.91	7.49	4.19	4.91	2.99	92.83
20.	5.04	3.52	7.62	12.31	12.39	8.18	5.63	3.61	4.55	3.19	3.30	3.91	7.49	4.19	4.91	2.99	92.82
30.	0.43	0.34	0.51	1.43	1.18	0.54	0.26	0.23	0.27	0.21	0.03	0.09	0.16	0.28	0.19	0.21	6.36
40.	0.41	0.30	0.51	0.75	0.69	0.30	0.26	0.21	0.24	0.20	0.03	0.03	0.09	0.10	0.17	0.21	4.49
50.	0.41	0.30	0.00	0.66	0.62	0.25	0.00	0.21	0.24	0.20	0.00	0.03	0.04	0.07	0.00	0.21	3.24
60.	0.28	0.25	0.00	0.00	0.00	0.00	0.00	0.17	0.18	0.15	0.00	0.00	0.00	0.00	0.00	0.13	1.14
70.	0.28	0.25	0.00	0.00	0.00	0.00	0.00	0.17	0.18	0.15	0.00	0.00	0.00	0.00	0.00	0.13	1.14
80.	0.28	0.25	0.00	0.00	0.00	0.00	0.00	0.17	0.18	0.15	0.00	0.00	0.00	0.00	0.00	0.13	1.14
90.	0.28	0.25	0.00	0.00	0.00	0.00	0.00	0.17	0.18	0.15	0.00	0.00	0.00	0.00	0.00	0.13	1.14
100.	0.28	0.25	0.00	0.00	0.00	0.00	0.00	0.17	0.18	0.15	0.00	0.00	0.00	0.00	0.00	0.13	1.14
110.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
130.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
140.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
190.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

200.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
210.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
240.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
250.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
260.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
270.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
280.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
290.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
300.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
310.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
320.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
330.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
340.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
350.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
360.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
370.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
380.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
390.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
400.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
410.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
420.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
430.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
440.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
450.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
460.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
470.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
480.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
490.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
500.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

1 ********** PLUME HEIGHT FREQUENCY TABLE **********

CALPINE OSPRAY SITE LMDCT, 1987-91 TAMPA MET DATA

SEASON=ANNUAL

HEIGHT ********** WIND FROM **********

FROM	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	ALL
TOWER	********** PLUME HEADED **********																
(M)	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	SUM
510.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
540.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
550.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
560.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
570.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
580.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
590.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
600.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
610.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
620.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
630.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
640.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
650.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
660.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
670.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
680.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
690.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
700.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
710.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
720.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
730.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
740.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
750.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
760.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
770.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
780.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
790.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
800.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
810.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
820.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
830.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
840.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
850.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
860.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
870.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
880.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

890.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
900.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
910.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
920.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
930.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
940.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
950.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
960.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
970.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
980.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
990.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1000.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

1 ********** PLUME RADIUS FREQUENCY TABLE **********

CALPINE OSPRAY SITE LMDCT, 1987-91 TAMPA MET DATA

SEASON=ANNUAL

MAXIMUM	********** WIND FROM **********																
FROM	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	ALL
TOWER	********** PLUME HEADED **********																
(M)	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	SUM
5.	5.05	3.52	7.62	12.31	12.39	8.18	5.63	3.61	4.55	3.19	3.30	3.91	7.49	4.19	4.91	2.99	92.83
10.	5.04	3.52	7.62	12.31	12.39	8.18	5.63	3.61	4.55	3.19	3.30	3.91	7.49	4.19	4.91	2.99	92.82
15.	4.94	3.48	1.28	8.89	8.01	5.59	0.55	3.49	4.46	3.14	0.10	1.46	2.48	2.50	0.37	2.86	53.62
20.	3.45	2.53	0.79	1.18	0.96	0.37	0.31	2.09	2.61	1.46	0.05	0.06	0.07	0.08	0.13	1.87	18.01
25.	0.28	0.25	0.38	1.18	0.96	0.37	0.17	0.17	0.18	0.15	0.02	0.06	0.07	0.07	0.07	0.13	4.47
30.	0.28	0.25	0.38	0.61	0.61	0.23	0.17	0.17	0.18	0.15	0.02	0.02	0.04	0.03	0.07	0.13	3.31
35.	0.28	0.25	0.38	0.61	0.61	0.23	0.17	0.17	0.18	0.15	0.02	0.02	0.04	0.03	0.07	0.13	3.31
40.	0.28	0.25	0.38	0.61	0.61	0.23	0.17	0.17	0.18	0.15	0.02	0.02	0.04	0.03	0.07	0.13	3.31
45.	0.28	0.25	0.38	0.61	0.61	0.23	0.17	0.17	0.18	0.15	0.02	0.02	0.04	0.03	0.07	0.13	3.31
50.	0.14	0.09	0.38	0.61	0.61	0.23	0.17	0.06	0.07	0.06	0.02	0.02	0.04	0.03	0.07	0.06	2.65
55.	0.14	0.09	0.38	0.61	0.61	0.23	0.17	0.06	0.07	0.06	0.02	0.02	0.04	0.03	0.07	0.06	2.65
60.	0.14	0.09	0.00	0.61	0.61	0.23	0.00	0.06	0.07	0.06	0.00	0.02	0.04	0.03	0.00	0.06	2.02
65.	0.14	0.09	0.00	0.61	0.61	0.23	0.00	0.06	0.07	0.06	0.00	0.02	0.04	0.03	0.00	0.06	2.02
70.	0.14	0.09	0.00	0.00	0.00	0.00	0.00	0.06	0.07	0.06	0.00	0.00	0.00	0.00	0.00	0.06	0.48
75.	0.14	0.09	0.00	0.00	0.00	0.00	0.00	0.06	0.07	0.06	0.00	0.00	0.00	0.00	0.00	0.06	0.48
80.	0.14	0.09	0.00	0.00	0.00	0.00	0.00	0.06	0.07	0.06	0.00	0.00	0.00	0.00	0.00	0.06	0.48
85.	0.14	0.09	0.00	0.00	0.00	0.00	0.00	0.06	0.07	0.06	0.00	0.00	0.00	0.00	0.00	0.06	0.48
90.	0.14	0.09	0.00	0.00	0.00	0.00	0.00	0.06	0.07	0.06	0.00	0.00	0.00	0.00	0.00	0.06	0.48
95.	0.14	0.09	0.00	0.00	0.00	0.00	0.00	0.06	0.07	0.06	0.00	0.00	0.00	0.00	0.00	0.06	0.48
100.	0.14	0.09	0.00	0.00	0.00	0.00	0.00	0.06	0.07	0.06	0.00	0.00	0.00	0.00	0.00	0.06	0.48
105.	0.14	0.09	0.00	0.00	0.00	0.00	0.00	0.06	0.07	0.06	0.00	0.00	0.00	0.00	0.00	0.06	0.48
110.	0.14	0.09	0.00	0.00	0.00	0.00	0.00	0.06	0.07	0.06	0.00	0.00	0.00	0.00	0.00	0.06	0.48
115.	0.14	0.09	0.00	0.00	0.00	0.00	0.00	0.06	0.07	0.06	0.00	0.00	0.00	0.00	0.00	0.06	0.48
120.	0.14	0.09	0.00	0.00	0.00	0.00	0.00	0.06	0.07	0.06	0.00	0.00	0.00	0.00	0.00	0.06	0.48
125.	0.14	0.09	0.00	0.00	0.00	0.00	0.00	0.06	0.07	0.06	0.00	0.00	0.00	0.00	0.00	0.06	0.48
130.	0.14	0.09	0.00	0.00	0.00	0.00	0.00	0.06	0.07	0.06	0.00	0.00	0.00	0.00	0.00	0.06	0.48
135.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
140.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
145.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
155.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
165.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
175.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
185.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
190.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
195.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
205.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
210.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
215.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
225.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
235.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
240.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
245.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
250.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

1 ********** PLUME RADIUS FREQUENCY TABLE **********

CALPINE OSPRAY SITE LMDCT, 1987-91 TAMPA MET DATA

SEASON=ANNUAL

MAXIMUM	********** WIND FROM **********																
FROM	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	ALL
TOWER	********** PLUME HEADED **********																
(M)	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	SUM

255.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
260.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
265.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
270.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
275.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
280.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
285.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
290.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
295.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
300.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
305.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
310.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
315.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
320.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
325.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
330.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
335.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
340.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
345.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
350.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
355.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
360.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
365.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
370.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
375.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
380.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
385.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
390.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
395.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
400.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
405.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
410.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
415.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
420.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
425.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
430.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
435.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
440.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
445.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
450.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
455.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
460.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
465.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
470.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
475.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
480.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
485.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
490.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
495.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
500.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

1 ********** HOURS OF PLUME SHADOWING TABLE **********

CALPINE OSPRAY SITE LMDCT, 1987-91 TAMPA MET DATA

SEASON=ANNUAL

DISTANCE FROM TOWER (M)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	ALL
	********** WIND FROM PLUME HEADED **********																
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	AVG
200.	63.5	114.3	256.4	362.8	473.7	458.7	292.7	169.5	176.5	261.4	405.2	489.2	469.5	359.1	238.7	72.6	291.5
400.	0.0	0.0	0.8	82.2	64.1	42.3	1.3	1.0	0.0	1.0	8.4	71.8	55.9	88.1	0.7	0.0	26.1
600.	0.0	0.0	0.0	50.0	14.6	8.6	1.3	0.0	0.0	0.0	0.0	25.5	10.3	51.1	0.0	0.0	10.1
800.	0.0	0.0	0.0	25.6	4.1	5.8	1.3	0.0	0.0	0.0	0.0	6.8	5.5	19.7	0.0	0.0	4.3
1000.	0.0	0.0	0.0	13.2	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	10.4	0.0	0.0	1.8
1200.	0.0	0.0	0.0	8.6	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2	0.0	0.0	0.9
1400.	0.0	0.0	0.0	3.1	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6	0.0	0.0	0.6
1600.	0.0	0.0	0.0	0.8	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.6	0.0	4.9	0.0	0.0	0.5
1800.	0.0	0.0	0.0	0.8	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.7	0.0	2.4	0.0	0.0	0.3
2000.	0.0	0.0	0.0	1.5	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.3
2200.	0.0	0.0	0.0	1.5	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.5	0.0	1.9	0.0	0.0	0.3
2400.	0.0	0.0	0.0	1.5	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.2
2600.	0.0	0.0	0.0	0.8	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.2
2800.	0.0	0.0	0.0	0.8	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
3000.	0.0	0.0	0.0	0.8	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
3200.	0.0	0.0	0.0	0.8	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
3400.	0.0	0.0	0.0	0.8	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
3600.	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1

3800.	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
4000.	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
4200.	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4400.	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4600.	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4800.	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5200.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5400.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5600.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5800.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6200.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6400.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6600.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6800.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7200.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7400.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7600.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7800.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

1 ********** TOTAL SOLAR ENERGY LOSS TABLE (MJ/M**2)**********

CALPINE OSPRAY SITE LMDCT, 1987-91 TAMPA MET DATA

SEASON=ANNUAL

DISTANCE FROM TOWER (M)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	ALL
	********** WIND FROM ********** PLUME HEADED **********																
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	AVG
200.	70.6	108.5	150.2	161.1	196.8	239.9	238.4	193.6	247.4	314.7	313.9	232.7	203.9	148.7	127.2	51.6	187.5
400.	0.0	0.0	0.0	7.9	11.9	10.5	0.3	0.2	0.0	0.7	4.4	11.9	8.9	4.3	0.0	0.0	3.8
600.	0.0	0.0	0.0	2.1	2.1	1.9	0.3	0.0	0.0	0.0	0.0	2.8	0.4	1.6	0.0	0.0	0.7
800.	0.0	0.0	0.0	0.9	0.2	0.5	0.3	0.0	0.0	0.0	0.0	0.3	0.2	0.4	0.0	0.0	0.2
1000.	0.0	0.0	0.0	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
1200.	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
1400.	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
1600.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1800.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2200.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2400.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2600.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2800.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3200.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3400.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3600.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3800.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4200.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4400.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4600.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4800.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5200.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5400.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5600.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5800.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6200.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6400.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6600.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6800.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7200.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7400.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7600.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7800.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

1 ********** PERCENT TOTAL ENERGY LOSS TABLE **********

CALPINE OSPRAY SITE LMDCT, 1987-91 TAMPA MET DATA

SEASON=ANNUAL

DISTANCE FROM TOWER (M)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	ALL
	********** WIND FROM ********** PLUME HEADED **********																
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	AVG

200.	0.5	0.8	1.1	1.2	1.4	1.7	1.7	1.4	1.8	2.3	2.3	1.7	1.5	1.1	0.9	0.4	1.4
400.	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
600.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
800.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1200.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1400.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1600.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1800.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2200.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2400.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2600.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2800.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3200.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3400.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3600.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3800.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4200.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4400.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4600.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4800.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5200.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5400.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5600.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5800.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6200.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6400.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6600.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6800.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7200.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7400.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7600.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7800.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

1 ********** PERCENT BEAM ENERGY LOSS TABLE **********

CALPINE OSPRAY SITE LMDCT, 1987-91 TAMPA MET DATA

SEASON=ANNUAL

DISTANCE	********** WIND FROM **********																
FROM	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	ALL
TOWER	********** PLUME HEADED **********																
(M)	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	AVG
200.	0.8	1.2	1.7	1.8	2.3	2.7	2.7	2.2	2.8	3.6	3.6	2.7	2.3	1.7	1.5	0.6	2.1
400.	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0
600.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
800.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1200.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1400.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1600.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1800.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2200.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2400.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2600.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2800.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3200.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3400.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3600.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3800.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4200.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4400.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4600.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4800.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5200.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5400.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5600.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

5800.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6200.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6400.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6600.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6800.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7200.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7400.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7600.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7800.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8000.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

1 ********** PLUME SALT DEPOSITION TABLE (KG./(KM.**2-MO.)) **********

CALPINE OSPRAY SITE LMDCT, 1987-91 TAMPA MET DATA

SEASON=ANNUAL

DISTANCE FROM TOWER (M)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	A
	********** WIND FROM **********																
	********** PLUME HEADED **********																
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	A
100.	2.36	1.64	2.44	4.52	4.33	2.98	1.66	1.58	1.94	1.39	1.06	1.35	2.21	1.39	1.48	1.37	
200.	3.71	2.60	3.53	6.76	6.88	4.43	2.50	2.44	3.11	2.16	1.52	1.96	3.87	2.28	2.38	2.19	
300.	4.34	3.03	3.55	6.76	6.88	4.43	2.52	2.67	3.45	2.42	1.53	1.96	3.88	2.30	2.41	2.59	
400.	4.61	3.48	4.14	8.17	8.30	5.32	2.84	3.08	3.82	2.45	1.86	2.22	4.24	2.72	2.92	2.53	
500.	3.49	2.79	5.48	7.06	6.78	4.08	3.13	2.32	2.91	1.74	1.87	1.34	2.66	1.85	2.96	1.85	
600.	3.47	2.77	3.69	5.71	5.14	2.78	1.80	2.30	2.90	1.74	0.60	0.49	1.39	1.06	1.37	1.84	
700.	2.95	2.33	3.66	5.71	5.14	2.77	1.77	1.98	2.44	1.35	0.59	0.49	1.39	1.06	1.36	1.49	
800.	1.74	1.35	3.36	5.13	4.27	2.40	1.51	1.18	1.32	0.78	0.45	0.38	0.77	0.74	0.97	0.84	
900.	0.69	0.54	2.81	4.45	3.63	2.06	1.27	0.51	0.59	0.48	0.39	0.33	0.55	0.60	0.83	0.33	
1000.	0.59	0.44	1.72	2.65	2.30	1.39	0.93	0.41	0.47	0.39	0.26	0.25	0.42	0.44	0.65	0.29	
1100.	0.46	0.35	1.30	1.56	1.41	0.73	0.69	0.25	0.29	0.23	0.16	0.08	0.13	0.16	0.41	0.23	
1200.	0.42	0.30	0.65	0.99	0.98	0.40	0.30	0.20	0.24	0.20	0.06	0.04	0.07	0.08	0.15	0.21	
1300.	0.42	0.30	0.61	0.99	0.98	0.40	0.27	0.19	0.24	0.20	0.05	0.04	0.07	0.08	0.14	0.20	
1400.	0.25	0.19	0.61	0.99	0.98	0.40	0.27	0.12	0.15	0.12	0.05	0.04	0.07	0.08	0.14	0.13	
1500.	0.21	0.16	0.61	0.99	0.98	0.40	0.27	0.11	0.13	0.11	0.05	0.04	0.07	0.08	0.14	0.11	
1600.	0.21	0.16	0.61	0.99	0.98	0.40	0.27	0.11	0.13	0.11	0.05	0.04	0.07	0.08	0.14	0.11	
1700.	0.21	0.16	0.57	0.87	0.85	0.36	0.26	0.11	0.13	0.11	0.05	0.04	0.07	0.07	0.13	0.11	
1800.	0.21	0.16	0.24	0.39	0.37	0.17	0.11	0.11	0.13	0.11	0.03	0.02	0.03	0.04	0.07	0.11	
1900.	0.21	0.16	0.24	0.39	0.37	0.17	0.11	0.11	0.13	0.11	0.03	0.02	0.03	0.04	0.07	0.11	
2000.	0.21	0.16	0.24	0.39	0.37	0.17	0.11	0.11	0.13	0.11	0.03	0.02	0.03	0.04	0.07	0.11	
2100.	0.21	0.16	0.24	0.39	0.37	0.17	0.11	0.10	0.13	0.10	0.03	0.02	0.03	0.04	0.07	0.10	
2200.	0.21	0.16	0.24	0.39	0.37	0.17	0.11	0.10	0.13	0.10	0.03	0.02	0.03	0.04	0.07	0.10	
2300.	0.21	0.16	0.24	0.39	0.37	0.17	0.10	0.10	0.13	0.10	0.03	0.02	0.03	0.04	0.06	0.10	
2400.	0.21	0.16	0.24	0.38	0.35	0.17	0.10	0.10	0.13	0.10	0.03	0.02	0.03	0.04	0.06	0.10	
2500.	0.21	0.16	0.24	0.37	0.34	0.16	0.10	0.10	0.13	0.10	0.03	0.02	0.03	0.03	0.06	0.10	
2600.	0.21	0.16	0.24	0.37	0.34	0.16	0.10	0.10	0.13	0.10	0.03	0.02	0.03	0.03	0.06	0.10	
2700.	0.10	0.09	0.24	0.37	0.34	0.15	0.10	0.06	0.08	0.05	0.03	0.02	0.03	0.03	0.06	0.05	
2800.	0.10	0.09	0.24	0.34	0.33	0.14	0.10	0.06	0.08	0.05	0.03	0.02	0.03	0.03	0.06	0.05	
2900.	0.10	0.09	0.24	0.34	0.33	0.14	0.10	0.06	0.08	0.05	0.03	0.02	0.03	0.03	0.06	0.05	
3000.	0.10	0.09	0.23	0.34	0.33	0.14	0.10	0.06	0.08	0.05	0.02	0.02	0.03	0.03	0.05	0.05	
3100.	0.09	0.07	0.23	0.34	0.33	0.14	0.10	0.05	0.06	0.04	0.02	0.02	0.03	0.03	0.05	0.05	
3200.	0.06	0.04	0.23	0.34	0.33	0.14	0.10	0.03	0.04	0.02	0.02	0.02	0.03	0.03	0.05	0.03	
3300.	0.06	0.04	0.23	0.34	0.33	0.14	0.10	0.03	0.04	0.02	0.02	0.02	0.03	0.03	0.05	0.03	
3400.	0.06	0.04	0.23	0.34	0.33	0.14	0.10	0.03	0.04	0.02	0.02	0.02	0.03	0.03	0.05	0.03	
3500.	0.06	0.04	0.06	0.24	0.23	0.10	0.02	0.03	0.04	0.02	0.01	0.01	0.02	0.02	0.02	0.03	
3600.	0.06	0.04	0.06	0.08	0.07	0.04	0.02	0.03	0.04	0.02	0.01	0.01	0.01	0.01	0.02	0.03	
3700.	0.06	0.04	0.06	0.08	0.07	0.04	0.02	0.03	0.04	0.02	0.01	0.01	0.01	0.01	0.02	0.03	
3800.	0.06	0.04	0.06	0.08	0.07	0.04	0.02	0.03	0.04	0.02	0.01	0.01	0.01	0.01	0.02	0.03	
3900.	0.06	0.04	0.06	0.08	0.07	0.04	0.02	0.03	0.04	0.02	0.01	0.01	0.01	0.01	0.02	0.03	
4000.	0.06	0.04	0.06	0.08	0.07	0.04	0.02	0.03	0.04	0.02	0.01	0.01	0.01	0.01	0.02	0.03	
4100.	0.06	0.04	0.06	0.08	0.07	0.04	0.02	0.03	0.04	0.02	0.01	0.01	0.01	0.01	0.02	0.03	
4200.	0.06	0.04	0.06	0.08	0.07	0.04	0.02	0.03	0.04	0.02	0.01	0.01	0.01	0.01	0.02	0.03	
4300.	0.06	0.04	0.06	0.08	0.07	0.04	0.02	0.03	0.04	0.02	0.01	0.01	0.01	0.01	0.02	0.03	
4400.	0.06	0.04	0.06	0.08	0.07	0.04	0.02	0.03	0.04	0.02	0.01	0.01	0.01	0.01	0.02	0.03	
4500.	0.06	0.04	0.06	0.08	0.07	0.04	0.02	0.03	0.04	0.02	0.01	0.01	0.01	0.01	0.02	0.03	
4600.	0.06	0.04	0.06	0.08	0.07	0.04	0.02	0.03	0.04	0.02	0.01	0.01	0.01	0.01	0.02	0.03	
4700.	0.04	0.03	0.06	0.08	0.07	0.04	0.02	0.02	0.04	0.02	0.01	0.01	0.01	0.01	0.02	0.02	
4800.	0.04	0.03	0.06	0.08	0.07	0.04	0.02	0.02	0.03	0.02	0.01	0.01	0.01	0.01	0.02	0.02	
4900.	0.03	0.03	0.06	0.08	0.07	0.04	0.02	0.02	0.03	0.01	0.01	0.01	0.01	0.01	0.02	0.02	
5000.	0.03	0.03	0.06	0.08	0.07	0.04	0.02	0.02	0.03	0.01	0.01	0.01	0.01	0.01	0.02	0.02	

1 ********** PLUME SALT DEPOSITION TABLE (KG./(KM.**2-MO.)) **********

CALPINE OSPRAY SITE LMDCT, 1987-91 TAMPA MET DATA

SEASON=ANNUAL

DISTANCE FROM TOWER (M)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	A
	********** WIND FROM **********																
	********** PLUME HEADED **********																
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	A

5100.	0.03	0.03	0.06	0.08	0.07	0.04	0.02	0.02	0.03	0.01	0.01	0.01	0.01	0.01	0.02	0.02
5200.	0.03	0.03	0.06	0.08	0.07	0.04	0.02	0.02	0.03	0.01	0.01	0.01	0.01	0.01	0.02	0.02
5300.	0.03	0.03	0.06	0.08	0.07	0.04	0.02	0.02	0.03	0.01	0.01	0.01	0.01	0.01	0.02	0.02
5400.	0.03	0.03	0.06	0.08	0.07	0.04	0.02	0.02	0.03	0.01	0.01	0.01	0.01	0.01	0.02	0.02
5500.	0.03	0.03	0.06	0.08	0.07	0.04	0.02	0.02	0.03	0.01	0.01	0.01	0.01	0.01	0.02	0.02
5600.	0.03	0.03	0.06	0.08	0.07	0.04	0.02	0.02	0.03	0.01	0.01	0.01	0.01	0.01	0.02	0.02
5700.	0.03	0.03	0.05	0.08	0.07	0.04	0.02	0.02	0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.02
5800.	0.03	0.03	0.02	0.08	0.07	0.04	0.01	0.02	0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.02
5900.	0.03	0.03	0.02	0.04	0.03	0.02	0.01	0.02	0.03	0.01	0.01	0.00	0.01	0.01	0.01	0.02
6000.	0.03	0.03	0.02	0.04	0.03	0.02	0.01	0.02	0.03	0.01	0.01	0.00	0.01	0.01	0.01	0.02
6100.	0.03	0.03	0.02	0.04	0.03	0.02	0.01	0.02	0.03	0.01	0.01	0.00	0.01	0.01	0.01	0.02
6200.	0.03	0.03	0.02	0.04	0.03	0.02	0.01	0.02	0.03	0.01	0.01	0.00	0.01	0.01	0.01	0.02
6300.	0.03	0.03	0.02	0.04	0.03	0.02	0.01	0.02	0.03	0.01	0.01	0.00	0.01	0.01	0.01	0.02
6400.	0.03	0.03	0.02	0.04	0.03	0.02	0.01	0.02	0.03	0.01	0.01	0.00	0.01	0.01	0.01	0.02
6500.	0.03	0.03	0.02	0.04	0.03	0.02	0.01	0.02	0.03	0.01	0.01	0.00	0.01	0.01	0.01	0.02
6600.	0.03	0.03	0.02	0.04	0.03	0.02	0.01	0.02	0.03	0.01	0.01	0.00	0.01	0.01	0.01	0.02
6700.	0.03	0.03	0.02	0.04	0.03	0.02	0.01	0.02	0.03	0.01	0.01	0.00	0.01	0.01	0.01	0.02
6800.	0.03	0.03	0.02	0.04	0.03	0.02	0.01	0.02	0.03	0.01	0.01	0.00	0.01	0.01	0.01	0.02
6900.	0.03	0.03	0.02	0.04	0.03	0.02	0.01	0.02	0.03	0.01	0.01	0.00	0.01	0.01	0.01	0.02
7000.	0.02	0.02	0.02	0.04	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
7100.	0.02	0.02	0.02	0.04	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
7200.	0.02	0.02	0.02	0.04	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
7300.	0.02	0.02	0.02	0.04	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
7400.	0.02	0.02	0.02	0.04	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
7500.	0.02	0.02	0.02	0.04	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
7600.	0.02	0.02	0.02	0.04	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
7700.	0.02	0.02	0.02	0.04	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
7800.	0.02	0.02	0.02	0.04	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
7900.	0.02	0.02	0.02	0.04	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
8000.	0.02	0.02	0.02	0.04	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
8100.	0.02	0.02	0.02	0.03	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
8200.	0.02	0.02	0.02	0.03	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
8300.	0.02	0.02	0.02	0.03	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
8400.	0.02	0.02	0.02	0.03	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
8500.	0.02	0.02	0.02	0.03	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
8600.	0.02	0.02	0.02	0.03	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
8700.	0.02	0.02	0.02	0.03	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
8800.	0.02	0.02	0.02	0.03	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
8900.	0.02	0.02	0.02	0.03	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
9000.	0.02	0.02	0.02	0.03	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
9100.	0.02	0.02	0.02	0.03	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
9200.	0.02	0.02	0.02	0.03	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
9300.	0.02	0.02	0.02	0.03	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
9400.	0.02	0.02	0.02	0.03	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
9500.	0.02	0.02	0.02	0.03	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
9600.	0.02	0.02	0.02	0.03	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
9700.	0.02	0.01	0.02	0.03	0.03	0.02	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.01	0.01	0.01
9800.	0.01	0.01	0.02	0.03	0.03	0.02	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01
9900.	0.01	0.01	0.02	0.03	0.03	0.02	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01
10000.	0.01	0.01	0.02	0.03	0.03	0.02	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01

1 ********** PLUME WATER DEPOSITION TABLE (KG./(KM.**2-MO.)) **********

CALPINE OSPRAY SITE LMDCT, 1987-91 TAMPA MET DATA

SEASON=ANNUAL

DISTANCE	********** WIND FROM **********															
FROM	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
TOWER	********** PLUME HEADED **********															
(M)	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE
100.	.16E+04	.11E+04	.16E+04	.30E+04	.29E+04	.20E+04	.11E+04	.11E+04	.13E+04	.93E+03	.69E+03	.86E+03	.14E+04	.91E+03	.98E+03	.93E+03
200.	.25E+04	.18E+04	.24E+04	.45E+04	.46E+04	.30E+04	.17E+04	.17E+04	.21E+04	.15E+04	.99E+03	.13E+04	.25E+04	.15E+04	.16E+04	.15E+04
300.	.29E+04	.20E+04	.24E+04	.45E+04	.46E+04	.30E+04	.17E+04	.18E+04	.23E+04	.16E+04	.99E+03	.13E+04	.25E+04	.15E+04	.16E+04	.17E+04
400.	.30E+04	.22E+04	.27E+04	.53E+04	.53E+04	.34E+04	.18E+04	.20E+04	.25E+04	.16E+04	.11E+04	.14E+04	.26E+04	.17E+04	.18E+04	.16E+04
500.	.20E+04	.16E+04	.35E+04	.44E+04	.41E+04	.25E+04	.19E+04	.13E+04	.16E+04	.98E+03	.11E+04	.77E+03	.15E+04	.10E+04	.17E+04	.10E+04
600.	.20E+04	.16E+04	.21E+04	.32E+04	.29E+04	.15E+04	.10E+04	.13E+04	.16E+04	.97E+03	.31E+03	.25E+03	.71E+03	.55E+03	.73E+03	.10E+04
700.	.16E+04	.13E+04	.21E+04	.32E+04	.29E+04	.15E+04	.98E+03	.10E+04	.13E+04	.72E+03	.31E+03	.25E+03	.71E+03	.54E+03	.72E+03	.81E+03
800.	.89E+03	.67E+03	.19E+04	.29E+04	.25E+04	.13E+04	.84E+03	.57E+03	.65E+03	.38E+03	.23E+03	.19E+03	.39E+03	.38E+03	.51E+03	.42E+03
900.	.33E+03	.24E+03	.16E+04	.25E+04	.21E+04	.11E+04	.69E+03	.21E+03	.24E+03	.21E+03	.20E+03	.17E+03	.28E+03	.30E+03	.43E+03	.16E+03
1000.	.30E+03	.21E+03	.93E+03	.14E+04	.13E+04	.72E+03	.49E+03	.17E+03	.20E+03	.18E+03	.12E+03	.12E+03	.21E+03	.21E+03	.32E+03	.14E+03
1100.	.25E+03	.18E+03	.71E+03	.87E+03	.82E+03	.38E+03	.37E+03	.12E+03	.14E+03	.12E+03	.73E+02	.41E+02	.68E+02	.72E+02	.21E+03	.12E+03
1200.	.25E+03	.17E+03	.42E+03	.64E+03	.64E+03	.25E+03	.19E+03	.11E+03	.13E+03	.12E+03	.27E+02	.25E+02	.43E+02	.40E+02	.84E+02	.12E+03
1300.	.25E+03	.17E+03	.39E+03	.64E+03	.64E+03	.25E+03	.17E+03	.11E+03	.13E+03	.12E+03	.22E+02	.25E+02	.43E+02	.40E+02	.76E+02	.12E+03
1400.	.12E+03	.85E+02	.39E+03	.64E+03	.64E+03	.25E+03	.17E+03	.54E+02	.68E+02	.60E+02	.22E+02	.25E+02	.43E+02	.40E+02	.76E+02	.59E+02
1500.	.90E+02	.65E+02	.39E+03	.64E+03	.64E+03	.25E+03	.17E+03	.42E+02	.53E+02	.46E+02	.22E+02	.25E+02	.43E+02	.40E+02	.76E+02	.45E+02
1600.	.90E+02	.65E+02	.39E+03	.64E+03	.64E+03	.25E+03	.17E+03	.42E+02	.53E+02	.46E+02	.22E+02	.25E+02	.43E+02	.40E+02	.76E+02	.45E+02
1700.	.90E+02	.65E+02	.37E+03	.55E+03	.55E+03	.21E+03	.16E+03	.42E+02	.53E+02	.46E+02	.20E+02	.22E+02	.37E+02	.35E+02	.71E+02	.45E+02
1800.	.90E+02	.65E+02	.12E+03	.18E+03	.18E+03	.73E+02	.54E+02	.42E+02	.53E+02	.46E+02	.93E+01	.78E+01	.13E+02	.14E+02	.27E+02	.45E+02

1900. .90E+02.65E+02.12E+03.18E+03.18E+03.73E+02.54E+02.42E+02.53E+02.46E+02.93E+01.78E+01.13E+02.14E+02.27E+02.45E+02.64
2000. .90E+02.65E+02.12E+03.18E+03.18E+03.73E+02.54E+02.42E+02.53E+02.46E+02.93E+01.78E+01.13E+02.14E+02.27E+02.45E+02.64
2100. .89E+02.64E+02.12E+03.18E+03.18E+03.73E+02.54E+02.41E+02.50E+02.42E+02.93E+01.78E+01.13E+02.14E+02.27E+02.42E+02.63
2200. .89E+02.63E+02.12E+03.18E+03.18E+03.73E+02.54E+02.41E+02.49E+02.42E+02.93E+01.78E+01.13E+02.14E+02.27E+02.42E+02.63
2300. .89E+02.63E+02.12E+03.18E+03.18E+03.73E+02.52E+02.41E+02.49E+02.42E+02.82E+01.78E+01.13E+02.14E+02.24E+02.42E+02.62
2400. .89E+02.63E+02.12E+03.18E+03.18E+03.72E+02.52E+02.41E+02.49E+02.42E+02.82E+01.76E+01.13E+02.13E+02.24E+02.42E+02.62
2500. .89E+02.63E+02.12E+03.18E+03.17E+03.70E+02.52E+02.41E+02.49E+02.42E+02.82E+01.74E+01.13E+02.12E+02.24E+02.42E+02.62
2600. .89E+02.63E+02.12E+03.18E+03.17E+03.70E+02.52E+02.41E+02.49E+02.42E+02.82E+01.74E+01.13E+02.12E+02.24E+02.42E+02.62
2700. .19E+02.17E+02.12E+03.18E+03.17E+03.70E+02.52E+02.12E+02.14E+02.97E+01.82E+01.73E+01.13E+02.12E+02.24E+02.10E+02.46
2800. .19E+02.17E+02.12E+03.17E+03.17E+03.67E+02.52E+02.12E+02.14E+02.97E+01.82E+01.68E+01.12E+02.11E+02.24E+02.10E+02.46
2900. .19E+02.17E+02.12E+03.17E+03.17E+03.67E+02.52E+02.12E+02.14E+02.97E+01.82E+01.68E+01.12E+02.11E+02.24E+02.10E+02.46
3000. .19E+02.17E+02.12E+03.17E+03.17E+03.67E+02.52E+02.12E+02.14E+02.97E+01.65E+01.68E+01.12E+02.11E+02.22E+02.10E+02.45
3100. .16E+02.14E+02.12E+03.17E+03.17E+03.67E+02.52E+02.93E+01.12E+02.79E+01.65E+01.68E+01.12E+02.11E+02.22E+02.87E+01.44
3200. .95E+01.61E+01.12E+03.17E+03.17E+03.67E+02.52E+02.41E+01.67E+01.37E+01.65E+01.68E+01.12E+02.11E+02.22E+02.57E+01.42
3300. .95E+01.61E+01.12E+03.17E+03.17E+03.67E+02.52E+02.41E+01.67E+01.37E+01.65E+01.68E+01.12E+02.11E+02.22E+02.57E+01.42
3400. .95E+01.61E+01.12E+03.17E+03.17E+03.67E+02.52E+02.41E+01.67E+01.37E+01.65E+01.68E+01.12E+02.11E+02.22E+02.57E+01.42
3500. .95E+01.61E+01.11E+02.11E+03.11E+03.43E+02.39E+01.41E+01.67E+01.37E+01.16E+01.43E+01.79E+01.73E+01.26E+01.57E+01.21
3600. .95E+01.61E+01.11E+02.15E+02.12E+02.72E+01.39E+01.41E+01.67E+01.37E+01.16E+01.78E+00.17E+01.20E+01.26E+01.57E+01.58
3700. .95E+01.61E+01.11E+02.15E+02.12E+02.72E+01.39E+01.41E+01.67E+01.37E+01.16E+01.78E+00.17E+01.20E+01.26E+01.57E+01.58
3800. .95E+01.61E+01.11E+02.15E+02.12E+02.72E+01.39E+01.41E+01.67E+01.37E+01.16E+01.78E+00.17E+01.20E+01.26E+01.57E+01.58
3900. .95E+01.61E+01.11E+02.15E+02.12E+02.72E+01.39E+01.41E+01.67E+01.37E+01.16E+01.78E+00.17E+01.20E+01.26E+01.57E+01.58
4000. .95E+01.61E+01.11E+02.15E+02.12E+02.72E+01.39E+01.41E+01.67E+01.37E+01.16E+01.78E+00.17E+01.20E+01.26E+01.57E+01.58
4100. .95E+01.61E+01.11E+02.15E+02.12E+02.72E+01.39E+01.41E+01.67E+01.37E+01.16E+01.78E+00.17E+01.20E+01.26E+01.57E+01.58
4200. .95E+01.61E+01.11E+02.15E+02.12E+02.72E+01.39E+01.41E+01.67E+01.37E+01.16E+01.78E+00.17E+01.20E+01.26E+01.57E+01.58
4300. .95E+01.61E+01.11E+02.15E+02.12E+02.72E+01.39E+01.41E+01.67E+01.37E+01.16E+01.78E+00.17E+01.20E+01.26E+01.57E+01.58
4400. .95E+01.61E+01.11E+02.15E+02.12E+02.72E+01.39E+01.41E+01.67E+01.37E+01.16E+01.78E+00.17E+01.20E+01.26E+01.57E+01.58
4500. .95E+01.61E+01.11E+02.15E+02.12E+02.72E+01.39E+01.41E+01.67E+01.37E+01.16E+01.78E+00.17E+01.20E+01.26E+01.57E+01.58
4600. .95E+01.61E+01.11E+02.15E+02.12E+02.72E+01.39E+01.41E+01.67E+01.37E+01.16E+01.78E+00.17E+01.20E+01.26E+01.57E+01.58
4700. .71E+01.51E+01.11E+02.15E+02.12E+02.72E+01.39E+01.37E+01.60E+01.29E+01.16E+01.78E+00.17E+01.20E+01.26E+01.40E+01.54
4800. .60E+01.46E+01.11E+02.15E+02.12E+02.72E+01.39E+01.36E+01.56E+01.26E+01.16E+01.78E+00.17E+01.20E+01.26E+01.32E+01.52
4900. .54E+01.44E+01.11E+02.15E+02.12E+02.72E+01.39E+01.34E+01.53E+01.24E+01.16E+01.78E+00.17E+01.20E+01.26E+01.29E+01.51
5000. .54E+01.44E+01.11E+02.15E+02.12E+02.72E+01.39E+01.34E+01.53E+01.24E+01.16E+01.78E+00.17E+01.20E+01.26E+01.29E+01.51

1 ********** PLUME WATER DEPOSITION TABLE (KG./(KM.**2-MO.)) **********

CALPINE OSPRAY SITE LMDCT, 1987-91 TAMPA MET DATA
SEASON=ANNUAL

DISTANCE FROM TOWER (M)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	A
	WIND FROM																
	PLUME HEADED																
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	A

5100. .54E+01.44E+01.11E+02.15E+02.12E+02.72E+01.39E+01.34E+01.53E+01.24E+01.16E+01.78E+00.17E+01.20E+01.26E+01.29E+01.51
5200. .54E+01.44E+01.11E+02.15E+02.12E+02.72E+01.39E+01.34E+01.53E+01.24E+01.16E+01.78E+00.17E+01.20E+01.26E+01.29E+01.51
5300. .54E+01.44E+01.11E+02.15E+02.12E+02.72E+01.39E+01.34E+01.53E+01.24E+01.16E+01.78E+00.17E+01.20E+01.26E+01.29E+01.51
5400. .54E+01.44E+01.11E+02.15E+02.12E+02.72E+01.39E+01.34E+01.53E+01.24E+01.16E+01.78E+00.17E+01.20E+01.26E+01.29E+01.51
5500. .54E+01.44E+01.11E+02.15E+02.12E+02.72E+01.39E+01.34E+01.53E+01.24E+01.16E+01.78E+00.17E+01.20E+01.26E+01.29E+01.51
5600. .54E+01.44E+01.11E+02.15E+02.12E+02.72E+01.39E+01.34E+01.53E+01.24E+01.16E+01.78E+00.17E+01.20E+01.26E+01.29E+01.51
5700. .54E+01.44E+01.77E+01.15E+02.12E+02.72E+01.28E+01.34E+01.53E+01.24E+01.13E+01.78E+00.17E+01.20E+01.22E+01.29E+01.48
5800. .51E+01.42E+01.31E+01.15E+02.12E+02.72E+01.12E+01.32E+01.52E+01.22E+01.94E+00.78E+00.17E+01.20E+01.15E+01.27E+01.42
5900. .51E+01.42E+01.31E+01.46E+01.40E+01.21E+01.12E+01.32E+01.51E+01.22E+01.94E+00.67E+00.11E+01.10E+01.15E+01.26E+01.27
6000. .51E+01.42E+01.31E+01.46E+01.40E+01.21E+01.12E+01.32E+01.51E+01.22E+01.94E+00.67E+00.11E+01.10E+01.15E+01.26E+01.27
6100. .51E+01.42E+01.31E+01.46E+01.40E+01.21E+01.12E+01.32E+01.51E+01.22E+01.94E+00.67E+00.11E+01.10E+01.15E+01.26E+01.27
6200. .51E+01.42E+01.31E+01.46E+01.40E+01.21E+01.12E+01.32E+01.51E+01.22E+01.94E+00.67E+00.11E+01.10E+01.15E+01.26E+01.27
6300. .51E+01.42E+01.31E+01.46E+01.40E+01.21E+01.12E+01.32E+01.51E+01.22E+01.94E+00.67E+00.11E+01.10E+01.15E+01.26E+01.27
6400. .51E+01.42E+01.31E+01.46E+01.40E+01.21E+01.12E+01.32E+01.51E+01.22E+01.94E+00.67E+00.11E+01.10E+01.15E+01.26E+01.27
6500. .51E+01.42E+01.31E+01.46E+01.40E+01.21E+01.12E+01.32E+01.51E+01.22E+01.94E+00.67E+00.11E+01.10E+01.15E+01.26E+01.27
6600. .51E+01.42E+01.31E+01.46E+01.40E+01.21E+01.12E+01.32E+01.51E+01.22E+01.94E+00.67E+00.11E+01.10E+01.15E+01.26E+01.27
6700. .51E+01.42E+01.31E+01.46E+01.40E+01.21E+01.12E+01.32E+01.51E+01.22E+01.94E+00.67E+00.11E+01.10E+01.15E+01.26E+01.27
6800. .51E+01.42E+01.31E+01.46E+01.40E+01.21E+01.12E+01.32E+01.51E+01.22E+01.94E+00.67E+00.11E+01.10E+01.15E+01.26E+01.27
6900. .51E+01.42E+01.31E+01.46E+01.40E+01.21E+01.12E+01.32E+01.51E+01.22E+01.94E+00.67E+00.11E+01.10E+01.15E+01.26E+01.27
7000. .31E+01.23E+01.31E+01.46E+01.40E+01.21E+01.12E+01.18E+01.28E+01.17E+01.94E+00.67E+00.11E+01.10E+01.15E+01.20E+01.21
7100. .29E+01.21E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.26E+01.17E+01.94E+00.67E+00.11E+01.10E+01.15E+01.19E+01.21
7200. .29E+01.21E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.26E+01.17E+01.94E+00.67E+00.11E+01.10E+01.15E+01.19E+01.21
7300. .29E+01.21E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.26E+01.17E+01.94E+00.67E+00.11E+01.10E+01.15E+01.19E+01.21
7400. .29E+01.21E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.26E+01.17E+01.94E+00.67E+00.11E+01.10E+01.15E+01.19E+01.21
7500. .29E+01.21E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.26E+01.17E+01.94E+00.67E+00.11E+01.10E+01.15E+01.19E+01.21
7600. .29E+01.21E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.26E+01.17E+01.94E+00.67E+00.11E+01.10E+01.15E+01.19E+01.21
7700. .29E+01.21E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.26E+01.17E+01.94E+00.67E+00.11E+01.10E+01.15E+01.19E+01.21
7800. .29E+01.21E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.26E+01.17E+01.94E+00.67E+00.11E+01.10E+01.15E+01.19E+01.21
7900. .29E+01.21E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.26E+01.17E+01.93E+00.67E+00.11E+01.10E+01.15E+01.19E+01.21
8000. .29E+01.21E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.26E+01.17E+01.92E+00.67E+00.10E+01.10E+01.14E+01.19E+01.21
8100. .29E+01.21E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.26E+01.17E+01.92E+00.67E+00.10E+01.10E+01.14E+01.19E+01.21
8200. .29E+01.21E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.26E+01.17E+01.92E+00.67E+00.10E+01.10E+01.14E+01.19E+01.21
8300. .29E+01.21E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.26E+01.17E+01.92E+00.67E+00.10E+01.10E+01.14E+01.19E+01.21
8400. .29E+01.21E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.26E+01.17E+01.92E+00.67E+00.10E+01.10E+01.14E+01.19E+01.21
8500. .29E+01.21E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.26E+01.17E+01.92E+00.67E+00.10E+01.10E+01.14E+01.19E+01.21
8600. .29E+01.21E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.26E+01.17E+01.92E+00.67E+00.10E+01.10E+01.14E+01.19E+01.21
8700. .29E+01.21E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.26E+01.17E+01.92E+00.67E+00.10E+01.10E+01.14E+01.19E+01.21

```
 8800. .29E+01.21E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.26E+01.17E+01.92E+00.67E+00.10E+01.10E+01.14E+01.19E+01.21
 8900. .29E+01.21E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.26E+01.17E+01.92E+00.67E+00.10E+01.10E+01.14E+01.19E+01.21
 9000. .29E+01.21E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.26E+01.17E+01.92E+00.67E+00.10E+01.10E+01.14E+01.19E+01.21
 9100. .29E+01.21E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.26E+01.17E+01.92E+00.67E+00.10E+01.10E+01.14E+01.19E+01.21
 9200. .29E+01.21E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.26E+01.17E+01.92E+00.67E+00.10E+01.10E+01.14E+01.19E+01.21
 9300. .29E+01.21E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.26E+01.17E+01.92E+00.67E+00.10E+01.10E+01.14E+01.19E+01.21
 9400. .29E+01.21E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.26E+01.17E+01.92E+00.67E+00.10E+01.10E+01.14E+01.19E+01.21
 9500. .29E+01.21E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.26E+01.17E+01.92E+00.67E+00.10E+01.10E+01.14E+01.19E+01.21
 9600. .29E+01.21E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.26E+01.17E+01.92E+00.67E+00.10E+01.10E+01.14E+01.19E+01.21
 9700. .27E+01.20E+01.31E+01.46E+01.40E+01.21E+01.12E+01.16E+01.24E+01.15E+01.92E+00.67E+00.10E+01.10E+01.14E+01.17E+01.20
 9800. .18E+01.15E+01.31E+01.46E+01.40E+01.21E+01.12E+01.12E+01.14E+01.65E+00.92E+00.67E+00.10E+01.10E+01.14E+01.90E+00.17
 9900. .18E+01.15E+01.31E+01.46E+01.40E+01.21E+01.12E+01.12E+01.14E+01.65E+00.92E+00.67E+00.10E+01.10E+01.14E+01.90E+00.17
10000. .18E+01.15E+01.31E+01.46E+01.40E+01.21E+01.12E+01.12E+01.14E+01.65E+00.92E+00.67E+00.10E+01.10E+01.14E+01.90E+00.17
1       ************************************ HOURS OF PLUME FOGGING TABLE ************************************
              CALPINE OSPRAY SITE LMDCT, 1987-91 TAMPA MET DATA
            SEASON=ANNUAL
DISTANCE ********************************************** WIND FROM **********************************************
  FROM      N    NNE    NE   ENE    E   ESE    SE   SSE    S   SSW   SW   WSW    W   WNW   NW   NNW   ALL
 TOWER    ********************************************** PLUME HEADED **********************************************
  (M)       S    SSW    SW   WSW    W   WNW    NW   NNW    N   NNE   NE   ENE    E   ESE   SE   SSE   SUM

   100.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   200.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   300.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   400.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   500.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   600.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   700.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   800.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   900.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
  1000.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
  1100.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
  1200.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
  1300.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
  1400.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
  1500.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
  1600.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
1       ************************************ HOURS OF RIME ICING TABLE ************************************
              CALPINE OSPRAY SITE LMDCT, 1987-91 TAMPA MET DATA
            SEASON=ANNUAL
DISTANCE ********************************************** WIND FROM **********************************************
  FROM      N    NNE    NE   ENE    E   ESE    SE   SSE    S   SSW   SW   WSW    W   WNW   NW   NNW   ALL
 TOWER    ********************************************** PLUME HEADED **********************************************
  (M)       S    SSW    SW   WSW    W   WNW    NW   NNW    N   NNE   NE   ENE    E   ESE   SE   SSE   SUM

   100.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   200.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   300.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   400.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   500.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   600.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   700.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   800.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   900.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
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  1100.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
  1200.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
  1300.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
  1400.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
  1500.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
  1600.    0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
1************************************************************************

                *** RUN TIME STATISTICS ***

BEGINNING HOUR,MINUTE,SECOND  - - - - - - - - : 12:57:14
BEGINNING MONTH,DAY,YEAR  - - - - - - - - - - : 03/09/00


ENDING HOUR,MINUTE,SECOND  - - - - - - - - - - : 12:57:21
ENDING MONTH,DAY,YEAR  - - - - - - - - - - - - : 03/09/00

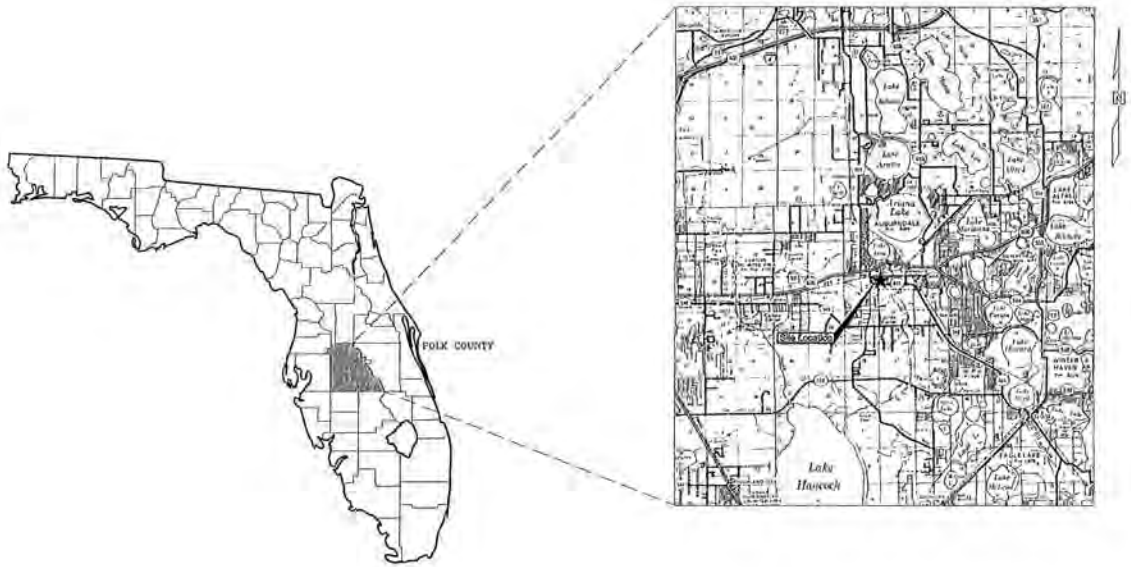

TOTAL CPU SECONDS  - - - - - - - - - - - - - - :          7.
```

****

OSPREY ENERGY CENTER

AUBURNDALE, FLORIDA

SECTION 15 - TOWNSHIP 28 SOUTH - RANGE 25 EAST



LIST OF DRAWINGS	
SHEET No.	TITLE
C-1	COVER SHEET
DP-1	DRAINAGE PLAN
DP-2	DRAINAGE PLAN DETAILS
EP-1	EROSION AND SEDIMENT CONTROL PLA
EP-2	EROSION AND SEDIMENT CONTROL DET
	BOUNDARY SURVEY

Golder Associates

TAMPA, FLORIDA

OWNER \ DEVELOPER:

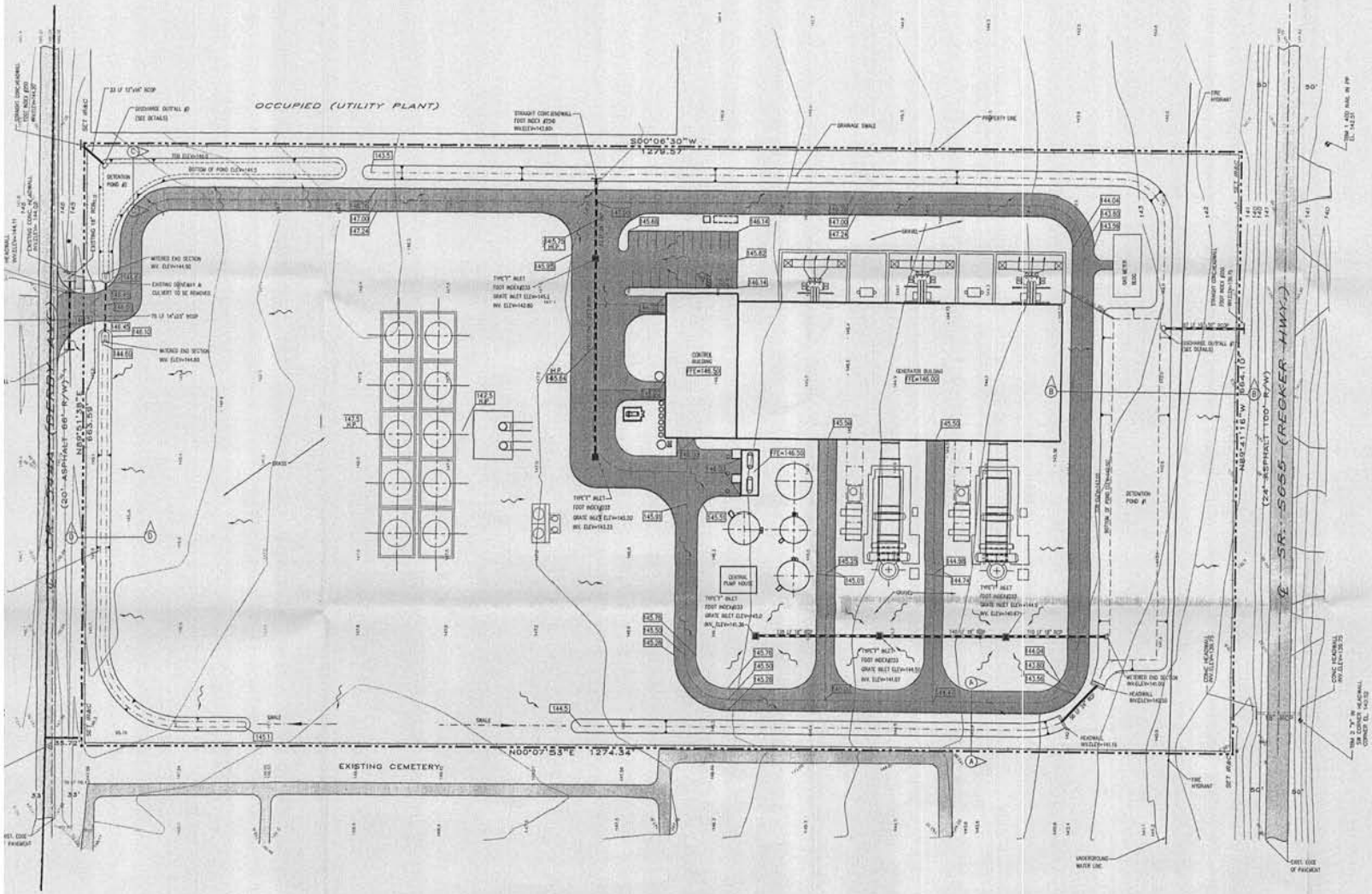
CALPINE CONSTRUCTION FINANCE COMPANY, L.P.
50 WEST SAN FERNANDO STREET
SAN JOSE, CA 95113
PHONE: (817) 723-7200
FAX: (817) 723-7039

SURVEYOR:

CHASTAIN SKILLMAN INC.
SEBRING OFFICE
363 U.S. 27 SOUTH, SEBRING, FL
PHONE: (941) 382-4160

CIVIL/ENVIRONMENTAL ENGINEER:

GOLDER ASSOCIATES INC.
5405 WEST CYPRESS STREET, SUITE 215
TAMPA, FLORIDA 33607
PHONE: (813) 287-1717
FAX: (813) 287-1716



Legend

- PROPERTY LINE
- FENCE LINE
- EXISTING CONTOUR LINE
- SECTION LINE
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- METERED END SECTION (MES)
- PROPOSED CONCRETE ENDWALL
- RUNOFF FLOW PATTERN
- 45.76 PROPOSED ELEVATION
- HANDICAP
- PROPOSED PAVED ROAD
- EXISTING ROAD

Drainage Notes:

1. ALL ELEVATIONS ARE BASED ON USCG&S DATUM 1929.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE WITHIN ROAD AND DRAINAGE RIGHT-OF-WAY AS A DIRECT RESULT OF PROJECT CONSTRUCTION. DISRUPTED AREAS SHALL BE RESTORED TO ITS ORIGINAL CONDITION.
3. CONTRACTOR SHALL LOCATE ALL EXISTING UTILITIES PRIOR TO WORK. SOME OF UNDERGROUND UTILITIES AND OVERHEAD UTILITIES AND POLES MAY REQUIRE RELOCATION.
4. ALL TOP SOIL AND OTHER ORGANIC MATERIALS SHALL BE STRIPPED FROM THE AREAS TO BE GRADED PRIOR TO STARTING EARTHWORK. TOPSOIL SHALL BE PLACED IN A STOCKPILE FOR LATER REDEVELOPMENT AND USE FOR LANDSCAPING THE SITE.
5. EXCAVATED MATERIAL UNSUITABLE FOR FILL SHALL BE DISPOSED OF OFFSITE AS REQUIRED.
6. ORGANIC MATERIALS SHALL BE EXCAVATED AND REPLACED WITH ACCEPTABLE FILL MATERIAL SUITABLE FOR THE INTENDED PURPOSE.
7. ALL DISTURBED AREAS SHALL BE SEEDED. POND SLOPES, TOP OF BANK, AND SLOPES GREATER THAN 5:1 SHALL BE SODDED UPON COMPLETION.
8. SITE STAKING TO LOCATE BUILDING, STRUCTURES, DETENTION POND FEATURES, RIGHTS-OF-WAY, AND LAYOUT SHALL BE ACCOMPLISHED FROM EXTRACTED COORDINATES/EXISTING FROM PLANS.
9. DRAIN PIPE IS NORMALLY CLOSED. THE CONTRACTOR SHALL BE INSPECTED FOR WATER QUALITY PRIOR TO OPENING THE RELEASE VALVE AND DISCHARGING ACCUMULATED STORMWATER INTO THE SD

DESCRIPTION	APPROVED

1"=60' 0 1"=60' scale feet

DESIGNED BY:	KDT	03/07/00	
DAD BY:	KDT	03/07/00	
REVIEWED BY:	AG	03/07/00	

FILE NAME: DP-1.dwg
FILE PATH: /993-9570/Impact Study/

Golder Associates

GOLDER ASSOCIATES INC.
5405 WEST CYPRESS STREET, SUITE 215
TAMPA, FLORIDA 33607
TEL: (813) 287-1717
FAX: (813) 287-1716

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF FLORIDA.

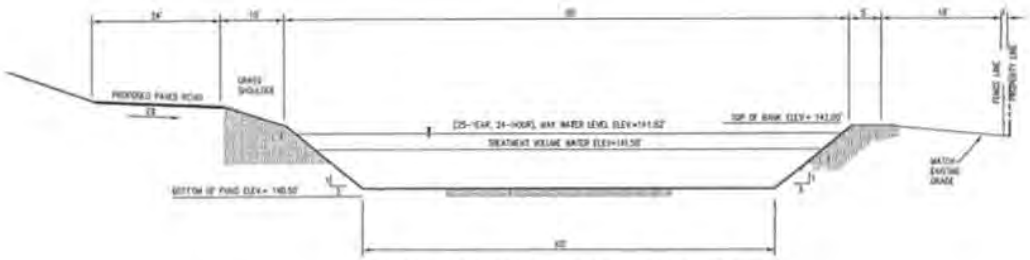
NAME _____ REG NO. _____

SIGNATURE

DATE

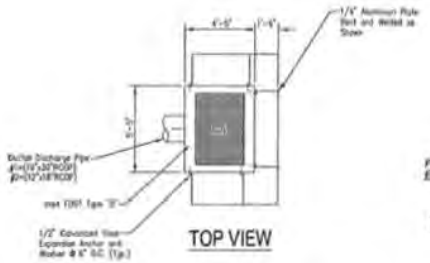
CLIENT/PROJECT
Calpine Construction Finance Company, L.P.
Osprey Energy Center
Auburndale, Florida

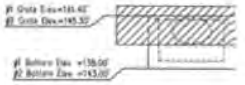
SHEET TITLE
DRAINAGE PLAN

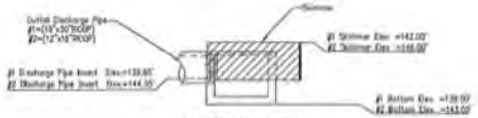


DETENTION POND #1 SECTION B-B

Horizontal Scale : 1"=10'
Vertical Scale : 1"=4'

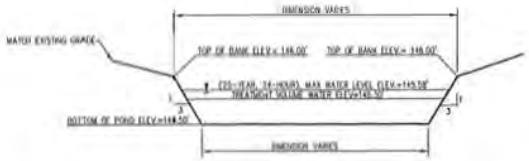






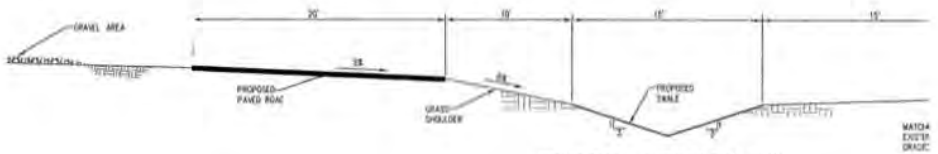
DISCHARGE CONTROL #1, #2 STRUCTURE DETAILS

Scale: 1"=4'



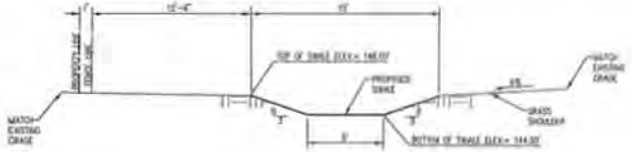
DETENTION POND #2 SECTION C-C

Horizontal Scale : 1"=10'
Vertical Scale : 1"=2'



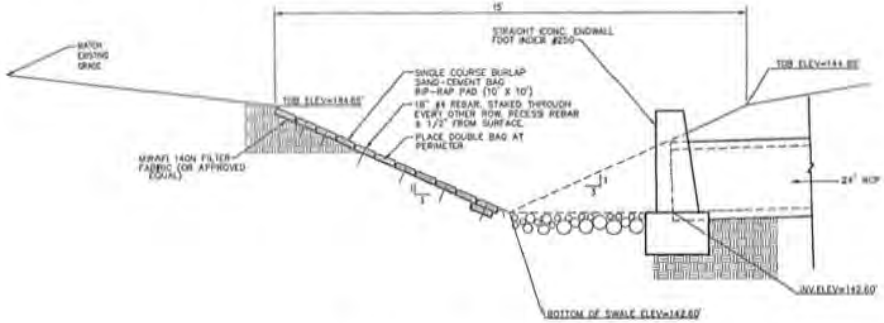
TYPICAL SECTION A-A

Scale : 1"=5'



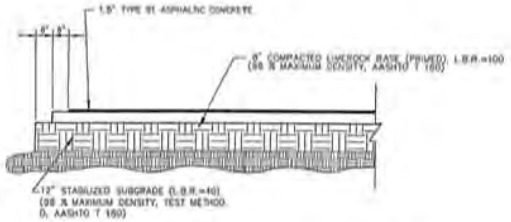
TYPICAL SECTION D-D

Scale : 1"=5'



ENDWALL SECTION

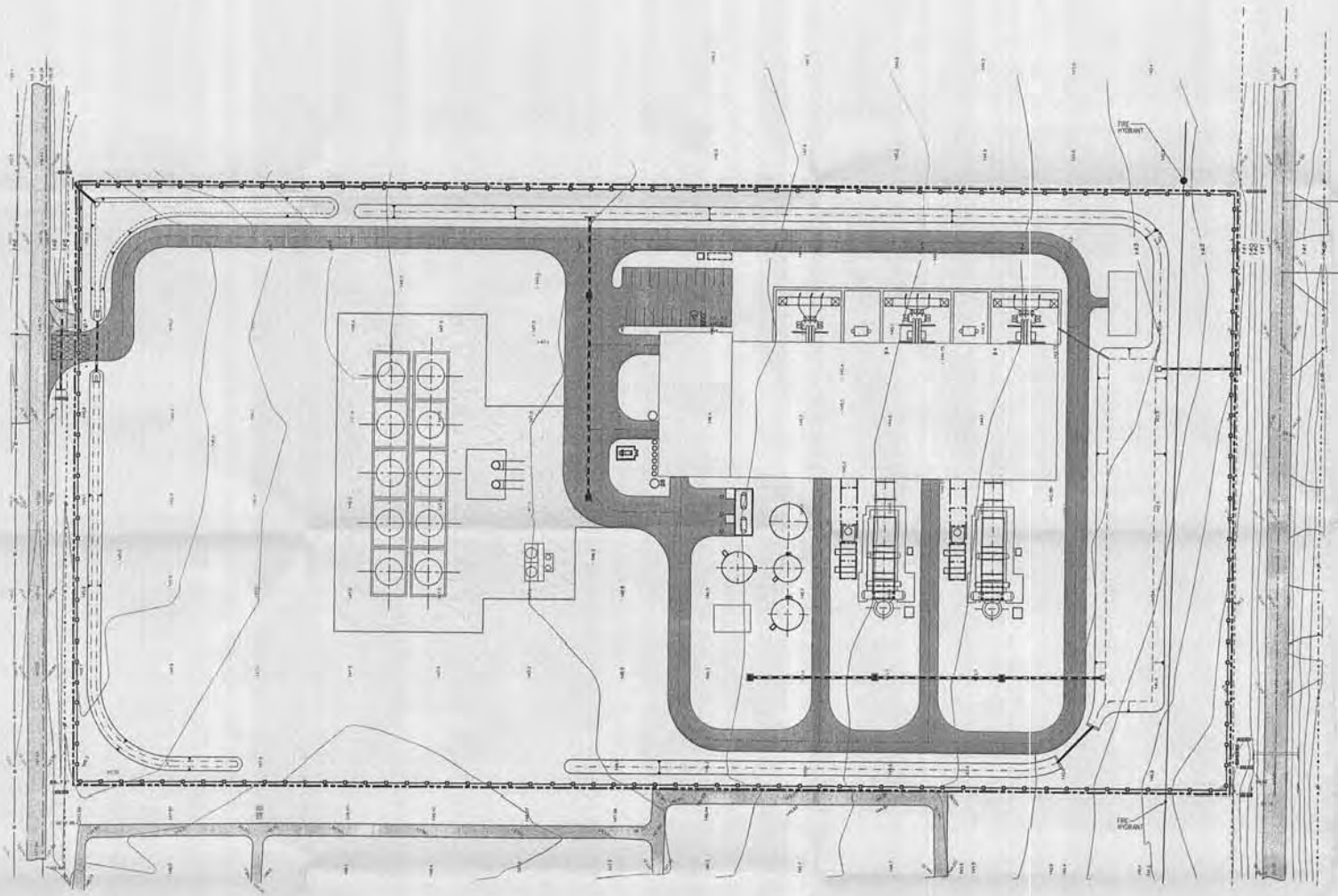
Scale : 1"=2'



TYPICAL PAVED ROAD SECTION

Scale : NTS

DESCRIPTION	APPROVED	FILE DATE	FILE ISSUE	0 0 0 scale feet	DESIGNED BY: JPE 02/29/2000 CAD BY: JPE 02/29/2000 REVIEWED BY: AC 02/29/2000	Golder Associates	GOLDER ASSOCIATES INC. 5100 WEST CYPRESS STREET, SUITE 210 TAMPA, FLORIDA 33607 TEL: (813) 287-1717 FAX: (813) 287-1716	I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF FLORIDA. NAME _____ NO. _____	CLIENT/PROJECT Calpine Construction Finance Company, L.P. Osprey Energy Center Auburndale, Florida	SHEET TITLE Drainage Details
					DP-2 DWG /663-3576-OSPREY_IMPACT-STUDY/						



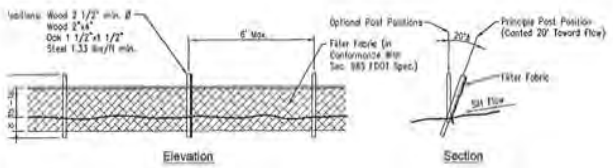
LEGEND

- FENCE LINE
- PROPERTY LINE
- HANDICAPP
- PROPOSED SUPPLY WELL (W)
- HAYBALE
- EXISTING ELEVATION
- SILT FENCE
- PROPOSED PAVED ROAD
- CONSTRUCTION ENTRANCE

EROSION AND SEDIMENT CONTROL NOTES:

1. SEDIMENT BASINS AND TRAPS, PERIMETER DIKES, SEDIMENT BARRIERS AND OTHER MEASURES INTEN TO TRAP SEDIMENT SHALL BE CONSTRUCTED AS A FIRST STEP IN ANY LAND-DISTURBING ACTIVITY SHALL BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKE PLACE.
2. ALL SEDIMENT CONTROL MEASURES ARE TO BE ADJUSTED TO MEET FIELD CONDITIONS AT THE TIME CONSTRUCTION AND BE COORDINATED PRIOR TO ANY CLEARING OR DISTURBANCE OF EXISTING SOIL MATERIAL OR BALANCE OF SITE. PERIMETER SEDIMENT BARRIERS SHALL BE CONSTRUCTED TO PRE SEDIMENT OR TRASH FROM FLOWING OR FLOATING ON TO ADJACENT PROPERTIES.
3. PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DISTURBED AREAS WITHIN SEV DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. TEMPORARY SOIL STABILI SHALL BE APPLIED WITHIN SEVEN DAYS TO DISTURBED AREAS THAT MAY NOT BE AT FINAL GRADE B WILL REMAIN UNDISTURBED FOR LONGER THAN 30 DAYS. PERMANENT STABILIZATION SHALL BE AP TO AREAS THAT ARE TO BE LEFT UNDISTURBED FOR MORE THAN ONE YEAR.
4. A PERMANENT VEGETATIVE COVER OR OTHER MEANS OF STABILIZATION SHALL BE ESTABLISHED ON DISTURBED AREAS NOT OTHERWISE PERMANENTLY STABILIZED. PERMANENT VEGETATION SHALL NO CONSIDERED ESTABLISHED UNTIL A GROUND COVER IS ACHIEVED THAT, IN THE OPINION OF THE RE IS UNIFORM, MATURE ENOUGH TO SURVIVE AND WILL INHIBIT EROSION.
5. SURFACE RUNOFF FROM DISTURBED AREAS THAT IS COMPRISED OF FLOW FROM DRAINAGE AREAS GREATER THAN OR EQUAL TO THREE ACRES SHALL BE CONTROLLED BY A SEDIMENT BASIN. THE SEDIMENT BASIN SHALL BE DESIGNED AND CONSTRUCTED TO ACCOMMODATE THE ANTICIPATED SEDI LOADING FROM THE LAND-DISTURBING ACTIVITY. THE OUTFALL DEVICE OR SYSTEM DESIGN SHALL INTO ACCOUNT THE TOTAL DRAINAGE AREA FLOWING THROUGH THE DISTURBED AREA TO BE DESIGN THE BASIN.
6. AFTER ANY SIGNIFICANT RAINFALL, SEDIMENT CONTROL STRUCTURES WILL BE INSPECTED FOR INTEG ANY DAMAGE DEVICES SHALL BE CORRECTED IMMEDIATELY.
7. CONCENTRATED RUNOFF SHALL NOT FLOW DOWN CUT OR FILL SLOPES UNLESS CONTAINED WITHIN A ADEQUATE TEMPORARY OR PERMANENT CHANNEL, FLUME OR SLOPE DRAIN STRUCTURE.
8. WHEREVER WATER SEEPS FROM A SLOPE FACE, ADEQUATE DRAINAGE OR OTHER PROTECTION SHALL PROVIDED.
9. SEDIMENT WILL BE PREVENTED FROM ENTERING ANY STORM DRAIN SYSTEM, DITCH, OR CHANNEL. A STORM SEWER INLETS THAT ARE MADE OPERABLE DURING CONSTRUCTION SHALL BE PROTECTED S THAT SEDIMENT-LADEN WATER CANNOT ENTER THE CONVEYANCE SYSTEM WITHOUT FIRST BEING FILTERED OR OTHERWISE TREATED TO REMOVE SEDIMENT.
10. BEFORE TEMPORARY OR NEWLY CONSTRUCTED STORM/OPEN CONVEYANCE CHANNELS ARE MADE OPERATIONAL, ADEQUATE OUTLET PROTECTION AND ANY REQUIRED TEMPORARY OR PERMANENT CHANNEL LINING SHALL BE INSTALLED IN BOTH THE CONVEYANCE CHANNEL AND RECEIVING CHANN
11. WHEN WORK IN A LIVE WATERCOURSE IS PERFORMED, PRECAUTIONS SHALL BE TAKEN TO MINIMIZE ENCROACHMENT, CONTROL SEDIMENT TRANSPORT AND STABILIZE THE WORK AREA TO THE GREATES EXTENT POSSIBLE DURING CONSTRUCTION. NONERODIBLE MATERIAL SHALL BE USED FOR THE CONSTRUCTION OF CAUSEWAYS AND COFFERDAMS. EARTHEN FILL MAY BE USED FOR THESE STRUCT IF ARMORED BY NONERODIBLE COVER MATERIALS.
12. THE BED AND BANKS OF A WATERCOURSE SHALL BE STABILIZED IMMEDIATELY AFTER WORK IN THE WATERCOURSE IS COMPLETED.
13. PERIODIC INSPECTION AND MAINTENANCE OF ALL SEDIMENT CONTROL STRUCTURES MUST BE PROVID TO ENSURE INTENDED PURPOSE IS ACCOMPLISHED. THE DEVELOPER, OWNER, AND/OR CONTRACTOR SHALL BE CONTINUALLY RESPONSIBLE FOR ALL SEDIMENT LEAVING THE PROPERTY. SEDIMENT CONT MEASURES SHALL BE IN WORKING CONDITION AT THE END OF EACH WORKING DAY.
14. WHERE CONSTRUCTION VEHICLE ACCESS ROUTES INTERSECT PAVED PUBLIC ROADS, PROVISIONS SHA BE MADE TO MINIMIZE THE TRANSPORT OF SEDIMENT BY TRACKING ONTO THE PAVED SURFACE.
15. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION OR AFTER THE TEMPORARY MEASURES ARE NO LONGER NE IN THE OPINION OF THE REVIEWER. DISTURBED TURF AREAS RESULTING FROM THE DISPOSITION OF TEMPORARY MEASURES SHALL BE PERMANENTLY STABILIZED TO PREVENT FURTHER EROSION AND SEDIMENTATION.
16. PROPERTIES AND WATERWAYS DOWNSTREAM FROM CONSTRUCTION SITES SHALL BE PROTECTED FRO SEDIMENT DEPOSITION AND EROSION.
17. PHASES PROJECTS SHOULD BE CLEARED IN CONJUNCTION WITH CONSTRUCTION OF EACH PHASE.
18. EROSION CONTROL DESIGN AND CONSTRUCTION SHALL FOLLOW THE REQUIREMENTS IN INDEX NUMBERS 101, 102, AND 103 OF FDOT ROADWAY AND TRAFFIC DESIGN STANDARDS.
19. CONTRACTOR SHALL COMPLY WITH THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) PREPA FOR THIS SITE AS PART OF THE NPDES PERMIT REQUIREMENTS RELATED TO CONSTRUCTION ACTIVI
20. A NOTICE OF INTENT (NOI) SHALL BE FILED TO DEP AT LEAST 72 HOURS PRIOR TO COMMENCEMEN CONSTRUCTION ACTIVITIES.

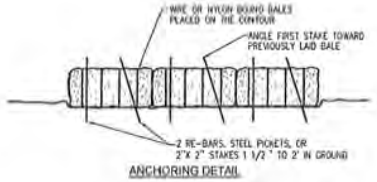
DESCRIPTION	APPROVED	60' 0 60' scale feet	DESIGNED BY: JPE 02/29/2000	Golder Associates	GOLDER ASSOCIATES INC. 5400 WEST CYPRESS STREET, SUITE 215 TAMPA, FLORIDA 33607 TEL: (813) 287-1717 FAX: (813) 287-1716	I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF FLORIDA. NAME: ALEX SHAFAI REG NO.: 48598 SIGNATURE DATE	CLIENT/PROJECT: Calpine Construction Finance Company, L.P. Osprey Energy Center Auburndale, Florida	SHEET TITLE: Erosion and Sediment Control Plan
			CAD BY: JPE 02/29/2000				
			REVIEWED BY:				
		FILE NAME:	EP-1.DWG				
		FILE PATH:	/993-9570-OSPREY/IMPACT-STUDY/				



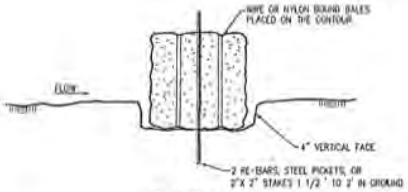
Type III Silt Fence

GENERAL NOTES:

1. POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE EMBEDDED A MINIMUM OF ONE FOOT.
2. THE TOE OF THE SILT FENCE SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW. WHERE FENCE CAN NOT BE TRENCHED IN (E.G. PAVEMENT) WEIGHT FABRIC FLAP WITH WASHED GRAVEL ON UPHILL SIDE TO PREVENT FLOW UNDER FENCE.
3. THE TRENCH MUST BE A MINIMUM OF 6 INCHES DEEP AND 6 INCHES WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.
4. SILT FENCE SHOULD BE SECURELY FASTENED TO EACH STEEL SUPPORT POST OR TO WOVEN WIRE, WHICH IS IN TURN ATTACHED TO THE STEEL FENCE POST.
5. INSPECTION SHALL BE MADE WEEKLY OR AFTER EACH RAINFALL EVENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
6. SILT FENCE SHALL BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
7. ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF 6 INCHES. THE SILT SHALL BE DISPOSED OF IN AN APPROVED SITE AND IN SUCH A MANNER AS TO NOT CONTRIBUTE TO ADDITIONAL SILTATION.



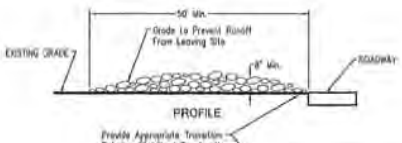
ANCHORING DETAIL



EMBEDDING DETAIL

GENERAL NOTES:

1. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF FOUR INCHES.
2. BALES SHALL BE SECURELY ANCHORED IN PLACE BY 3/8 INCH REBAR STAKES DRIVEN THROUGH THE BALES. THE FIRST STAKE IN EACH BALE SHALL BE ANGLED TOWARD PREVIOUSLY LAID BALE TO FORCE BALES TOGETHER.
3. INSPECTION SHALL BE WEEKLY OR AFTER EACH RAINFALL EVENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED BY THE CONTRACTOR.
4. WHEN SILT REACHES A DEPTH OF 6 INCHES, IT SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED SITE AS TO NOT CREATE A SILTATION PROBLEM.
5. AFTER THE DEVELOPMENT SITE IS COMPLETELY STABILIZED, THE BALE AND ACCUMULATED SILT SHALL BE REMOVED AND DISPOSED OF AT AN APPROVED SPOIL DISPOSAL SITE.



PROFILE



PLAN VIEW

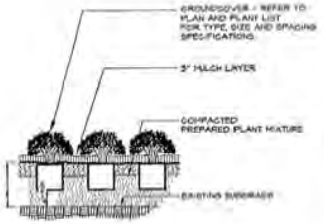
Notes:

1. STONE SIZE : 3" - 5" OPEN GRADED ROCK
2. LENGTH: AS EFFECTIVE BUT NOT LESS THAN 50 FEET
3. THICKNESS : NOT LESS THAN 8 INCHES.
4. WIDTH: NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS/ EGRESS
5. WASHING: WHEN NECESSARY, WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLICK ROADWAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE WHICH DRAINS INTO AN APPROVED TRAP OR SEDIMENT BASIN. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATERCOURSE USING APPROVED METHODS.
6. MAINTENANCE: THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC ROADWAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE CONDITIONS DEMAND, AND REPAIR AND CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC ROADWAY MUST BE REMOVED IMMEDIATELY.
7. DRAINAGE: ENTRANCE MUST BE PROPERLY GRADED OR INCORPORATE A DRAINAGE SWALE TO PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE.

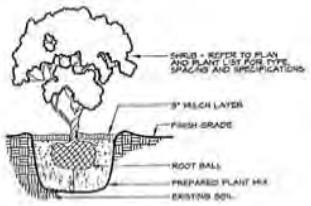
DESCRIPTION:	APPROVED	NTS 0 NTS (1inch / 1inch)	DESIGNED BY:	AG	03/10/00	Golder Associates	GOLDER ASSOCIATES INC. 5406 WEST CYPRESS STREET, SUITE 215 TAMPA, FLORIDA 33607 TEL: (813) 287-1717 FAX: (813) 287-1716	I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF FLORIDA. NAME _____ REG NO. _____ SIGNATURE _____ DATE _____
		FILE NAME:	CAD BY:	CDT	03/10/00			
		FILE PATH:	REVIEWED BY:					
			EP-2.dwg					
			983-9570/Impact Study					

CLIENT/PROJECT
Calpine Construction Finance Company, L.P.
Osprey Energy Center
Auburndale, Florida

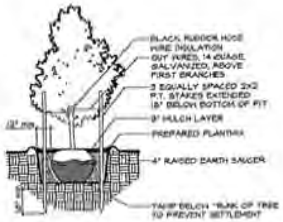
SHEET TITLE
Erosion Control Plan



GROUNDCOVER PLANTING DETAIL



SHRUB PLANTING DETAIL



TREE PLANTING DETAIL

PLANT LIST

QT.	COMMON NAME	SCIENTIFIC NAME	REMARKS
44	BALD CYPRESS	TAXODIUM DISTICHUM	8' HT, 1.5" CAL
40	LIVE OAK	QUERCUS VIRGINIANA	8' HT, 1.5" CAL
112	SHUMARD OAK	QUERCUS SHUMARDII	8' HT, 1.5" CAL
10	DAHOON HOLLY	ILEX CASSINE	8' HT, 1.5" CAL
79	LONG LEAF PINE	PINUS PALUSTRIS	8' HT, 1.5" CAL
8	WAX MYRTLE	MYRICA CERIFERA	25 GAL, 20' OC
3	T.F. LIGUSTRUM	LIGUSTRUM JAPONICUM	25 GAL, 12' OC
570	FLORIDA ANISE	ILLICIUM FLORIDANUM	SPACE 5' OC
348	VIBURNUM	VIBURNUM OBOVATUM	SPACE 3' OC
30	OLEANDER	NERUM OLEANDER	3 GAL, 4' HT MIN SPACE 2.5' OC
149	IND. HAWTHORNE	RAPHIOLEPIS INDICA	3 GAL, 4' HT MIN SPACE 2.5' OC
24	DW. YAUPON HOLLY	ILEX VOMITORIA 'NANA'	3 GAL, 4' HT MIN SPACE 2.5' OC
480	EVERGREEN GIANT LIRIOPE	LIRIOPE EVERGREEN GIANT'	1 GAL SPACE 15" OC
28,476 SQ.		PINE STRAW MULCH	3" THICK
40,000 SY		HYDROSEED	

LANDSCAPE CALCULATIONS

LOT TREE CALCULATION FOR NON-RESIDENTIAL
ONE TREE PER 3,000 SQUARE FEET
LOT SIZE = 14.9 ACRES (649,420 SF)
TOTAL NUMBER OF TREES REQUIRED = 384
TOTAL NUMBER OF NEW TREES = 269

SHADE TREES REQUIRED
80% OF 362 = 171
SHADE TREES PROVIDED = 285

PERIMETER STRIP SEPERATING VEHICULAR USE FROM RIGHT-OF-WAY
TREE CALCULATION
ONE TREE PER 50 LINEAL FEET
PERIMETER LENGTH ON NORTH SIDE = 1140 LF
TOTAL NUMBER OF TREES REQUIRED = 7
TOTAL NUMBER OF TREES PROVIDED =7

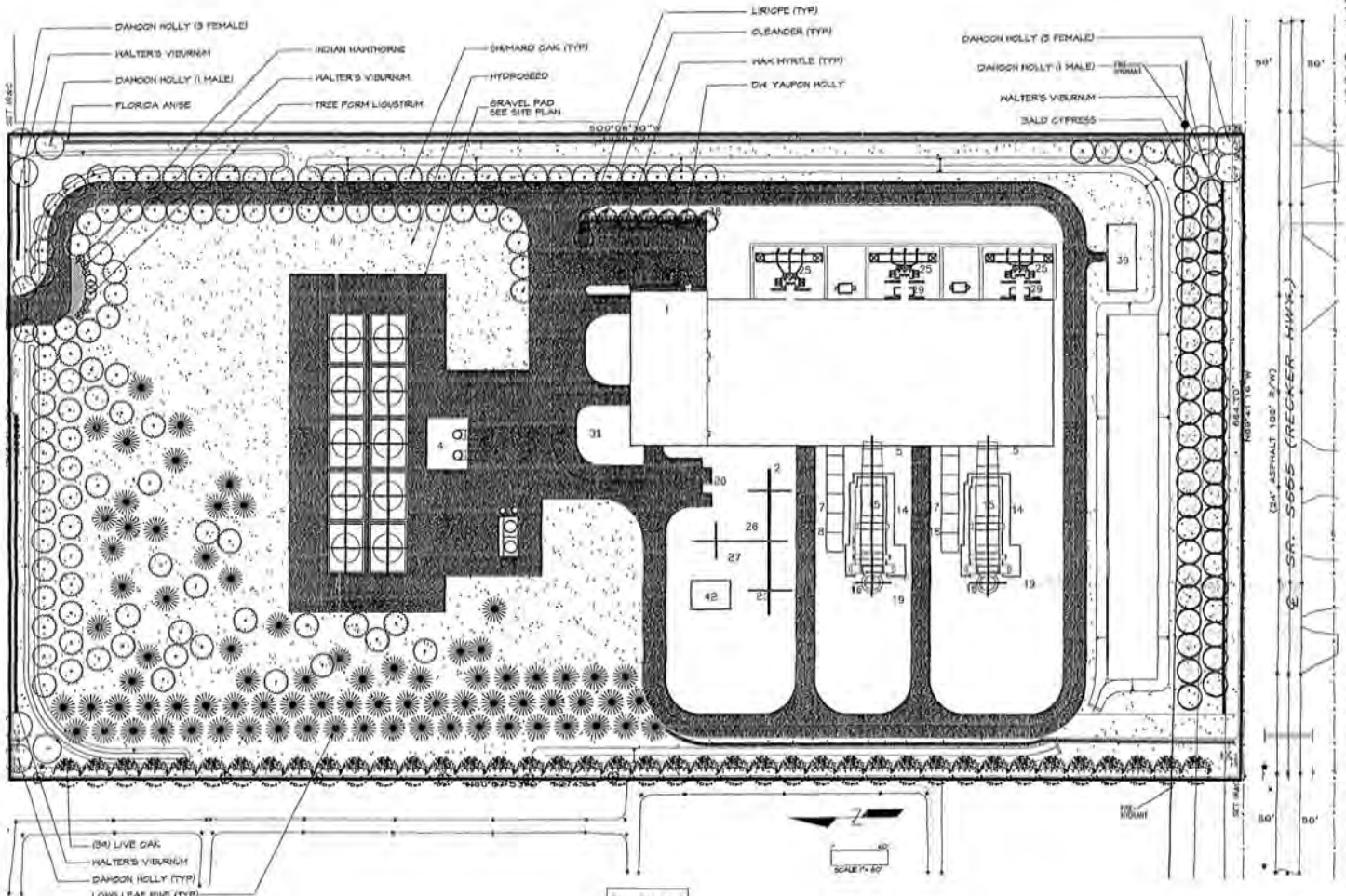
PERIMETER LENGTH ON SOUTH SIDE = 580 LF
TOTAL NUMBER OF TREES REQUIRED = 20
TOTAL NUMBER OF TREES PROVIDED = 24

HEDGE REQUIREMENT
MINIMUM OF 48" HIGH FROM GROUND TO TOP OF PLANT
SPACING 18-36" ON CENTER
SPACING PROVIDED ON PLAN IS 30" ON CENTER

PERIMETER STRIP SEPERATING VEHICULAR USE FROM THE INTERIOR LOT LINE OF AN ADJUTING PROPERTY
TREE CALCULATION
ONE TREE PER 50 LINEAL FEET

PERIMETER LENGTH ON EAST SIDE = 1,070 LF
TOTAL NUMBER OF TREES REQUIRED = 21
TOTAL NUMBER OF TREES PROVIDED = 21

PERIMETER LENGTH ON WEST SIDE = 460 LF
TOTAL NUMBER OF TREES REQUIRED = 16
NUMBER OF NEW TREES = 10
NUMBER OF EXISTING TREES = 6
TOTAL NUMBER OF TREES PROVIDED = 16



LANDSCAPE NOTES

1. PLANT MATERIAL SHALL BE FLORIDA NUMBER 1 GRADE AS OUTLINED IN 'GRADES AND STANDARDS FOR NURSERY PLANTS', LATEST EDITION, PUBLISHED BY THE FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES.

2. EXISTING SITE CONDITIONS MAY DICTATE AN ADJUSTMENT OF THE LANDSCAPE PLAN. IF SUCH CONDITIONS OCCUR, PRIOR TO MAKING ANY CHANGES, THE CONTRACTOR SHALL PROMPTLY NOTIFY THE OWNER FOR DIRECTION AND APPROVAL OF PROPOSED MODIFICATIONS.

3. PLANT SUBSTITUTIONS WILL BE PERMITTED ONLY UPON SUBMISSION OF SUFFICIENT PROOF THAT THE SPECIFIED PLANTS ARE NOT ATTAINABLE AND UPON THE CONSENSUS OF THE OWNER.

4. PLANT QUANTITIES IDENTIFIED ON THE PLANT LIST ARE FOR REFERENCE ONLY. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING PLANTS SPACED AS SPECIFIED ON THE PLANT LIST AND IN SUFFICIENT QUANTITIES TO FULFILL THE DESIGN INTENT.

5. WHERE TREE CALIPER, HEIGHT, AND/OR SPREAD IS SPECIFIED, ALL ARE MINIMA.

6. FERTILIZER TABLETS, SOIL CONDITIONING AGENTS (SUCH AS TERRA SORB) AND MYCORHYZAE BIOSTIMULANTS SHALL BE ADDED TO THE PLANTING AREA ACCORDING TO THE MANUFACTURER'S RECOMMENDATION.

7. ENSURE THE PLANTING AREA DRAINS PROPERLY BEFORE INSTALLING PLANT MATERIAL. IMMEDIATELY NOTIFY THE ENGINEER OF ANY DRAINAGE OR PERCOLATION PROBLEMS BEFORE INSTALLING PLANT MATERIAL.

8. THE CONTRACTOR SHALL FULLY ACQUAINT HIMSELF WITH THE RELATED PAVING, GRADING, AND UTILITY WORK TO PRECLUDE ANY MISUNDERSTANDING AND UNFORSEEN PROBLEMS. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE WATER AND/OR ELECTRICITY REQUIRED TO COMPLETE THE MAINTAIN THE HEALTH AND SURVIVABILITY OF THE PLANT WORK AND MATERIAL.

9. ALL MATERIALS AND EQUIPMENT SHALL BE INSTALLED IN A PROFESSIONAL MANNER IN ACCORDANCE WITH THE BEST RECOGNIZED PRACTICE OF THE TRADE. THE OWNER AND/OR LANDSCAPE ARCHITECT RESERVES THE RIGHT TO DIRECT THE REMOVAL AND REPLACEMENT OF ANY ITEMS DUE TO DEFECTIVE MATERIALS, EQUIPMENT OR WORKMANSHIP PRIOR TO FINAL COMPLETION AND ACCEPTANCE OF THE WORK.

10. THE EXACT LOCATION OF UTILITIES SHALL BE DETERMINED ON SITE. THE APPROPRIATE UTILITY COMPANIES SHALL BE NOTIFIED 48 HOURS IN ADVANCE OF ANY EXCAVATION.

11. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ANY AND ALL PERMITS REQUIRED FOR LANDSCAPE CONSTRUCTION AS REQUIRED BY LOCAL OR STATE GOVERNMENTS.

12. THE CONTRACTOR SHALL GUARANTEE THE HEALTH AND VIGOR OF PLANT MATERIAL FOR A MINIMUM OF 90 DAYS. PLANT MATERIAL THAT DOES NOT MEET REQUIREMENTS AS DESCRIBED IN NOTE 1 SHALL BE REPLACED AT THE CONTRACTORS EXPENSE.

13. CONTRACTOR SHALL PROVIDE IRRIGATION PLAN ACCORDING TO LOCAL IRRIGATION DESIGN STANDARDS.

RS&
Architectural, Engineering and Environmental
Reynolds, Smith and
1715 North Westshore B
Tampa, Florida
813-289-5550 FAX
www.rsandh.
FL Cert.No. AAC001886 - EBC

Gold Asso

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REVISIONS

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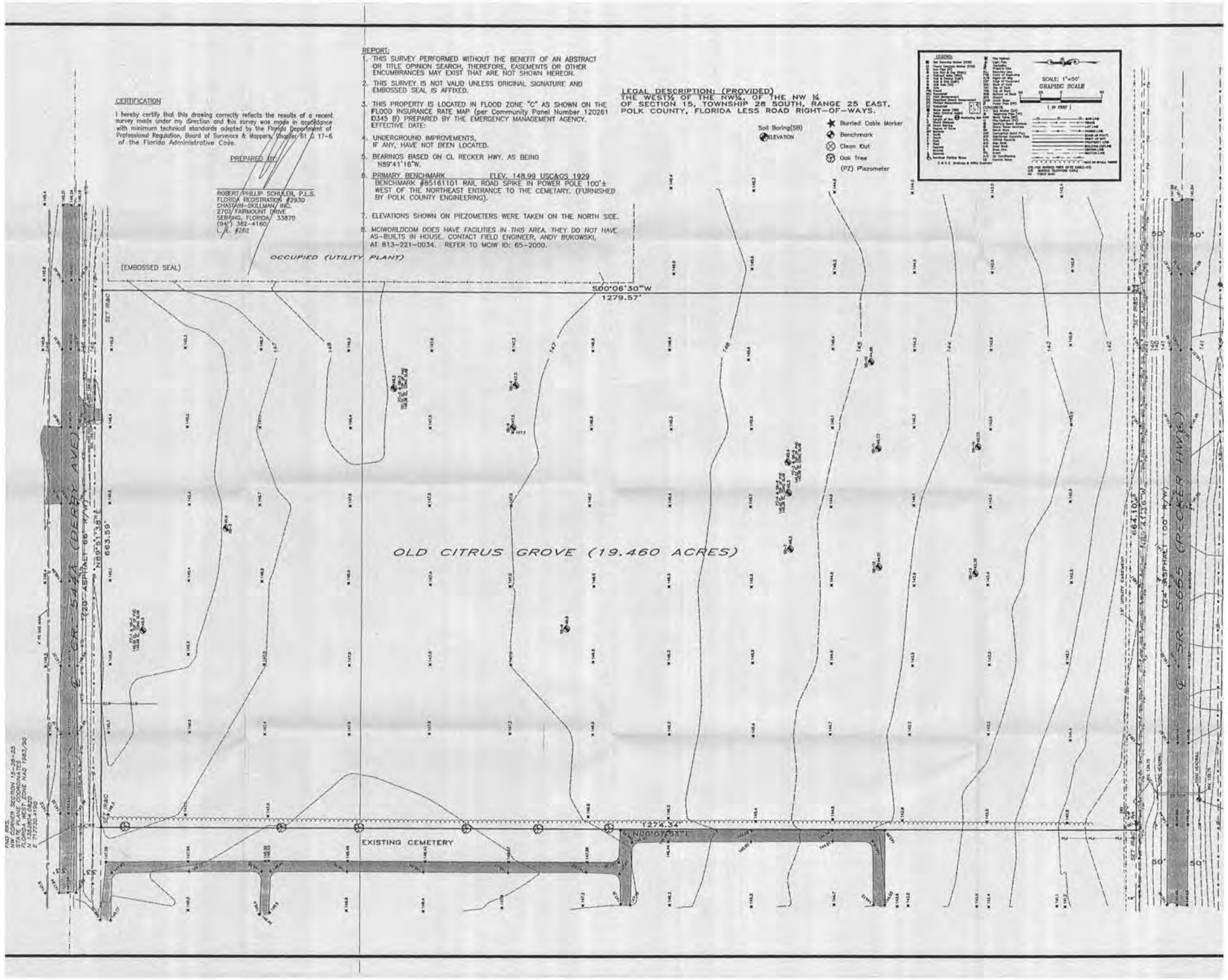
DATE ISSUED:
REVIEWED BY: RS
DRAWN BY: DMZ
DESIGNED BY: DMZ
AEP PROJECT 104-089
© 1998 REYNOLDS, SMITH

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L.1.

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REPORT:
1. THIS SURVEY PERFORMED WITHOUT THE BENEFIT OF AN ABSTRACT OR TITLE OPINION SEARCH, THEREFORE, EASEMENTS OR OTHER ENCUMBRANCES MAY EXIST THAT ARE NOT SHOWN HEREON.
2. THIS SURVEY IS NOT VALID UNLESS ORIGINAL SIGNATURE AND EMBOSSED SEAL IS AFFIXED.
3. THIS PROPERTY IS LOCATED IN FLOOD ZONE "C" AS SHOWN ON THE FLOOD INSURANCE RATE MAP (per Community Panel Number 120261 0345 B) PREPARED BY THE EMERGENCY MANAGEMENT AGENCY. EFFECTIVE DATE:
4. UNDERGROUND IMPROVEMENTS, IF ANY, HAVE NOT BEEN LOCATED.
5. BEARINGS BASED ON CL RECKER HWY. AS BEING N89°41'16"W.
6. PRIMARY BENCHMARK ELEV. 148.99 USC&GS 1929 BENCHMARK #85161101 RAIL ROAD SPIKE IN POWER POLE 100'± WEST OF THE NORTHEAST ENTRANCE TO THE CEMETARY. (FURNISHED BY POLK COUNTY ENGINEERING).
7. ELEVATIONS SHOWN ON PIEZOMETERS WERE TAKEN ON THE NORTH SIDE.
8. MCIWORLDCOM DOES HAVE FACILITIES IN THIS AREA. THEY DO NOT HAVE AS-BUILTS IN HOUSE. CONTACT FIELD ENGINEER, ANDY BUKOWSKI, AT 813-221-0034. REFER TO MCIW ID: 65-2000.
CERTIFICATION
I hereby certify that this drawing correctly reflects the results of a recent survey made under my direction and this survey was made in accordance with minimum technical standards adopted by the Florida Department of Professional Regulation, Board of Surveyors & Mappers, Chapter 61 G 17-6 of the Florida Administrative Code.
PREPARED BY:
ROBERT PHILLIP SCHULER, P.L.S.
FLORIDA REGISTRATION #2930
CHASTAIN-SKILLMAN, INC.
2703 FAIRMOUNT DRIVE
SEBRING, FLORIDA 33870
(941) 382-4160
L.B. #262
(EMBOSSED SEAL)
LEGAL DESCRIPTION: (PROVIDED)
THE WEST½ OF THE NW¼ OF THE NW ¼ OF SECTION 15, TOWNSHIP 28 SOUTH, RANGE 25 EAST, POLK COUNTY, FLORIDA LESS ROAD RIGHT-OF-WAYS.
Soil Boring(SB)
ELEVATION
Buried Cable Marker
Benchmark
Clean Out
Oak Tree
(PZ) Piezometer
LEGEND:
SCALE: 1"=50'
GRAPHIC SCALE
OCCUPIED (UTILITY PLANT)
S00°06'30"W
1279.57'
SET P&C
OLD CITRUS GROVE (19.460 ACRES)
℄ CR 544A (DERBY AVE)
120' ASPHALT 66' R/W
N89°51'38"E
683.59'
℄ SR 565 (RECKER HWY.)
(24' ASPHALT 100' R/W)
N89°41'16"W
664.10'
EXISTING CEMETERY
S.N00°07'53"E
1274.34'
50'
FND RES.
KW CORNER SECTION 15-28-25
STATE PLANE COORDINATES
EAST ZONE NAD 1983/90
N 1352804.0820
E 717730.4190