CITY OF TALLAHASSEE

CITY HALL
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July 16, 1997

Hand Delivered

Hamilton S. Oven
Department of Environmental Protection
2720 Blair Stone Road
Suite H
Tallahassee, FL 32399

Subject: City of Tallahassee - Purdom Unit 8 Project
Edited Pages of Site Certification Application

Dear Mr. Oven:

Enclosed please find 18 sets of edited pages to the subject Site Certification. As we have discussed, these pages contain edits of the text, figures, and tables which clarify certain issues in response to agency questions previously asked and answered, or simply correct typographical errors. These editorial changes are provided for the convenience of all reviewers and do not represent a revision to the project.

Revised and additional text is italicized for ease of identification and a line marking the location of a change is included on the edge of each page. Instructions for replacing and adding pages are also included.

Please let me know if you have any questions on this material. You can reach me at (850) 891-8850.

Thank you for helping the City of Tallahassee develop this method for keeping all parties up to date.

Sincerely,

Jennette Curtis
Environmental Administrator

Enclosures

JC/ns

cc: Rob McGarrah (COT)
Gary Sams (HGSS)
Doug Fulle (FWENC)
c:\winword\PP8team\Ovenltr2.doc

Page(s) to be Removed	Replacement Page(s)	Page(s) to be Added	Reason for the Change
VOLUME I			
CONTENTS			
vii	vii		Page number changes
ix	ix		Page number changes
xvi	xvi		Page number changes
xxiv	xxiv		Page number changes
xxxiv	xxxiv		Typographical error
Section 1.0			
1-1	1-1		Supplemental information
Section 2.2.1			
2.2.1-5 (Figure 2.2.1-3)	2.2.1-5 (Figure 2.2.1-3)		Clarification of key
Section 2.2.7			
2.2.7-25 (Figure 2.2.7-21)	2.2.7-25 (Figure 2.2.7-21)		Supplemental information
Section 2.3.4			
2.3.4-62 (Figure 2.3.4-41)	2.3.4-62 (Figure 2.3.4-41)		Scale correction
Section 3.0			
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Section 3.2			
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Section 3.8			
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5.6-29	5.6-29		Typographical error
5.6-46 (Table 5.6.1-27)	5.6-46 (Table 5.6.1-27)		Typographical error
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6.1-10 (Figure 6.1.7-2)	6.1-10 (Figure 6.1.7-2)		Clarification, correct scale
6.1-12	6.1-12		Supplemental information
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6.2-2 (Figure 6.2.1-1)	6.2-2 (Figure 6.2.1-1)		Clarification
Section 7.2			
7.2-1 (Table 7.2.1-1)	7.2-1 (Table 7.2.1-1)		Clarification
7.2-6 (Figure 7.2.2-1)	7.2-6 (Figure 7.2.2-1)		Clarification of tank numbering

Page(s) to be Removed	Replacement Page(s)	Page(s) to be Added	Reason for the Change
VOLUME 2			
Section 10.1.2			
10.1.2-1	10.1.2-1		Supplemental information
		Add at the end of Section 10.1.2: Blue Sheet Copy of Purdom Generating Station Storm Water General Permit (1 page)	Supplemental information
Section 10.1.5			
Attachment PGS-04			
1	1		Clarification
Attachment PGS-06			
iii	iii		Page number changes
ix	ix		Page number changes
2-14 (Figure 2-4)	2-14 (Figure 2-4)		Foundation elevation correction
3-3 (Table 3-2)	3-3 (Table 3-2)		Clarification
3-13 (Table 3-4)	3-13 (Table 3-4)		Clarification
6-20	6-20		Typographical error
6-47	6-47 thru 6-48 (Figure 6-26)		Supplemental information
7-14 (Table 7-10)	7-14 (Table 7-10)		Typographical error
8-5 (Table 8-1) thru 8-6	8-5 (Table 8-1) thru 8-6		Supplemental information
8-11	8-11		Supplemental information
10-1	10-1		Supplemental information
VOLUME 3			
Attachment PGS-07			
Replace table (3 pages) after page 2	3 page table after page 2 (Attachment PGS-07)		Supplemental information
Section 10.4			
10.4-1	10.4-1		Supplemental information
5th page of Industrial Wastewater Permit (first permit in this Section, 5th page begins with GENERAL CONDITIONS: #14)	Page begins with GENERAL CONDITIONS: #14 (1 page)		Reprinted page
		Add at the end of Section 10.4: Blue Sheet Consumptive Use Permit (Water) (9 pages)	Supplemental information
		Blue Sheet PSC Determination of Need (26 pages)	Supplemental information
VOLUME 4			
Section 10.6.4			
10.6.4-1	10.6.4-1	*Add after page 10.6.4-1:* Stormwater Pond Drawdown Calculation (20 pages)	Supplemental information

VOLUME 1

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PREFACE

The City of Tallahassee (City) is a municipally owned corporation under the laws of the State of Florida. Under the City's charter, the City owns and operates the fourth largest municipal electric utility in Florida and serves approximately 88,000 customers in a service territory of 221 square miles. The City's electric utility continues to enjoy growth in the demand for electricity. The City's current and projected growth rate is approximately 2 percent per year.

The City currently contracts for a 100 MW portion of its supply side resources, 75 MW from the Southern Company and 25 MW from Entergy. In May of 2000, the 75 MW contract will expire and the City has a need to replace this resource as well as meet the increasing customer load. To meet this need, the City proposes to expand its generating capacity at its existing Purdom Generating Station located in the City of St. Marks, Florida. The existing Purdom Station has a nominal generating capacity of *113* MW (Steam Units 5 and 6 - 22 MW each; Steam Unit 7 - 44 MW, Gas Turbines 1 & 2 - 12.5 MW each) This expansion will include the addition of a nominal 250 MW combined cycle generating facility (known as Unit 8) coupled with the early permanent retirement of the existing Purdom Units 5 and 6. This will result in a net addition of over 200 MW to the City's electric system. Unit 8 will primarily burn clean natural gas and utilize Number 2 (0.05% S) diesel fuel oil as a secondary fuel. The design of Unit 8 includes many environmentally beneficial design features that result in a reduced environmental impact from the Purdom Station while the generating capacity is doubled.

The City is seeking approval for the Purdom Unit 8 Project under the Florida Electrical Power Plant Siting Act, Chapter 403, Part II, Florida Statutes (PPSA). The PPSA provides for a centralized review process for new electrical generating facilities in Florida, involving a balancing of "the increasing demand for electrical power plants with the broad interests of the public," including human health, the environment, state waters and wildlife. Under the PPSA, the Florida Public Service Commission (PSC) is the sole forum for the determination of need for a proposed facility. The Florida Department of Environmental Protection (FDEP) acts as the coordinator for the remainder of the certification process, with input from various State, regional and local agencies and ultimate disposition by the Governor and Cabinet sitting as the Siting Board. The City is concurrently seeking certification under the PPSA of its entire Purdom site.

The City submitted a "Petition to Determine Need for Electrical Power Plant - Purdom Unit 8" to the PSC on December 21, 1996. The Petition, along with supporting documentation, addresses the manner in which the Purdom Unit 8 Project will: (i) meet the need for electric system reliability and integrity; (ii) meet the need for adequate electricity at reasonable cost; and (iii) be the most cost-effective alternative available. Salient points of the Need Petition are summarized in Chapter 1 of this Site Certification Application (SCA).

This SCA is being filed with FDEP pursuant to Chapter 62-17, F.A.C. It addresses the environmental and socioeconomic aspects of the Purdom Unit 8 Project by presenting information on the existing natural and human environments, on the generating and associated facilities proposed to be constructed and operated, and on the impacts of those facilities on those environments. In general, the Purdom Unit 8 Project represents a major addition to the City's total generating capacity. Use of an existing site minimizes environmental impacts.

1.1 INTRODUCTION

The City of Tallahassee (City) has determined that in order to continue to provide reliable, cost-effective service to its customers, as well as to meet future load growth, it must add generating resources to replace an expiring 75 megawatts (MW) purchased power contract which terminates in the year 2000. The most cost-effective way for the City to meet this need is to construct a new 250 MW primarily natural gas fired combined cycle unit to be placed into service by May 2000. This unit will be constructed at the City's existing Sam O. Purdom Generating Station (Purdom Station) located in the City of St. Marks, Florida, and will be designated as Purdom Unit 8. The unit consists of a new combustion turbine/generator, heat recovery steam generator, steam turbine/generator and the associated auxiliary facilities.

The Purdom Unit 8 Project will have an immediate and positive impact on the City's ability to provide cost-effective utility service. Based on an evaluation conducted during the City's Integrated Resource Planning (IRP) process, the addition of Purdom Unit 8 will reduce the electric system average energy cost by approximately 11 percent in the first full year of commercial operation. This savings comes from replacing relatively high-cost purchased power and existing generation from older, less efficient units on the City's system (Purdom Units 5 and 6 will be retired once Purdom Unit 8 goes into service) with generation from a highly efficient new unit. Additionally, Purdom Unit 8 will enhance the reliability of the City's system by enabling the City to meet its reliability criteria in the year 2000 as well as providing the required reactive capability for voltage support to the southeast portion of the City's electric system.

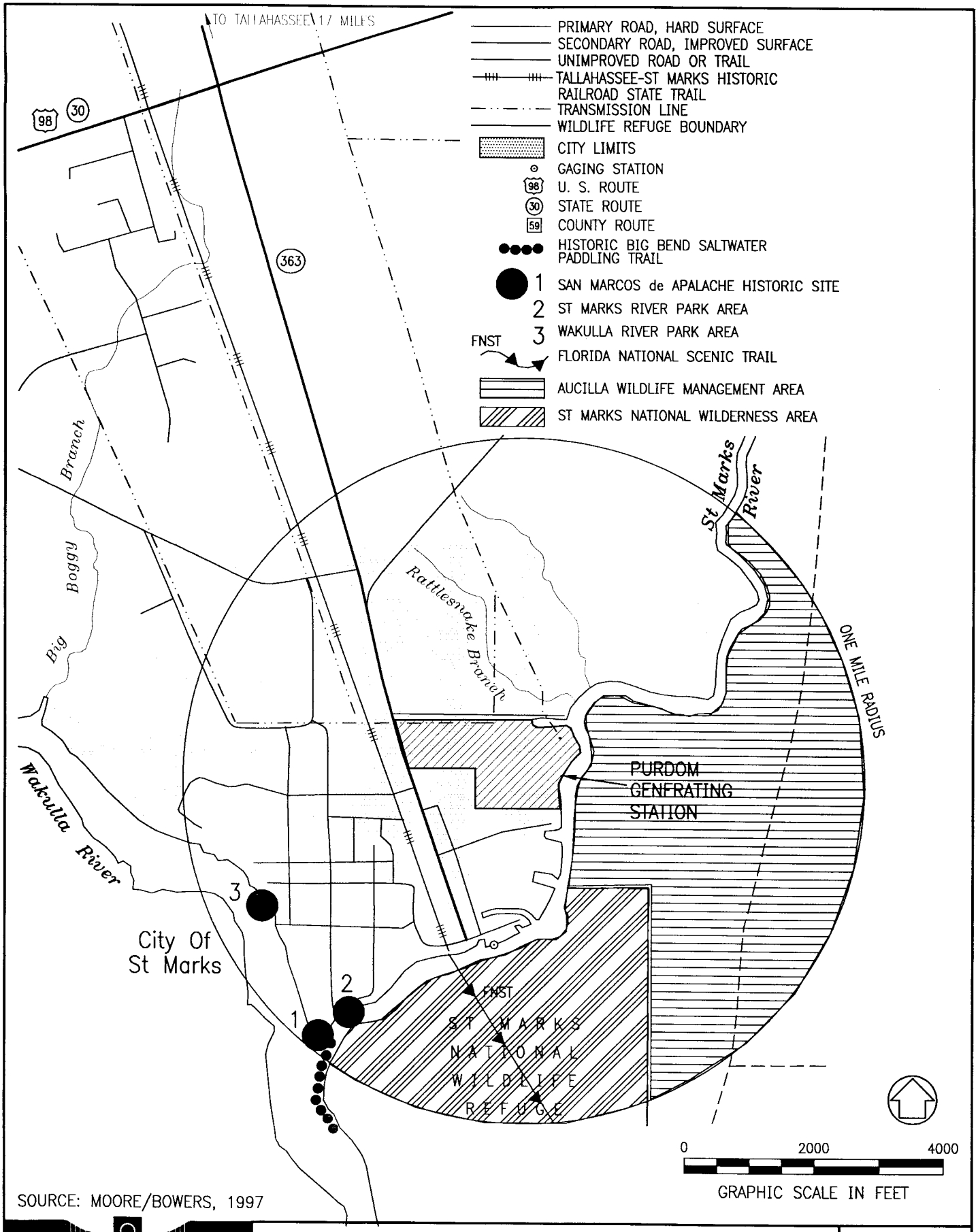
Purdom Unit 8 is being licensed under the Florida Electrical Power Plant Siting Act (PPSA), Chapter 403, Part II, Florida Statutes and the Site Certification Application (SCA) is being filed with the Florida Department of Environmental Protection (FDEP). The City filed its Need for Power Application with the Florida Public Service Commission (PSC) on December 20, 1996. This Chapter 1 of the Site Certification Application is comprised mainly of the Executive Summary of the Need for Power Application. The full Need for Power Application, as filed with the PSC (Docket No. 961512-EM), *and the PSC Need Determination, issued on June 9, 1997, a copy of which is included in Appendix 10.4,* should be consulted for details.

1.2 BACKGROUND

The City of Tallahassee is a municipal corporation which owns, operates, and maintains an electric generation, transmission, and distribution system to supply electric power in and around the City. One of the City's primary goals in the operation of its utility is to provide an adequate and reliable power supply to its customers.

1.3 THE CITY'S CURRENT POWER SYSTEM

The City currently serves approximately 88,000 customers located within a 221-square mile service territory. The City has two fossil fuel generating stations, each of which contains both steam and gas turbine electric generating facilities, a hydroelectric generating station, and a 1.33 percent undivided ownership interest in Crystal River Unit #3. Together, these generating resources provide 490 MW (net) of summer capacity. The City currently purchases power under



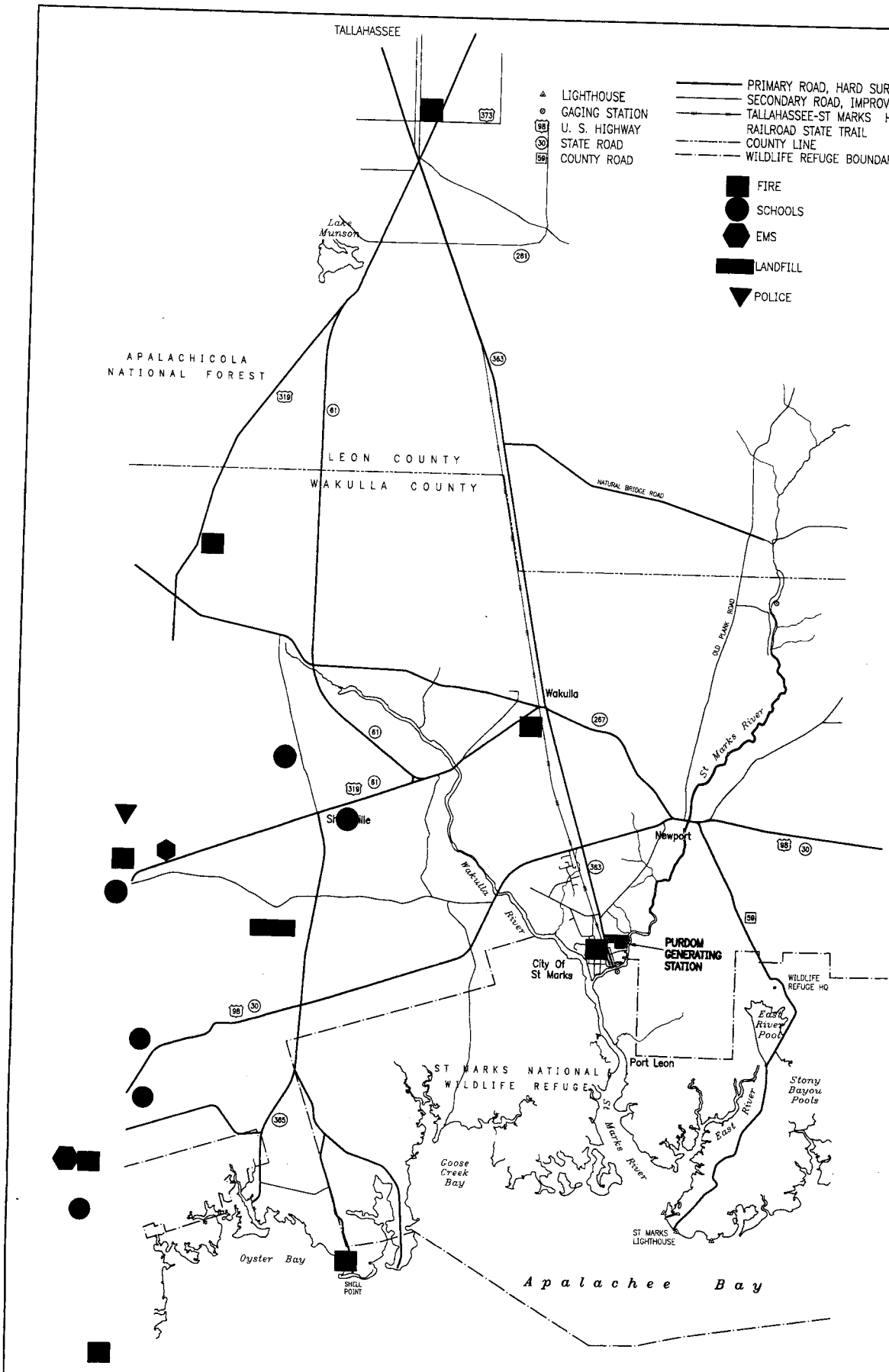
SOURCE: MOORE/BOWERS, 1997

CITY OF TALLAHASSEE

PARKS, RECREATION AREAS AND CONSERVATION LANDS WITHIN ONE MILE

PURDOM UNIT 8 PROJECT - ST MARKS, FLORIDA

Figure 2.2.1-3



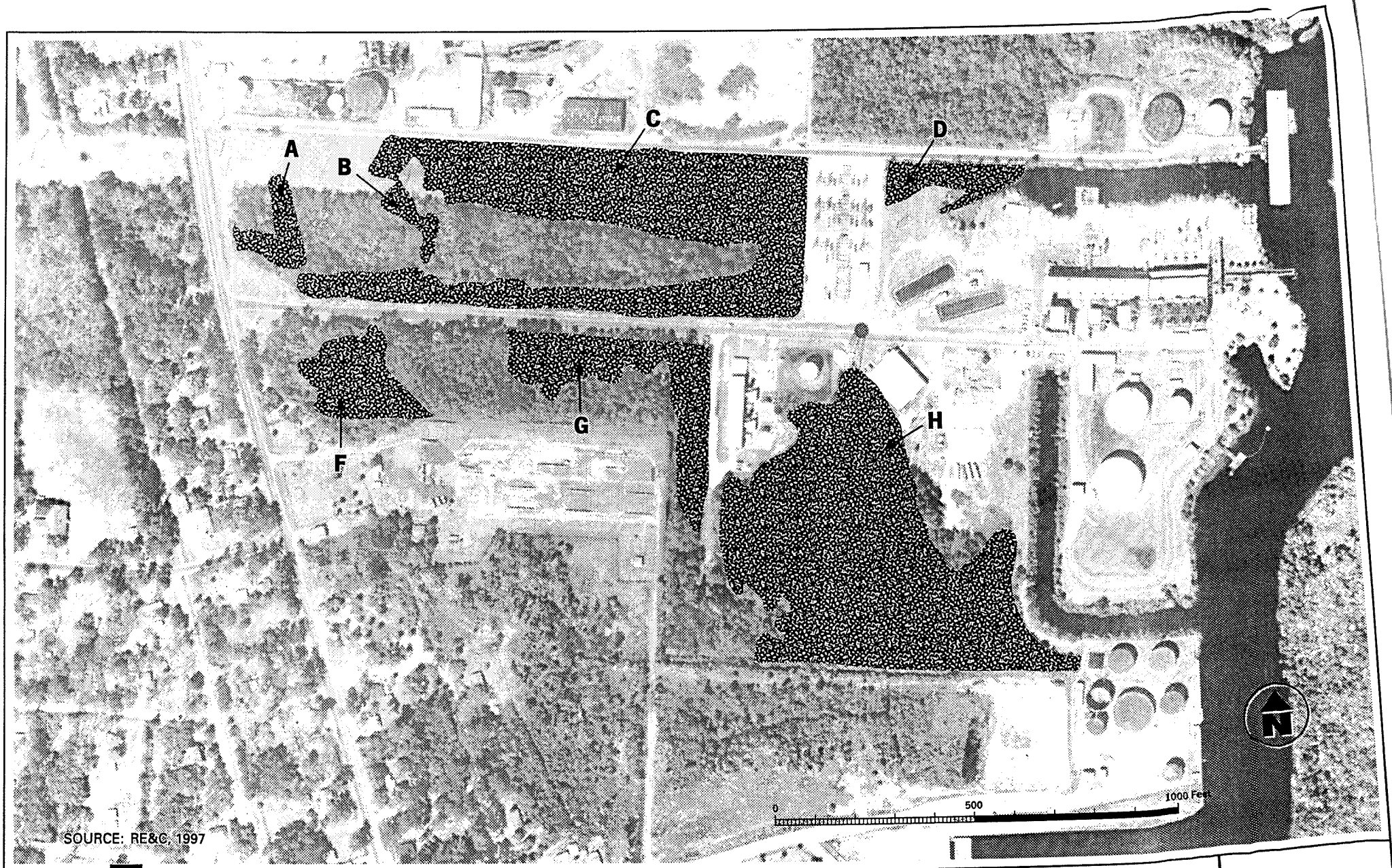
SOURCES: WAKULLA COUNTY PLANNING DEPARTMENT, 1996
MOORE/BOWERS, 1996

CITY OF TALLAHASSEE

LOCATIONS OF PUBLIC SERVICES IN WAKULLA COUNTY
1" = 2 MILES

PURDOM UNIT 8 PROJECT - ST MARKS, FLORIDA

Figure
2.2.7-21



CITY OF TALLAHASSEE

ON-SITE WETLAND WATER BODIES

PURDOM UNIT 8 PROJECT – ST MARKS FLORIDA

Figure 2.3.4-41

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CHAPTER 3

THE PROJECT AND DIRECTLY ASSOCIATED FACILITIES

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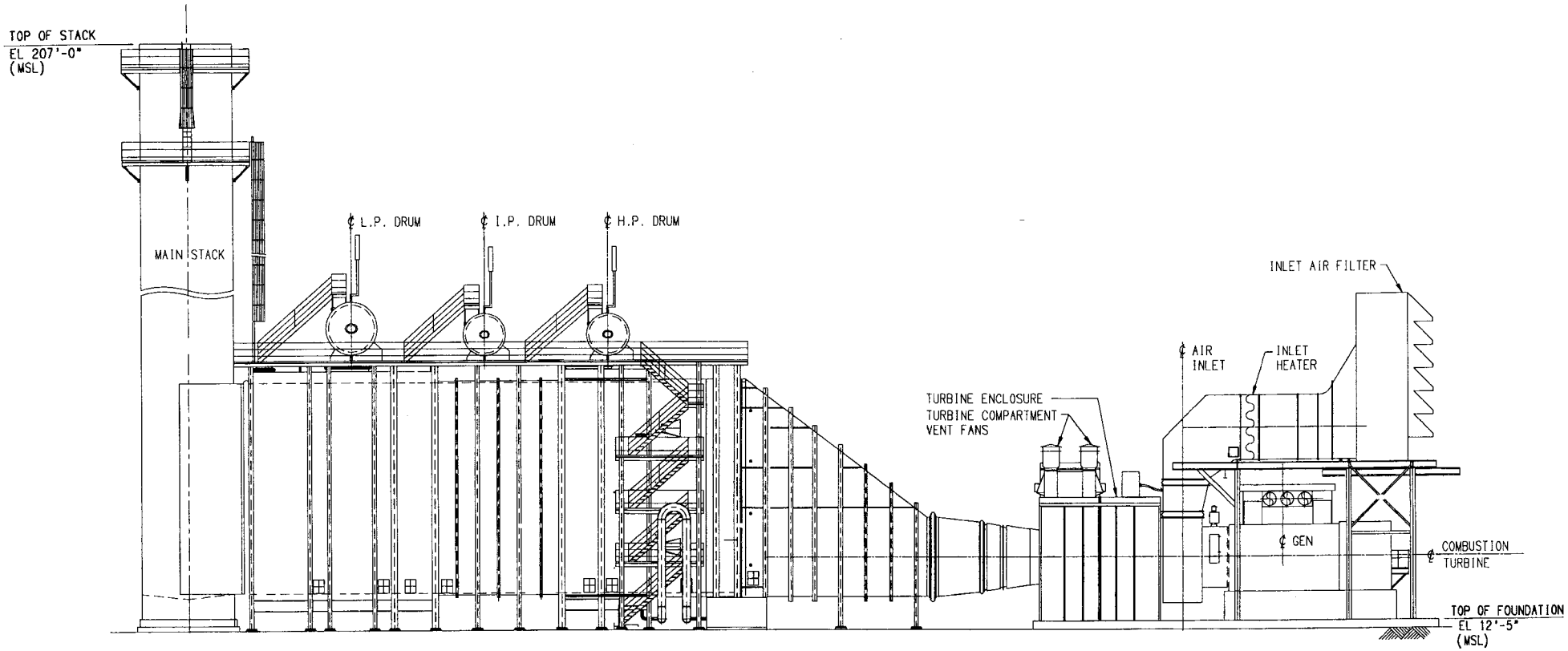


SOURCE: RE&C, 1997

CROSS SECTION
COMBINED CYCLE UNIT

PURDOM UNIT 8 PROJECT - ST MARKS, FLORIDA

CITY OF TALLAHASSEE

Figure
3.2-3

TABLE 3.4.1-1
PURDOM STATION PSD APPLICABILITY SUMMARY

Pollutant	Current Actual Emissions (tons/year)[1]	Future Estimated Emissions (tons/year)[1]	Net Increase in Emissions (tons/year)	Applicable PSD Significance Criterion (tons/year)[2][3]	PSD Applicability Determination
Carbon Monoxide	66	193	127	*100*	Yes
Nitrogen Oxides	467	467	0	*40*	No
Sulfur Dioxide	80	80	0	*40*	No
Ozone (VOCs)	2.8	14.7	11.9	40	No
Particulate Matter (TSP)	10.7	59.0	48.3	25	Yes
Particulate Matter (PM_{10})	10.7	59.0	48.3	15	Yes
Total Reduced Sulfur	NA	NA	NA	10	No
Reduced Sulfur Compounds	NA	NA	NA	10	No
Sulfuric Acid Mist	3.0	8.6	5.6	7	No
Fluorides	.08	1.64	1.56	3	No
Vinyl Chloride	NA	NA	NA	1	No
Lead	*.011*	*.091*	0.080	0.6	No
Mercury	.0020	.0024	0.0004	0.1	No
Asbestos	NA	NA	NA	0.007	No
Beryllium	*.0003*	*.00052*	0.00022	0.0004	No

NA - No emissions information available or no emissions expected.

(1) For information on these values see appendix B and C PSD report (section 10.1.5).

(2) Due to the proximity to the Class I area, lower criteria *may* apply for those pollutants with a maximum projected 24-hour average impact of 1.0 microgram per cubic meter or more in the Class I area. *In this case, no pollutants would produce such an impact and the standard criteria apply.*

(3) Table 212.400-2, Rule 62-212.400, F.A.C.

Source: Foster Wheeler Environmental, 1997

3.5 PROJECT WATER USE

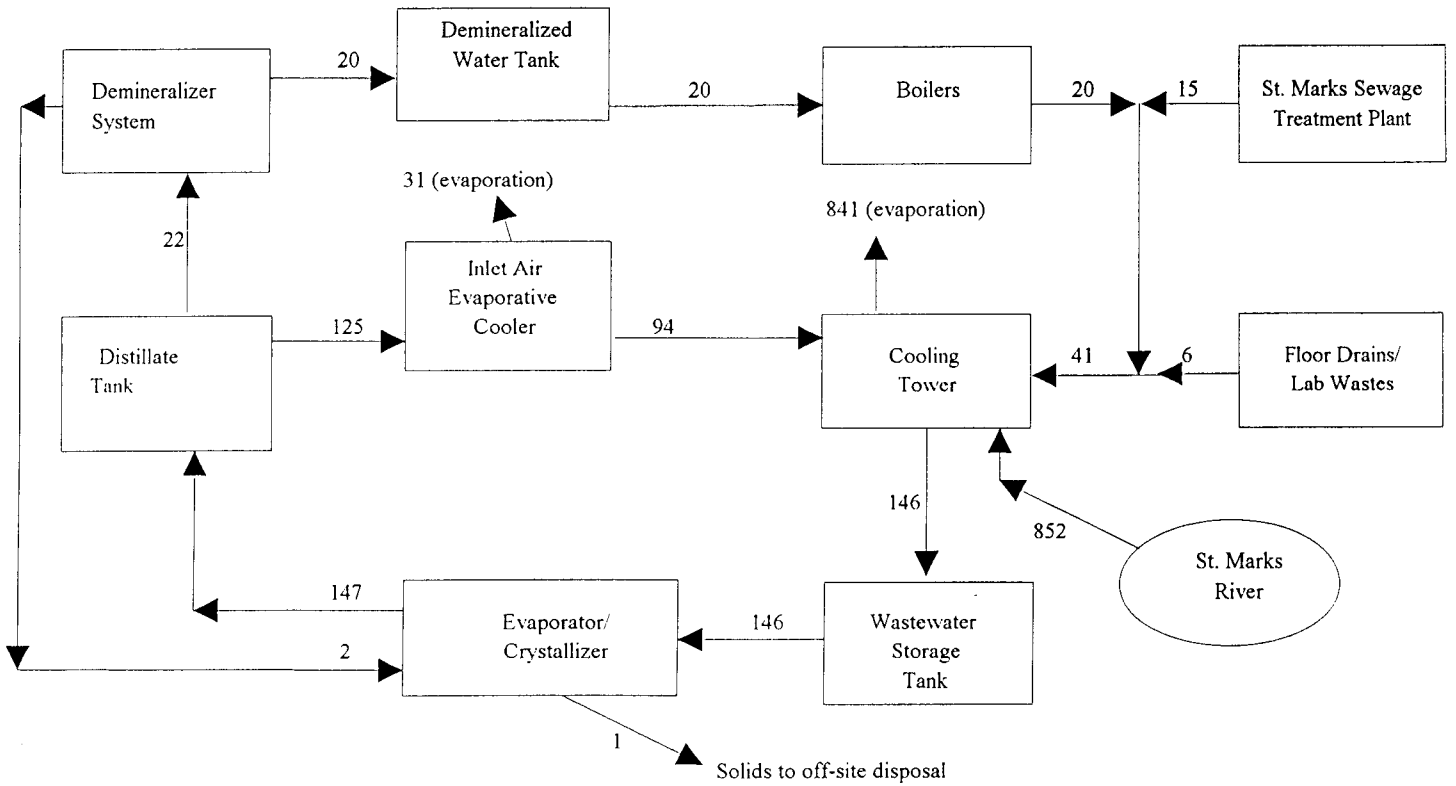
Purdom Unit 8 has been designed to minimize impacts to the St. Marks River watershed. The existing plant currently uses St. Marks River water for once-through cooling, Floridan aquifer water for process makeup and auxiliary cooling, and water from the City of St. Marks municipal system for potable water. The City of Tallahassee looked at potential sources of wastewater as the first choice for makeup to the proposed Unit 8. The National Pollutant Discharge Elimination System (NPDES) permits in the site vicinity were examined. Those discharges that dealt primarily with stormwater flows to the river (e.g., Seminole Refining) were eliminated from consideration. The discharge from Primex Technologies (formerly Olin Corporation) was examined, but neither the City of Tallahassee nor Primex could justify the economics of pursuing reuse of that waste stream. This process of elimination left only the discharges from the St. Marks Wastewater Treatment Facility and the non-cooling, non-stormwater outfalls from the Purdom Station itself, as discharges to the river containing pollutants but suitable for use as cooling tower makeup. The City of Tallahassee is committed to reuse of these two waste streams, to improve the quality of the river, and to support the State's commitment to reuse wastewater.

Based on historical analysis of groundwater quality from the City of Tallahassee's wells, it was concluded that the use of groundwater should be discontinued with the start-up of Unit 8 to help prevent any further saline intrusion. This left the St. Marks River as the only remaining water source. Since the maximum facility demand was predicted to be approximately 2 cfs, or about 0.6 percent of the 7Q10 (347 cfs) at the Purdom Station, it was concluded that the utilization of such a quantity of surface water from the river would not have significant hydrological impact. Therefore, the Project proposes such a use. As the facility is already connected to the City of St. Marks municipal water system, and the proposed Project does not require any additional staff, potable water will continue to be withdrawn from the municipal system.

Purdom Unit 8 is proposed to be a zero discharge facility with respect to the NPDES program. This means it will have no point source discharges of wastewaters or contaminated stormwater to surface waters. The key feature of this design is the zero discharge wastewater treatment system. The City of Tallahassee is presently evaluating two different designs for this system. The first design consists of a falling film, vapor compression evaporator and a steam-driven forced circulation crystallizer and solids separator. The second design includes the use of heat exchangers and wastewater evaporating cooling tower cells. It is likely that the final design will be some combination of the two. In any case, use of the zero discharge wastewater treatment system will allow Unit 8 to use the reclaimed water from the City of St. Marks Wastewater Treatment Facility and the recycled process wastewaters from Purdom Units 7 and 8 to minimize the withdrawal of St. Marks River water for makeup to the cooling tower and to both boilers. This allows the Purdom Station to discontinue the use of groundwater at the site.

Based on this design, a quantitative water balance for the unit is shown on Figure 3.5-1 for firing natural gas under average annual meteorological conditions, and on Figure 3.5-2 for firing number 2 fuel oil under extreme meteorological conditions. Expected average conditions are represented on Figure 3.5-1, while peak water use at the plant under any conditions is represented on Figure 3.5-2. *Peak sustained water use is shown on Figure 3.5-3. Table 3.5-1 presents the*

Flows in GPM



SOURCE: RE&C, 1996

CITY OF TALLAHASSEE

PEAK SUSTAINED WATER USE
100% CAPACITY FIRING GAS DURING MAY

PURDOM UNIT 8 PROJECT - ST MARKS, FLORIDA

Figure 3.5-3

TABLE 3.5-1
EXISTING AND PROPOSED WATER USE

Withdrawal Point		Existing Average Daily Flow (gallons)	Existing Maximum Daily Flow (gallons)	Existing Average Monthly Flow (gallons)	Existing Maximum Monthly Flow (gallons)	Proposed Average Daily Flow (gallons)	Proposed Maximum Daily Flow (gallons)	Proposed Average Monthly Flow (gallons)	Proposed Maximum Monthly Flow (gallons)
#	Description								
SOP 6	Well	40,650	260,000	1,219,500	7,800,000	0	0	0	0
SOP 7	Well	40,650	260,000	1,219,500	7,800,000	0	0	0	0
SOP 8	Well	40,650	260,000	1,219,500	7,800,000	0	0	0	0
SOP 9	Well	40,650	260,000	1,219,500	7,800,000	0	0	0	0
	Total All Wells	162,600	432,000	4,878,000	12,960,000	0	0	0	0
SW 4	Unit 4 C.W.	1,400,000	7,200,000	42,000,000	216,000,000	0	0	0	0
SW 5	Unit 5 C.W.	19,879,315	34,560,000	596,379,452	1,036,800,000	0	0	0	0
SW 6	Unit 6 C.W.	17,224,932	34,560,000	516,747,945	1,036,800,000	0	0	0	0
SW 7	Unit 7 C.W.	58,426,751	60,624,000	1,752,802,521	1,818,720,000	58,426,751	60,624,000	1,752,802,521	1,818,720,000
SW GT	Gas Turbines	300,000	2,937,600	9,000,000	88,128,000	300,000	2,937,600	9,000,000	88,128,000
SW 8	Unit 8 C.W.	0	0	0	0	959,040	1,347,840	28,771,200	36,806,400
	Total All Surface Water	97,230,997	139,881,600	2,916,929,918	4,196,448,000	59,685,791	64,909,440	1,790,573,721	1,943,654,400
	Total Withdrawal of Water	97,393,597	140,313,600	2,921,807,918	4,209,408,000	59,685,791	64,909,440	1,790,573,721	1,943,654,400
	Water Discharged to River	97,329,637	139,980,240	2,919,889,118	4,199,407,200	58,726,751	63,561,600	1,761,802,521	1,906,848,000

Note 1: C.W. is Circulating (Condenser Cooling) Water Recirculated to the river except for Unit 8.
Note 2: Existing Average well flows based on monitoring data for March - December 1996.
Note 3: Maximum single well pumpage is 260,000 gpd if only one well is being pumped. Normally two wells are pumped at a time, and the maximum pumpage from each well is then only 216,000 gpd.

average and maximum flows associated with both the existing Purdom Station, and the proposed Purdom Station associated with the construction and operation of Unit 8.

3.5.1 Heat Dissipation System

The heat dissipation device will consist of a closed-cycle mechanical draft evaporative cooling tower.

3.5.1.1 System Design

The heat dissipation system will consist of a multi-cell cooling tower, two 50 percent capacity circulating water pumps, piping, valves, and instrumentation to provide cooling water to the condenser and the auxiliary cooling water system.

The cooling tower will be an evaporative mechanical draft type unit sized to accommodate the heat load and flow from the condenser and auxiliary cooling water system. The tower construction will be treated Douglas Fir. Each cell will be provided with a motor driven fan. The tower will be erected over a concrete basin.

The circulating water pumps will be of the vertical, wet pit type. The system will provide for independent pump isolation and protection from flow reversal using motor operated butterfly valves at each pump discharge.

Two 50 percent capacity cooling tower makeup pumps will be installed in the existing circulating water intake structure for Purdom Unit 5. These pumps will deliver makeup water to the Unit 8 cooling tower basin.

The auxiliary cooling water system will consist of the auxiliary cooling water pumps, suction strainers, piping, valves, and instrumentation to provide cooling water to the following:

- Combustion Turbine Generator Coolers
- Combustion Turbine Lube Oil Coolers
- Steam Turbine Lube Oil Coolers
- Steam Turbine Hydraulic Oil Coolers
- Miscellaneous Mechanical Equipment Coolers

The auxiliary cooling water pumps will be two 100 percent capacity horizontal centrifugal type pumps taking suction from the circulating water system. The auxiliary cooling water pumps provide cooling water to the various plant equipment at sufficient flow and pressure for cooling.

At its design condition of a 95° F dry bulb and 79° F wet bulb, the cooling tower will dissipate about 580 million Btu per hour. Consumptive use of water by evaporation in the cooling tower has been estimated under both average and extreme (peak) conditions, on a monthly basis. The results are presented in Table 3.5.1-1. The heat dissipation systems for Units 5, 6, 7, GT1 and GT2 have been described in Section 2.3.4.1.

TABLE 3.5.1-1
AVERAGE AND PEAK MONTHLY COOLING TOWER EVAPORATION (100% LOAD)

	Extreme Conditions		Average Conditions	
Month	Wet Bulb (°F)	Evaporation (gpm)	Wet Bulb (°F)	Evaporation (gpm)
January	66.4	707	46.0	595
February	65.1	740	48.5	619
March	68.9	771	55.0	643
April	68.4	809	60.2	679
May	72.1	841	67.1	689
June	75.9	834	72.3	705
July	77.4	835	75.0	701
August	77.7	837	75.0	695
September	75.9	835	71.3	701
October	72.5	799	62.0	675
November	69.1	759	54.4	635
December	68.5	724	48.7	611
	Peak = 77.7	841.0	Average = 61.3	662.3

Source: Foster Wheeler Environmental, 1996, RE&C, 1997

3.5.1.2 Source of Cooling Water

The main source of cooling water will be the St. Marks River. Its temperature range is described in Section 2.3.4.1. Minimum average cooling water quality characteristics to operate the heat dissipation system as proposed are estimated to be:

Silicon Dioxide	< 18 mg/l
Calcium	< 15 mg/l
Sulfate	< 12 mg/l
Iron	< 0.5 mg/l
Manganese	< 0.5 mg/l
Aluminum	< 0.125 mg/l
Sulfides	< 0.625 mg/l
Magnesium	< 54 mg/l
Total Dissolved Solids (TDS)	≤ 2500 mg/l
Source: RE&C, 1997	

3.5.1.3 Dilution System

There will be no dilution system associated with the heat dissipation system.

3.5.1.4 Blowdown, Screened Organisms, and Trash Disposal

The heat dissipation system will have no blowdown; it will be a zero discharge system. Wash water for the existing traveling water screens is supplied by screen-wash pumps which withdraw water from within the pump structure. The discharge from the screens is flushed into a collecting box where debris is retained for off-site disposal, and flush water is drained back to the source.

Unit 7 takes its water from the Unit 7 Intake Canal. Unit 8 will take its water from the St. Marks River, utilizing the existing Unit 5 intake structure.

3.5.1.5 Injection Wells

There will be no injection wells associated with the heat dissipation system.

3.5.2 Domestic/Sanitary Wastewater

Sanitary wastewater is currently sent to the City of St. Marks Wastewater Treatment Facility, at a rate estimated to be less than 1,500 gpd. Because there will not be any additional plant staff associated with the Project, no changes to these services are proposed.

3.5.3 Potable Water Systems

Potable water is currently provided to the site from the City of St. Marks municipal system at a rate estimated to be less than 1,500 gallons per day. Because there will not be any additional plant staff associated with the Project, no changes to these services are proposed.

3.5.4 Process Water Systems

The main usage of water at the site, after completion of the installation of Unit 8, will be as makeup to the cooling tower. The river water, the reclaimed water from the City of St. Marks Wastewater Treatment Facility, and the process wastewaters from the plant itself (both Units 7 and 8) will all be discharged directly to the cooling tower basin. Except for the continuation of chlorination (and the cessation of the dechlorination) of the Wastewater Treatment Facility effluent, the influent to the cooling tower basin will not be treated.

One of the large Number 6 fuel oil storage tanks (Tank No. 2) will be converted to a wastewater storage tank to facilitate recycling of all of the facility wastewaters. This tank will be closed in accordance with the procedures of Chapter 62-762, F.A.C. prior to being converted to a wastewater storage tank. This tank will then be the influent storage tank for the zero discharge wastewater treatment system, which will also serve as the pretreatment unit for the process water treatment system.

The tank normally will receive up to 173 gpm of cooling tower blowdown from Purdom Unit 8, and up to 19 gpm of demineralizer regeneration wastewater from Purdom Units 7 and 8, for a design inflow of 192 gpm. Design inflow TDS has been estimated to be 15,075 mg/l. If Unit 8 is not operational, the reclaimed water from the St. Marks Wastewater Treatment Facility and the recycled process wastewaters from the Purdom Station will be routed to this 2,310,000-gallon wastewater storage tank.

Water from the wastewater storage tank will be sent to the zero discharge wastewater treatment system, where the wastewater will be essentially distilled to produce feedwater for the existing demineralizer system. The existing demineralizer system consists of an anionic and a cationic ion exchanger, and is used to provide demineralized water for boiler makeup for the existing Units 5 through 7. Upon installation of Unit 8, and the retirement of Units 5 and 6, the demineralizer will

have sufficient capacity to supply makeup water for the Unit 8 HRSG as well as the Unit 7 boiler.

Because Unit 8 will be a zero discharge system, the process water system will discharge no pollutants.

3.8 ON-SITE DRAINAGE SYSTEM

3.8.1 Environmental Regulations

On-site drainage is regulated by federal, state, and local regulations. Federal regulation is accomplished through general NPDES stormwater permits. As part of the operational general permit, the facility is required to update the plant Stormwater Pollution Prevention Plan (SWPPP) annually. Areas subject to construction activities are covered under a construction general permit, which calls for an erosion and sedimentation control plan to be implemented during construction.

State regulations are encoded in Chapter 62-25, F.A.C., rules of the FDEP. These rules generally require retention, or detention with filtration, of the first half-inch of runoff for projects such as this which affect less than 100 acres; or percolation of the runoff from a 3-year 1-hour storm. They also encourage the prevention of increasing flows or pollution loadings to existing stormwater management facilities.

Local regulations require the use of a 25-year 24-hour design storm, and the implementation of an erosion and sedimentation control plan during construction.

The Northwest Florida Water Management District (NWFWMD) has not been delegated authority by FDEP for stormwater management.

3.8.2 Design Parameters

Existing site drainage has been described in Section 2.3.4-1. The six drainage areas that comprise the site are shown on Figure 3.8.2-1 . Areas I, II, and III are unaffected by industrial activity, and drain respectively to outfalls OSN 007, OSN 010, and OSN 008 as described in Section 2.3.4-1. Area IV runoff is also unaffected by industrial activity, and drains mainly as sheet flow to the intake and discharge canals, and to the St. Marks River. Areas V and VI are the secondary containments for oil storage tanks. Runoff from Area V is detained and released through valved pipes, if it meets water quality limits, to the St. Marks River. Runoff from Area VI is similarly released to Wetlands Number VI (see Figure 2.3.4-41). The areas which will be affected by the Project are I, II, III and IV for construction, and II and III during operation. Based on the regulatory parameters discussed in Subsection 3.8.1, the design storm is the 24-hour event with a 25-year return frequency. This storm is about 9 inches (see Section 2.3.7). The design detention/retention volume is the first one-half inch of runoff. Based on the Unit 8 footprint area of about 2.4 acres, this volume is about 4,350 cubic feet. *Drawdown of the detained volume will be through the use of an outlet filter drain as shown in Appendix 10.6.4.*

3.8.3 Construction Phase Stormwater Runoff

Construction runoff in Area I will be that associated with the installation of the new effluent pipeline, the relocation of the gas yard, and the upgrading of the gas line (if required) along the plant road. Construction runoff in Area II will be that associated with the installation of the new effluent pipeline, the upgrading of the gas line (if required), the relocation of the gas yard, and the installation of the new unit. Construction runoff in Area III will be that associated with the installation of the new unit. Construction runoff in Area IV will be that associated with

4.3 GROUNDWATER IMPACTS

4.3.1 Impact Assessment

Activities associated with construction of Purdom Unit 8 are not expected to have any adverse impacts on local groundwater resources. Because the Purdom Station will no longer utilize groundwater as its major source of process and equipment cooling water, the only construction activity affecting groundwater will be the abandonment of the existing well field.

Construction of Unit 8 may require short-term temporary dewatering to complete one or more of the following activities:

- Stormwater ponds and drainageways;
- Sumps, underground pipes, duct banks, transformer and storage tank secondary containment structures, culverts, and manholes; and
- Selected foundations.

The duration of these dewatering activities and the limited extent of the excavations will prevent off-site areas from being impacted. In addition, the clayey nature of near surface sediments above the deposits of the Floridan aquifer system will likely prevent significant quantities of water from being withdrawn during short-term dewatering activities.

As discussed in Section 4.2.1, construction contractors will be required to implement practices to minimize spills. Maintenance and refueling will be performed only in designated areas. Spills or hazardous material releases will be managed in an approved manner, in accordance with local, state, and federal regulations.

4.3.2 Measuring and Monitoring Programs

Groundwater monitoring is not proposed as part of construction for the Purdom Unit 8. Only very limited construction dewatering activities are planned which will have no off-site impacts. Additionally, impacts to wetland areas located on site are not expected. Assessment and recovery of any spills or hazardous materials releases will be conducted in accordance with Florida Department of Environmental Protection (FDEP) requirements.

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CHAPTER 5

EFFECTS *OF* PROJECT OPERATION

Section **Page**

5.1 EFFECTS OF THE OPERATION OF THE HEAT DISSIPATION SYSTEM

The Purdom Unit 8 Project is designed with no thermal discharge to waters of the state. Information relative to 316 Demonstrations associated with the Purdom Station is presented in Appendix 10.1.1.

5.1.1 Temperature Effect on Receiving Body of Water

Unit 8 will have no thermal discharge to any receiving body of water. The only temperature effects will be from the permanent shut-down of Units 5 and 6. This will result in the shrinking of the thermal plume from that of Units 5 through 7, which crossed the full surface width of the river when measured on July 19, 1996 (see Figure 2.3.4-24), to less than half the width of the river when only Unit 7 operates, as measured on July 21, 1996 (see Figure 2.3.4-25). The existing combustion turbines (GT1 and GT2) will continue to operate; however, their impacts on the thermal plume are insignificant. Although the Florida Department of Environmental Protection (FDEP) and the U.S. Environmental Protection Agency (EPA) have found the existing thermal plume to result in acceptable environmental impacts, a lessening of that plume can only result in lesser impacts.

Unit 8 will have a withdrawal of makeup water from the St. Marks River; however, that withdrawal will be offset by the cessation of once-through cooling water withdrawals from the St. Marks River for Units 5 and 6. The amount of water withdrawn for Unit 8 for make-up to the cooling tower and boiler/HRSG, and for NO_x control when firing oil, will average approximately 343 million gallons per year. The amount withdrawn for once-through cooling for Units 5 and 6 during the last 12-month period of record was 13,543 million gallons.

The maximum Unit 8 withdrawal rate (936 gallons per minute (gpm)) will take water from the top 1.5 feet of the river, at an average velocity of about 0.14 feet per second. This is only about one-half to one-fourth of the 0.26 to 0.43 feet per second presently entering the Units 5 and 6 intake structures when those units are operating (see Section 2.3.4.1). This velocity will only occur over a cross-sectional area of about 15 square feet, as opposed to about 500 square feet now affected when Units 5 and 6 operate. Again, this reduction in velocity and area will result in a reduction in impacts.

5.1.2 Effects on Aquatic Life

In addition to the elimination of the City of St. Marks Wastewater Treatment Facility effluent discharge into the St. Marks River, with its concomitant reduction of nutrient loading to the river, the significant reduction in thermal discharges from the Purdom Generating Station will provide a long-term benefit to aquatic life in the river. The permanent reduction in thermal effluent is consistent with the position of the U.S. Fish and Wildlife Service that thermal discharge reductions are beneficial to populations of animals such as the manatee (USFWS, 1997). Thermal discharges in northern Florida have altered the natural migration and wintering movements of some members of manatee populations. It is the policy of the U.S. Fish and Wildlife Service that restoration of natural migration patterns is needed to maintain the long-term viability of manatee populations.

On a short-term basis, it is not expected that the reduction in thermal discharge to the St. Marks River from the Purdom Generating Station during winter will adversely affect any manatees wintering there. The Wakulla River, which joins the St. Marks River a short distance south of the Purdom Site, provides a thermal refugium for animals such as the manatee during cold months. The dominant factor controlling the water temperature in the Wakulla River is the discharge from Wakulla Springs. The spring water is believed to keep the river temperature above 62° F (16.8° C) all year (Hydrologic Almanac of Florida, 1981). This temperature range provides suitable temperatures for manatees that remain in the nearby St. Marks River during the winter. Thus, any manatees that might be influenced by the Unit 7 thermal discharge to remain in the St. Marks River during winter will be able to find a natural thermal refuge in the Wakulla River at any time that Unit 7 does not operate.

5.1.3 Biological Effects of Modified Circulation

The modifications conducted at the Purdom facility as described in Section 3.5.1 will result in a zero discharge closed loop cooling tower system to dissipate waste heat from Unit 8. The permanent shut-down of Units 5 and 6 and the replacement of the existing four high volume intake water pumps with one lower volume intake water pump (see Section 2.3.4) will reduce the cooling water intake from the St. Marks River to approximately one-twelfth of the current intake volumes at the location (see Section 3.5). Decreased intake volumes and pumping rates will reduce the amount of impingement and entrainment of aquatic organisms. Discharges from the Unit 5 discharge structure will be eliminated with the shutdown of the unit.

Intake rates at the Unit 7 intake structure would remain consistent with current volumes and velocities while the unit is in operation. In all likelihood, Unit 7 would operate at no more than current production levels (see Section 2.3.4). Impingement and entrainment of aquatic organisms will remain consistent with current levels or could be reduced due to a reduction in Unit 7 operation.

Flow rates within the Unit 6 and 7 discharge canal will be reduced with the shut-down of Unit 6 (see Section 2.3.4). Flows into the discharge canal would be limited to periods of Unit 7 and/or existing combustion turbines (GT1 and GT2) operation (peak demand periods) only. The reduction in flow rates should pose no adverse impact to the aquatic life of the St. Marks River.

In an agreement with the City of St. Marks, the Purdom Station has agreed to utilize the effluent from the City of St. Marks Wastewater Treatment Facility as a source of make-up water for the Unit 8 cooling water system. This will eliminate the discharge from the Wastewater Treatment Facility to the St. Marks River and improve water quality immediately downstream of that facility.

With the operation of Unit 8, there would be a consumptive water use of up to 936 gpm removed from the St. Marks River at the current Unit 5/6 intake structure. This intake water is to be used as makeup water for the closed loop heat dissipation system. The consumptive use represents approximately 0.6% of the 7Q10 for the St. Marks River at the Purdom Station location (Section 2.3.4) and would result in a reduction of flow of approximately 2 cfs downstream. This reduction in flow should not produce a significant impact to the aquatic resources of the St. Marks River. The project should have an overall positive impact on the health of the St. Marks River by

reducing impingement and entrainment of aquatic species, reduction of thermal input, and the elimination of two waste streams.

5.1.4 Effects of Offstream Cooling

The cooling tower will operate at temperatures ranging from about 12 to about 20° F above the ambient air wet bulb temperature. The cooling tower will produce plumes of saturated air that will cool and produce visible vapor plumes on some days. Because of the exit velocity imparted to the plumes from the mechanical draft fans of the cooling tower, and their buoyancy, they will only rarely reach ground level. Therefore, no significant impacts to transportation (either land or waterborne) are expected.

Cooling tower blowdown will be recycled in the zero discharge wastewater treatment system and will not be released to the environment.

Cooling tower drift emission rates and their control technology are presented in Section 3.4. Air quality impacts of cooling tower drift are presented in Section 5.6. Because the Purdom Station is within 4 miles of Appalachee Bay, natural airborne salt drift is expected to be present in significant quantities. This expectation is supported by the presence on and near the site of salt-tolerant vegetation. Therefore, impacts of salt drift on the on-site and off-site lands and water bodies are expected to be insignificant.

Purdom Unit 8 will recycle domestic wastewater from the City of St. Marks Wastewater Treatment Facility. Because all of the outflow from that Wastewater Treatment Facility will go to the Purdom Station, and none of it will be discharged to waters of the state, the effluent will no longer be de-chlorinated. The maintenance of a significant chlorine residual (greater than 2 mg/l) in the effluent pipeline will result in a chlorine contact time in excess of 1 hour. This disinfection will be sufficient to prevent any biological or health impacts from the cooling tower drift.

5.1.5 Measurement Program

Because Unit 8 is a zero discharge unit, no additional monitoring beyond that already required by the Purdom Station National Pollutant Discharge Elimination System (NPDES) Permit (see Appendix 10.1.2) is proposed.

5.1.6 *References*

Hydrologic Almanac of Florida. 1981. United States Geological Survey Open File Report 81-1107.

USFWS (U.S. Fish and Wildlife Service). 1997. Telephone conversation between F. Shanholtzer, Foster Wheeler Environmental, and R. Turner, USFWS. February 24, 1997.

5.3 IMPACTS ON WATER SUPPLIES

5.3.1 Surface Water

The withdrawal of up to 936 gpm (2.1 cubic feet per second (cfs)) of surface water from the St. Marks River represents 0.6 % of the 7 consecutive day low flow with a 10 year recurrence interval (7Q10). That 7Q10 was presented in Section 2.3.4.1 as 347 cfs (155,734 gpm). The impact of this withdrawal *on river discharge and aquatic resources downstream of the Purdom Station* will be insignificant.

The on-site drainage system (see Section 3.8) is designed to maintain existing stormwater runoff volumes at approximately the existing rate, while keeping peak runoff flows at or below existing levels. Therefore, no measurable changes to surface water flows in and out of on-site wetlands, or to off-site waterbodies, are expected.

5.3.2 Groundwater

Construction and operation of Purdom Unit 8 will have no adverse impacts to groundwater resources in the study area. During the last year, the Purdom Station utilized approximately 162,200 gallons per day (gpd) of groundwater for boiler makeup, service water, and small equipment auxiliary cooling. The water is withdrawn from the Upper Floridan aquifer system by two wells operating in tandem. To reduce groundwater impacts in the vicinity of their wellfield, the Purdom Station rotates the usage of wells 6 and 8 with wells 7 and 9 on a monthly basis. This groundwater withdrawal will be eliminated when Purdom Unit 8 is constructed. The existing Purdom Station wellfield will be retired from service and properly abandoned with operation of Purdom Unit 8. This reduction in groundwater use by the Purdom Station will have a positive impact on local groundwater resources and help to preserve the fresh groundwater resources which are available locally.

Although Purdom Unit 8 will be constructed in a recharge area for the Floridan aquifer system, the site is presently classified as industrial and the construction activities at the Purdom Station will not result in a significant increase in the paved acreage. A surface water recharge swale will be constructed to capture any additional site runoff and allow it to enter the ground as recharge and to prevent any significant new discharges to surface water bodies. Thus, there will not be a loss in aquifer recharge or a significant increase in surface water runoff due to construction of this new facility. The only waste storage facility will be a natural gas liquids storage tank (see Section 3.3). This tank will have impervious secondary containment to protect the groundwater (see Section 3.7).

The operation of Purdom Unit 8 will generate several waste streams as discussed in Sections 3.6 and 3.7. These wastes will include waste oil, steam generator blowdown, solvent parts cleaning waste, floor and laboratory drain waste, demineralizer regeneration waste, and solid waste such as dry filter cake from the zero discharge facility and air filters. Only the solid waste (dry filter cake) from the zero discharge wastewater treatment system is a new waste. All of the solid wastes will be temporarily stored on site in safe storage areas until they can be scheduled for pick-up and delivered off site to an approved disposal facility. Waste oil and solvent parts

TABLE 5.6.1-12
MAXIMUM ANNUAL NET CHANGE IN EMISSIONS AND PSD SIGNIFICANCE VALUES

Pollutant	Net Increase In Emissions[1] (TPY)	PSD Significance Criterion[2] (TPY)	PSD Review Required (Yes/No)
Carbon Monoxide (CO)	127	*100*	Yes
Nitrogen Oxides (NO_x)	0	*40*	No
Sulfur Dioxide (SO_2)	0	*40*	No
Particulate Matter (PM_{10})	48.3	15	Yes
Total Suspended Particulates (TSP)	48.3	25	Yes
Volatile Organic Compounds (VOCs)	11.9	40	No
Lead (Pb)	0.08	0.6	No
Asbestos	N/A	0.007	No
Beryllium (Be)	0.00022	0.0004	No
Mercury (Hg)	0.0004	0.1	No
Vinyl Chloride	N/A	1	No
Total Fluorides (Fl)	1.6	3	No
Sulfuric Acid Mist (H_2SO_4)	5.6	7	No
Total Reduced Sulfur	N/A	10	No
Reduced Sulfur Compounds	N/A	10	No

(1) Based on worst case scenarios.

(2) Due to the proximity to the Class I area, lower criteria *may* apply for those pollutants with a minimum projected 24-hour average impact of 1.0 $\mu g/m^3$ or more in the Class I area, as per Rule 62-212.400(2)(f)(1), F.A.C. *In this case, no pollutants would produce such an impact and the standard criteria apply.*

NA = No emissions information available or no emissions expected.
TPY = Tons per year

Source: Foster Wheeler Environmental, 1997

A screening technique known as the "Screening Threshold" method (North Carolina DNR, 1985) was applied to sources located within 50 km from the Purdom Station. The method is described in the PSD Report (Appendix 10.1.5). The existing source emissions inventory was also sorted with respect to PSD increment consuming and expanding sources and all sources for the AAQS analysis.

The completed existing source emissions inventories were submitted to FDEP for review and were determined to be acceptable for input to the ISCST3 model (FDEP, 1997a). The AAQS source and PSD source emissions inventories used in the air quality modelling analysis are presented in Tables 5.6.1-19 and 5.6.1-20, respectively. The emissions for all applicable pollutants in those tables are in terms of maximum allowable or "potential" emissions in order to evaluate worst-case emissions scenarios for those sources from both AAQS and PSD increment impact standpoints.

5.6.1.9 Receptor Locations

Receptor Grids for Site Vicinity

Ambient concentrations were determined for the significant impact area and monitoring exemption analyses for receptors in a polar grid consisting of 36 radial directions at 10 degree intervals at distances listed below (in kilometers) from the site origin, the proposed stack location for Purdom Unit 8 (UTM coordinates 769.611 km East 3,339.767 km North):

0.5	2.5	4.5	7.0
1.0	3.0	5.0	8.0
1.5	3.5	5.5	9.0
2.0	4.0	6.0	10.0

Receptors from these polar grids which fell within the Project site boundaries were not included but 57 additional receptors were placed around the site boundary. A total of 632 receptors were used in the modelling. Figure 5.6.1-3 presents the location of the site boundary and polar receptors.

For the monitoring exemption request, Class II PSD, and AAQS analyses, an additional 11x11 (121 point) receptor grid with a spacing of 100m was placed over the critical impact receptor as determined from the preliminary runs. Special grids were used for the 3-hour, 24-hour, and annual SO_2 AAQS analyses covering receptors within the Primex Technologies (formerly Olin) site boundaries. The details of all of the receptor grids are depicted in figures in the PSD report.

Receptor Grid for Class I PSD Analysis

The modelling for the St. Marks and Bradwell Bay National Wilderness Areas analyses used receptor grids approved by FDEP (1996b). The St. Marks National Wilderness Area analysis used a total of 68 receptors, including receptors spaced at 75m intervals along the northern boundary as requested by the USFWS. A total of 18 receptors were used in the modelling analysis of the Bradwell Bay Wilderness Area. The receptors used in the Class I PSD analysis

TABLE 5.6.1-27
SUMMARY OF FAAQS ANALYSIS

Pollutant	Avg Period	Max[1] Refined Conc ($\mu g/m^3$)	Background ($\mu g/m^3$)	Max[1] Modelled + Background ($\mu g/m^3$)	FAAQS[2] ($\mu g/m^3$)	Period (yymmddhh)	Receptor Location[3] East (m)	Receptor Location[3] North (m)	Preliminary Maximum[1] Concentration by Year 1985 ($\mu g/m^3$)	1986 ($\mu g/m^3$)	1987 ($\mu g/m^3$)	1988 ($\mu g/m^3$)	1989 ($\mu g/m^3$)
Sulfur Dioxide (SO_2)	3-hr	402.1	183	585	1300	86031203	767338	3344831	296.6	306.9	289.3	304.9	253.6
Sulfur Dioxide (SO_2)	24-hr	137.2	71	208	260	86051824	767438	3342731	88.9	98.2	94.9	96.0	92.6
Sulfur Dioxide (SO_2)	Annual	25.7	9	35	60	87	768943	3339624	11.6	15.1	21.0	19.4	14.9
Particulate Matter (PM_{10})	24-hr	83.8	47	131	150	89061024	767881	3342365	40.0	40.1	42.0	49.7	51.4
Particulate Matter (PM_{10})	Annual	19.1	22.4	42	50	87	767611	33411995	5.6	5.5	6.6	5.6	6.5
Nitrogen Dioxide (NO_2)	Annual	21.4	14	35	100	87	767511	3341895	5.1	7.4	10.4	9.1	6.8
Carbon Monoxide (CO)	1 hr	103.1	8050	8153	40000	85090112	769362	3339793	103.1	28.2	28.1	27.0	28.7
Carbon Monoxide (CO)	8-hr	16.3	5290	5306	10000	86072916	767460	3342348	8.3	13.3	10.1	11.6	8.7
Lead (Pb)	24-hr	0.011	0.03	0.04	1.5	87062724	769610	3338267	0.0064	0.010	0.011	0.011	0.0084

(1) Short-term values are highest second high values for this analysis.
(2) Rule 62-204.240, F.A.C.
(3) Unit 8 stack location 769,611 m East, 3,339,767 m North.

Source: Foster Wheeler Environmental, 1997

CITY OF TALLAHASSEE

PURDOM 8 PREFERRED AND ALTERNATE RECLAIMED WATER PIPELINE CORRIDORS

PURDOM UNIT 8 PROJECT – STMARKS FLORIDA

Figure 6.1.7-2

6.1.8.3 Solid Wastes

All construction solid wastes will be collected and removed for recycling or off-site disposal in compliance with all applicable regulations.

6.1.8.4 Changes to Vegetation, Wildlife, and Aquatic Life

No significant permanent changes to animal and plant populations are expected. Most of the corridor is currently in road right-of-way or early successional landcovers.

6.1.8.5 Impact on Human Populations

All facilities of the pipeline installed in a state road right-of-way will be designed and constructed in accordance with the FDOT *Utility Accommodation Manual*, 1993. Construction will begin in 1999 and is expected to take approximately 2 months to complete.

The pipeline routes follow city streets which are lightly traveled. The use of existing rights-of-way and the short duration of construction activities in any given location should minimize any inconvenience which might occur.

6.1.8.6 Impact on Regional Scenic, Cultural, and Natural Landmarks

Since the pipeline is an underground facility and will be constructed along or within city streets, there will be no impacts to regional scenic, cultural, or natural landmarks located near the route.

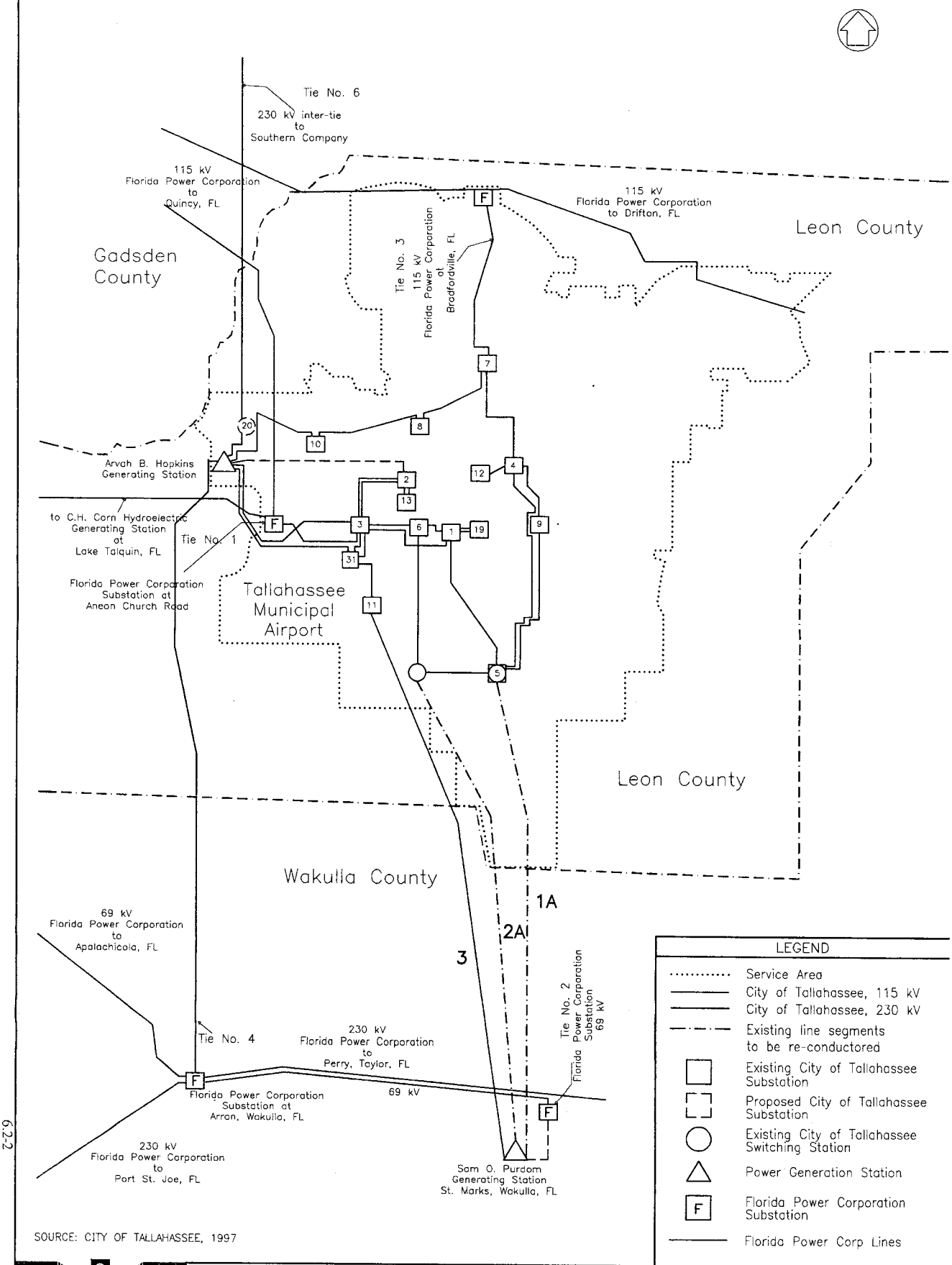
6.1.8.7 Impact on Archeological and Historic Sites

Both the preferred and alternate corridor routes have been reviewed by the Division of Historical Resources (DHR). The review included a January 28, 1997, on-site visit by DHR staff. Based on that review, DHR concluded (DHR, 1997) that use of the preferred route would have no effect on significant historic properties (including archeological sites) provided construction is confined to existing road and trail rights-of-way, and is located within the road surfaces or within 6 feet of road edges. It is anticipated that construction will conform to these requirements. Should construction require activities outside of these areas, pre-construction subsurface testing by a professional archeologist will be carried out in accordance with the recommendation of DHR.

DHR has also concluded that use of the alternate corridor would have no effect on significant historic properties provided construction in the area between Riverside Drive and the City of St. Marks WWTF is contained within existing fill deposits.

Both alternates include construction of a pumping station at the City of St. Marks WWTF. A previously recorded prehistoric archeological site may be located in the same general vicinity. It is anticipated that construction in this area will be confined to existing fill deposits. However, to insure that archeological remains are not disturbed, a professional archeologist will monitor construction in this area. *If evidence of potentially significant cultural resources is found in the sub-fill area to be excavated, excavation activity will be halted in the area of concern and the Division of Historical Resources consulted to determine the appropriate course of action to follow.*

PLOT DATE JUNE 20, 1997 C:\15840002\----\00000-24.DWG



SOURCE: CITY OF TALLAHASSEE, 1997

6.2-2

CITY OF TALLAHASSEE

CITY OF TALLAHASSEE
TRANSMISSION LINE SYSTEM

PURDOM UNIT 8 PROJECT - ST MARKS, FLORIDA

Figure
6.2.1-1

7.2 SOCIOECONOMIC COSTS

7.2.1 Temporary External Costs

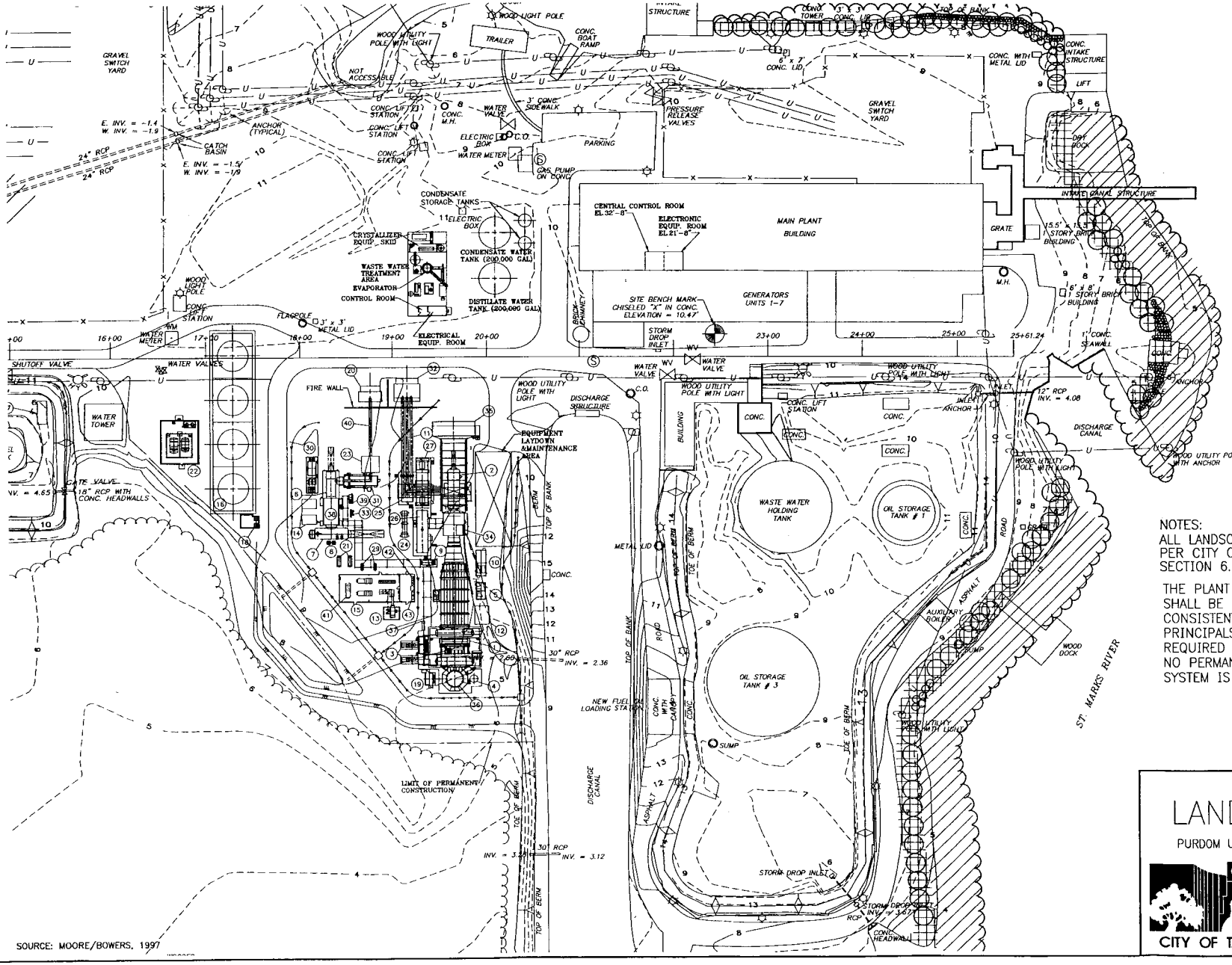
The average number of construction workers seeking temporary housing near the Purdom Station is estimated at 80. At or near the peak of construction, this number will probably be no greater than 110 to 120. The location of lodgings in and around the City of St. Marks is shown on Figure 7.2.1-1. According to a survey of seven motels and trailer parks in the area, the number of existing units is 164, and average year-round occupancy rates ranged from 15 to 95 percent. Considering those factors, it is estimated that about *50* units would be available for rental by the Purdom Unit 8 construction workers (see Table 7.2.1-1). Although there may be a shortage of temporary housing in the immediate vicinity of the Purdom Station, the 1996 Florida Statistical Abstract reports 18,812 apartment units and 24,710 hotel and motel units in Leon County. Therefore, no actual shortage of housing is expected.

TABLE 7.2.1-1
TEMPORARY HOUSING AVAILABILITY
IN ST MARKS AND VICINITY

Establishment	Total No. of Units	Avg Year-Round Occupancy Rate	No. of Units Available
Shell Point Resort Shell Point Road & Hwy 98, Shell Point	26 rooms	65% full	9
Shell Island Fish Camp Shell Island Road, St. Marks	24 rooms 4 cabins	80% full	5
El Camino Motel 3705 Woodville Hwy, Tallahassee	27 rooms	43% full	15
Oaks Motel & Restaurant 52 Coastal Highway, Panacea	19 rooms	62% full	7
Harrell's Trailer Park Near SR 267 and SR 363	5 Trailers	95% full	0
Posey's Motel US 98, Panacea	25 rooms	80% full	*5*
Wakulla Springs State Park SR 267 and CR 61	27 rooms	80% full	5
Sweet Magnolia Bed & Breakfast 803 Port Leon Drive, St. Marks	7 rooms	15% full	6
TOTAL	164	—	*52*

Source: Moore/Bowers, 1997

As indicated in Section 4.6.1, no roadway improvements are expected to be required to accommodate the construction traffic. Other public service fees and costs expected to be paid or incurred during construction of Unit 8 at the Purdom site include those for police protection, fire protection and emergency medical services, ambulance service, building inspection, solid waste disposal, and growth management. The following are hypothetical estimates of service


LEGEND
CANOPY TREE
UNDERSTORY TREE
SHRUB
25 FT PLANTED BUFFER
SHORELINE PROTECTION ZONE
NOTES:
ALL LANDSCAPING SHALL BE INSTALLED PER CITY OF ST MARKS CODE REQUIREMENTS SECTION 6.0.
THE PLANT MATERIALS USED SHALL BE DROUGHT TOLERANT AND CONSISTENT WITH XERISCAPE PRINCIPALS. WATER SHALL BE REQUIRED FOR ESTABLISHMENT, BUT NO PERMANENT IRRIGATION SYSTEM IS INCLUDED.
N
SCALE: 1" = 100'
LANDSCAPE PLAN
PURDOM UNIT 8 PROJECT - ST MARKS, FLORIDA
CITY OF TALLAHASSEE
Figure 7.2.2-1
SOURCE: MOORE/BOWERS, 1997
CENTRAL CONTROL ROOM
MAIN PLANT BUILDING
WASTE WATER HOLDING TANK
OIL STORAGE TANK # 1
OIL STORAGE TANK # 3
WATER TOWER
ST. MARKS RIVER
LIMIT OF PERMANENT CONSTRUCTION

VOLUME 2

10.1.2 NPDES Applications/Permits

Following is a copy of the Purdom Generating Station NPDES Permit Number FL0025526, issued on September 29, 1992 by the U.S.EPA. Following that are copies of two submittals dated November 3, 1995, and April 26, 1996, which constitute the City of Tallahassee's application to renew the Purdom Generating Station NPDES Permit under the FDEP's authority to administer the NPDES permitting program in Florida as of May 1, 1995.

The addition of Purdom Unit 8 and the accompanying retirement of Purdom Units 5 and 6 will result in the elimination of the outfalls with serial numbers 001, 005, and 006. Additionally, outfall serial number 002 will see a reduction in flow of approximately 36% (see Sections 2.3.4-1 and 3.5.1) with the retirement of Unit 6.

During the transition period when Units 5 and 6 are being permanently shut down and Unit 8, including the zero discharge wastewater treatment system, is being tested prior to commercial operation, the City of Tallahassee may use the existing low volume wastewater treatment system to treat wastewater resulting from preoperation and cleaning activities. Any discharge from that treatment will meet the existing NPDES permit limits.

A copy of the Purdom Generating Station Storm Water General Permit is included at the end of this section.

U.S. Environmental P ection Agency
National Pollutant Discharge Elimination System (NPDES)

S T O R M W A T E R G E N E R A L P E R M I T C O V E R A G E N O T I C E

December 31, 1992

Dear Operator:

Your Notice of Intent (NOI) for the facilty noted below has been processed by the U.S. Environmental Protection Agency. This facility is authorized to discharge storm water associated with industrial or construction activity under the terms and conditions imposed by EPA's NPDES storm water general permit issued for use in the state of Florida. Your facility's NPDES storm water permit number is FLR00A317.

EPA's storm water general permit requires certain storm water pollution prevention and control measures, possible monitoring and reporting, and annual inspections. Among the conditions and requirements of this permit, you must prepare and implement a pollution prevention plan (PPP) that is tailored to your industrial or construction site. Enclosed is a summary guidance document designed to assist you in the development and implementation of your PPP. The summary is organized according to the phases of the pollution prevention planning process. A set of worksheets and an example of a pollution prevention plan are provided for your assistance. As a facility authorized to discharge under this storm water general permit, all terms and conditions must be complied with to maintain coverage and avoid possible penalties.

FACILITY:

Sam O Purdom Generating Stati
Po Box 8
Saint Mark, FL 32355-

OPERATOR:

City Of Tallahassee
300 South Adams St
Tallahassee, FL 32301-

If you have general questions concerning the storm water program, or need to obtain a copy of the permit, please call the Storm Water Hotline at (703) 821-4823.

As part of the initial Title V application development, the City of Tallahassee reviewed the potential sources of unconfined particulate emissions at its Purdom Generating Station. The intent of the review was to ensure that reasonable precautions were in place to prevent and/or control these potential particulate emissions. The potential sources which were identified included the following:

1. Concrete mixing;
2. Abrasive blasting
3. Aggregate handling and storage;
4. Heavy construction activities;
5. Driving on paved/unpaved roads; and
6. Spray application of surface coatings.

Based on the City of Tallahassee's review of these potential sources, the following reasonable precautions have been established to control unconfined emissions of particulate matter:

- The portable concrete mixer is operated on an as-needed basis. Reasonable precautions include enclosing the activity wherever practical.

- The abrasive blasting activities are associated with normal maintenance and corrosion control activities. These activities are also enclosed wherever practical.

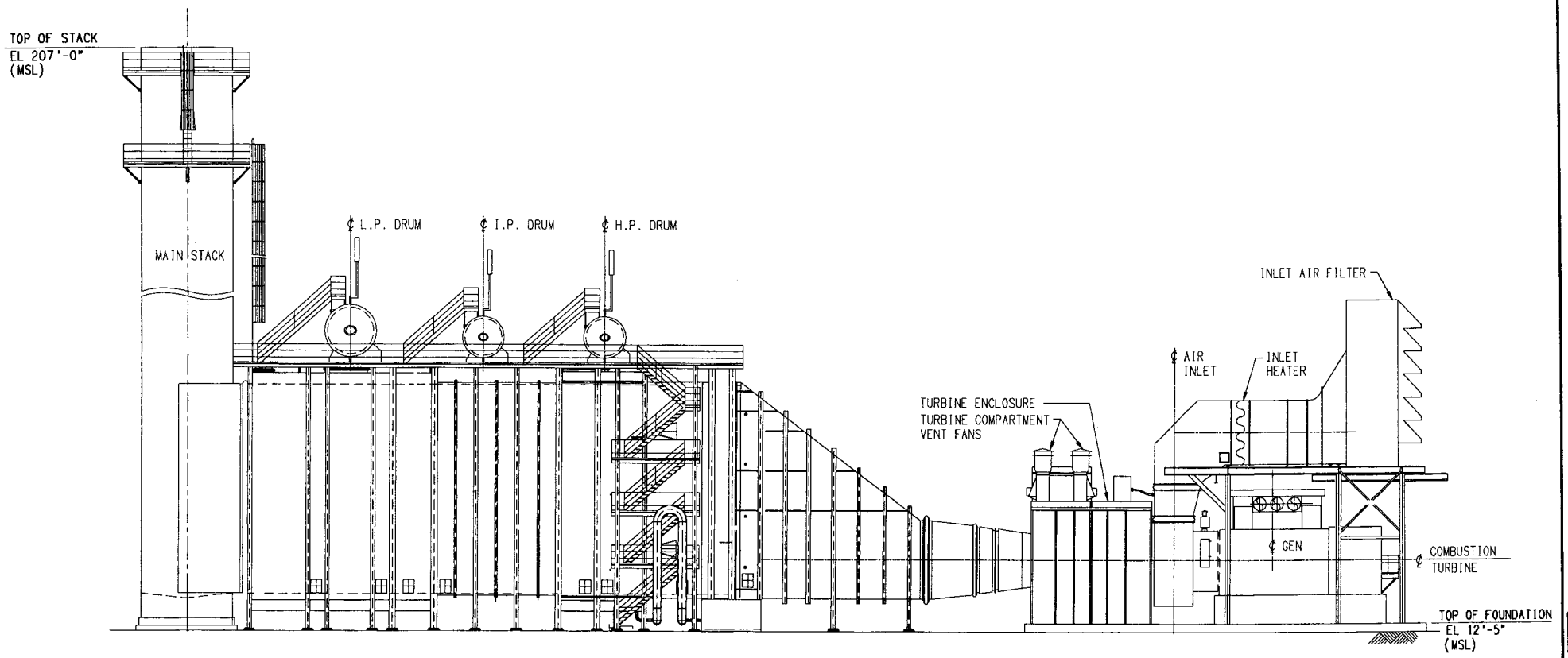
- *Unconfined emissions associated with the limited on-site traffic are controlled through limiting vehicle speeds and unnecessary traffic within the plant grounds.*

The spray applications of surface coatings are associated with normal maintenance and corrosion activities. These activities are enclosed whenever practical.

During the construction of Unit 8, unavoidable particulate matter emissions are likely to occur from various construction-related activities. Emissions of these pollutants will be minimized using the above reasonable precautions. The quantities of fugitive dust emitted by the site construction vehicular traffic will be dependent on a number of factors, including the frequency of operations, specific operations being conducted, weather, and soil conditions.

The impact of heavy construction activities and site preparation on air quality will be short term and confined to the immediate vicinity of the construction activity. This is primarily because most of the fugitive dust created by construction traffic consists of relatively large particles (i.e., larger than those which constitute PM_{10}). These large particles tend to settle quickly rather than remain suspended for transport over long distances.

LIST OF FIGURES (Cont'd)



SOURCE: RE&C, 1997

CROSS SECTION
COMBINED CYCLE UNIT

PURDOM UNIT 8 PROJECT - ST MARKS, FLORIDA

CITY OF TALLAHASSEE

Figure
2-4

TABLE 3-2
PSD SIGNIFICANT EMISSION RATES

Pollutant	Annual Significant Emission Rate (TPY) per Table 212.400-2	Applicable Significant Emission Rate for Proposed Purdom Project [1] (TPY)
Carbon Monoxide (CO)	100	*100*
Oxides of Nitrogen (NO_x)	40	40
Sulfur Dioxide (SO_2)	40	40
Particulate Matter (PM_{10})	15	15
Total Suspended Particulates (TSP)	25	25
Volatile Organic Compounds (VOC)	40	40
Lead (Pb)	0.6	0.6
Asbestos	0.007	0.007
Beryllium (Be)	0.0004	0.0004
Mercury (Hg)	0.1	0.1
Vinyl Chloride	1	1
Total Fluorides (Fl)	3	3
Sulfuric Acid Mist (H_2SO_4)	7	7
Reduced Sulfur Compounds (Including H_2S)	10	10
Total Reduced Sulfur (Including H_2S)	10	10

TPY = tons per year

(1) Due to the proximity to the Class I area, any increase in emissions is considered significant for these pollutants with a maximum projected 24-hour average impact of 1.0 microgram per cubic meter or more in the Class I area, as per Rule 62-212.400(2)(f)(1), F.A.C. *However, since an increase of more than 100 tpy at Purdom would be required to produce a 1.0 microgram per cubic meter impact at the Class I area, the standard significant emission rate criteria apply.*

Source: Rule 62-212.400, F.A.C. Table 212.400-2

TABLE 3-4
MAXIMUM ANNUAL NET CHANGE IN EMISSIONS AND PSD SIGNIFICANCE VALUES

Pollutant	Net Increase In Emissions[1] (TPY)	PSD Significance Criterion[2] (TPY)	PSD Review Required (Yes/No)
Carbon Monoxide (CO)	127	*100*	Yes
Nitrogen Oxides (NO_x)	0.0	*40*	No
Sulfur Dioxide (SO_2)	0.0	*40*	No
Particulate Matter (PM_{10})	48.3	15	Yes
Particulate Matter (TSP)	48.3	25	Yes
Volatile Organic Compounds (VOCs)	11.9	40	No
Lead (Pb)	0.080	0.6	No
Asbestos	N/A	0.007	No
Beryllium (Be)	0.00022	0.0004	No
Mercury (Hg)	0.00040	0.1	No
Vinyl Chloride	N/A	1	No
Total Fluorides (Fl)	1.6	3	No
Sulfuric Acid Mist (H_2SO_4)	5.6	7	No
Total Reduced Sulfur	N/A	10	No
Reduced Sulfur Compounds	N/A	10	No

(1) Based on worst case scenarios.

(2) Due to the proximity to the Class I area, lower criteria *may* apply for those pollutants with a minimum projected 24-hour average impact of 1.0 mg/m^3 or more in the Class I area. *In this case, no pollutants would produce such an impact and the standard criteria apply.*

NA = No emissions information available or no emissions expected.
TPY = Tons per year

Source: Foster Wheeler Environmental, 1997

6.8 RECEPTOR LOCATIONS

6.8.1 Receptor Grids for Site Vicinity

Ambient concentrations were determined for the significant impact area and monitoring exemption analyses for receptors in a polar grid consisting of 36 radial directions at 10 degree intervals at distances listed below (in kilometers) from the site origin, the proposed stack location for Purdom Unit 8 (UTM coordinates 769.611 km East 3,339.767 km North):

0.5	2.5	4.5	7.0
1.0	3.0	5.0	8.0
1.5	3.5	5.5	9.0
2.0	4.0	6.0	10.0

Receptors from these polar grids which fell within the Project site boundaries were not included but 57 additional receptors were placed around the site boundary. A total of 632 receptors were used in the modelling. Figure 6-3 presents the location of the site boundary and polar receptors.

For the monitoring exemption request, Class II PSD, and AAQS analyses, an additional 11x11 (121 point) receptor grid with a spacing of 100m was placed over the critical impact receptor as determined from the preliminary runs. Figures 6-4 through 6-17 depict the location of these "refined" receptors along with the original "preliminary" receptors. Please note that when maximum predicted impacts were zero based on the use of the preliminary receptor grid in Figure 6-3 (annual SO2 Class II increment consumption, for example), no refined receptor grids were needed, and therefore, no figures are presented.

During the AAQS modelling analysis, impacts greater than the 24-hr SO2 AAQS were modelled. The locations of the receptors with high impacts were found to be on the Primex facility, located northwest of the Purdom Station. Then, as indicated in Figures 6-10 and 6-11, special grids were used for the 3-hour, 24-hour, and annual SO2 AAQS analyses, which eliminated receptors within the Primex Technologies (formerly Olin) site boundaries. Therefore, a second approach to modelling these receptors, consistent with an EPA guidance memorandum (EPA 1989) was taken. This approach requires that the receptors that are located on the Primex facility be modelled using all appropriate sources except Primex sources. Figure 6-12 depicts the receptors' locations on the Primex facility.

6.8.2 Receptor Grid for Class I PSD Analysis

The modelling for the St. Marks and Bradwell Bay National Wilderness Areas analyses used receptor grids approved by FDEP (1996b). The St. Marks National Wilderness Area analysis used a total of 68 receptors, including receptors spaced at 75m intervals along the northern boundary as requested by the USFWS. A total of 18 receptors were used in the modelling

6.11 AUXILIARY BOILER MODELLING

Emissions from the recently permitted auxiliary boiler were modeled using the general procedures described in Section 6.1. For short-term model runs, the auxiliary boiler was modelled separately from Units 7 and 8 since a permit condition prohibits it from running at the same time as the existing steam generating units. Long-term analyses of the Project did include the emissions from the auxiliary boiler along with the other sources. A revised permit condition is proposed which would prohibit the operation of the auxiliary boiler simultaneously with Unit 7 or 8 after Unit 8 is completed and successfully commences operation. The emissions from the auxiliary boiler were included in Tables 6-5 and 6-6. Receptor locations used are as indicated for the other sources in Section 6.8.

6.12 *SUPPLEMENTAL NO_2 MODELLING FOR AQRV ANALYSIS*

At FDEP's suggestion, a supplemental analysis for NO_2 was conducted using maximum short-term emission rates instead of the annual facility wide cap. It was assumed that Unit 7 and the two existing combustion turbines (GT1 and GT2) would be operating at full load on No. 6 fuel oil and diesel fuel, respectively. It was also assumed that the proposed Unit 8 was operating on diesel fuel at 42 ppmvd at its worst case impact load (50% load at 20° F). Also included in the modelling were the other existing sources included in the ambient air quality standards (AAQS) emission inventory for NO_X. Since there are no short-term background concentrations available, the annual measured background value of 14 micrograms per cubic meter ($\mu g/m^3$) was scaled up using the standard EPA time scale conversion rations (i.e., 0.9 for 3-hour, 0.7 for 8-hour, 0.4 for 24-hour, and 0.05 for annual, when compared to a 1-hour value).

The ISCST3 model was run using the same five years of meteorological data and coarse grid receptors as were used in other PSD analyses. After the five years of modelling were completed, a fine grid was modelled for each averaging period. Figure 6-26 depicts the receptor grids used in the analyses.

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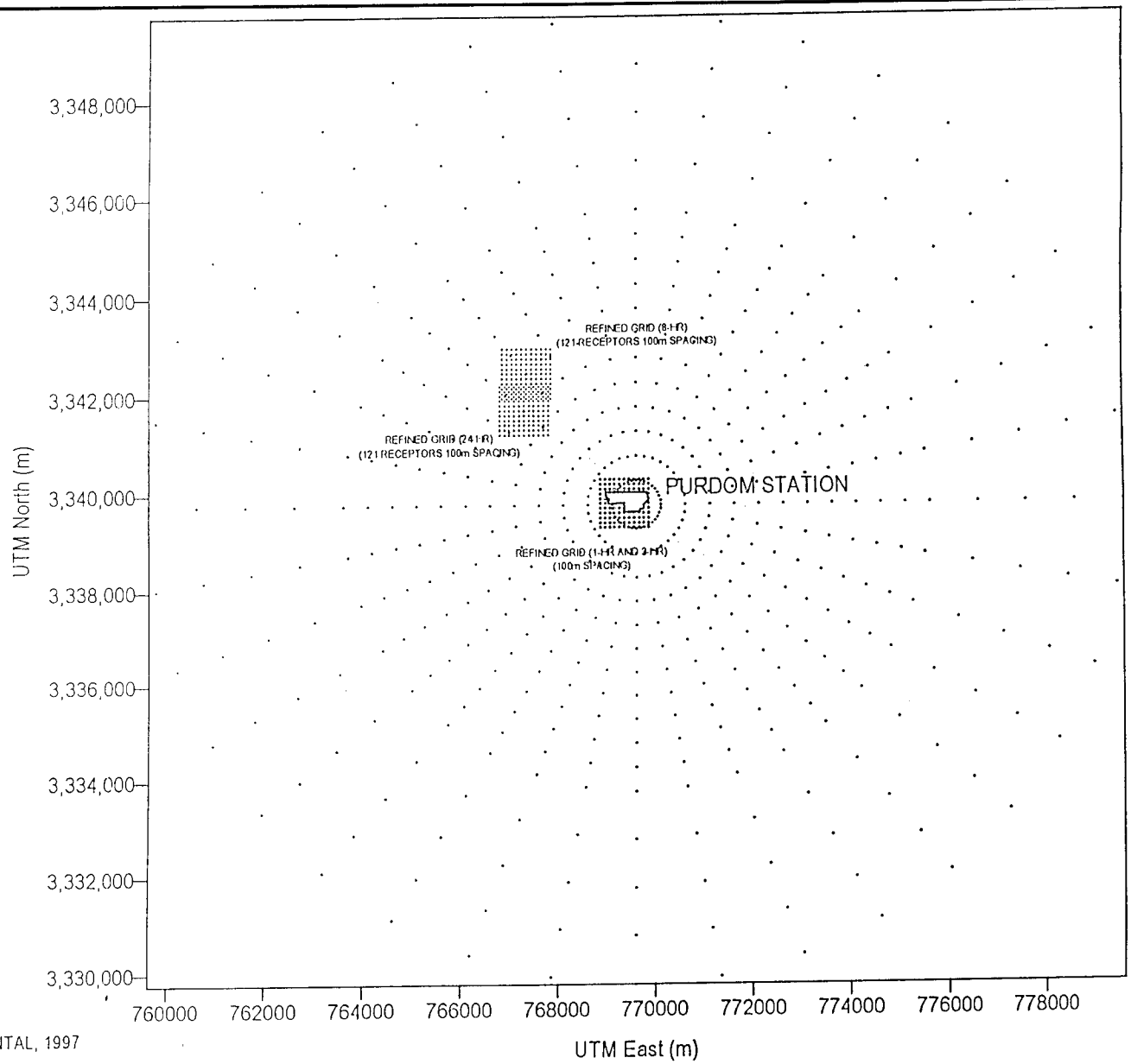

SOURCE: FOSTER WHEELER ENVIRONMENTAL, 1997

CITY OF TALLAHASSEE

NO_2 SHORT TERM
REFINED GRID - ISCST3 MODELLING RECEPTORS

PURDOM UNIT 8 PROJECT - ST MARKS, FLORIDA

Figure
6-26

TABLE 7-10
SUMMARY OF FAAQS ANALYSIS

Pollutant	Avg Period	Max[1] Refined Conc ($\mu g/m^3$)	Background ($\mu g/m^3$)	Max[1] Modelled + Background ($\mu g/m^3$)	FAAQS[2] ($\mu g/m^3$)	Period (yymmddhh)	Receptor Location[3] East (m)	Receptor Location[3] North (m)	Preliminary Maximum[1] Concentration by Year 1985 ($\mu g/m^3$)	1986 ($\mu g/m^3$)	1987 ($\mu g/m^3$)	1988 ($\mu g/m^3$)	1989 ($\mu g/m^3$)
Sulfur Dioxide (SO_2)	3-hr	402.1	183	585	1300	86031203	767338	3344831	296.6	306.9	289.3	304.9	253.6
Sulfur Dioxide (SO_2)	24-hr	137.2	71	208	260	86051824	767438	3342731	88.9	98.2	94.9	96.0	92.6
Sulfur Dioxide (SO_2)	Annual	25.7	9	35	60	87	768943	3339624	11.6	15.1	21.0	19.4	14.9
Particulate Matter (PM_{10})	24-hr	83.8	47	131	150	89061024	767881	3342365	40.0	40.1	42.0	49.7	51.4
Particulate Matter (PM_{10})	Annual	19.1	22.4	42	50	87	767611	33411995	5.6	5.5	6.6	5.6	6.5
Nitrogen Dioxide (NO_2)	Annual	21.4	14	35	100	87	767511	3341895	5.1	7.4	10.4	9.1	6.8
Carbon Monoxide (CO)	1 hr	103.1	8050	8153	40000	85090112	769362	3339793	103.1	28.2	28.1	27.0	28.7
Carbon Monoxide (CO)	8-hr	16.3	5290	5306	10000	86072916	767460	3342348	8.3	13.3	10.1	11.6	8.7
Lead (Pb)	24-hr	0.011	0.03	0.04	1.5	87062724	769610	3338267	0.0064	0.010	0.011	0.011	0.0084

(1) Short-term values are highest second high values for this analysis.
(2) Rule 62-204.240, F.A.C.
(3) Unit 8 stack location 769,611 m East, 3,339,767 m North.

Source: Foster Wheeler Environmental, 1997

TABLE 8-1
SUMMARY OF THE MAXIMUM PREDICTED IMPACTS
FROM THE PURDOM STATION

Air Contaminant	Maximum Predicted Impact ($\mu g/m^3$)[1]				
	1-Hour	3-Hour	8-Hour	24-Hour	Annual
Carbon Monoxide (CO)	**8,153**	7,338	**5,306**	3,032	379
Particulate Matter (PM)	328	295	229	**131**	**42**
Sulfur Dioxide (SO_2)	650	**585**	455	**208**	**35**
Nitrogen Dioxide (NO_2)[2]	***1,780***	***970***	***359***	***214***	**35**
Lead (Pb)	3.88E-02	3.49E-02	**2.71E-02**	**1.49E-02**	**2.07E-04**
Beryllium (Be)	5.63E-04	5.06E-04	**3.94E-04**	**2.17E-04**	**1.07E-06**
Mercury (Hg)	3.81E-03	3.43E-03	**2.67E-03**	**1.47E-03**	**4.97E-06**
Arsenic (As)	1.41E-02	1.27E-02	**9.85E-03**	**5.42E-03**	**1.78E-05**
Antimony (Sb)	1.16E-02	1.05E-02	**8.15E-03**	**4.49E-03**	**7.14E-05**
Cadmium (Cd)	6.36E-03	5.72E-03	**4.45E-03**	**2.45E-03**	**1.36E-05**
Chromium (Cr)	2.82E-02	2.54E-02	**1.97E-02**	**1.09E-02**	**1.52E-04**
Cobalt (Co)	1.61E-02	1.45E-02	**1.13E-02**	**6.20E-03**	**2.95E-05**
Manganese (Mn)	1.07E-01	9.60E-02	**7.46E-02**	**4.11E-02**	**1.07E-03**
Nickel (Ni)	6.16E-01	5.54E-01	**4.31E-01**	**2.37E-01**	**3.89E-03**
Vanadium (V)	1.97E-01	1.77E-01	**1.38E-01**	**7.59E-02**	**2.73E-04**

[1] Includes background levels for each averaging period when available and where appropriate. Numbers in bold typeface were predicted by modelling. Other values were scaled using EPA's conversion factors for converting model results to different averaging periods-screening (simple terrain).

(2) NO_2 impacts were explicitly modelled for each averaging time rather than using the approach discussed in Note (1).

Source: Foster Wheeler Environmental, 1997; *COT, 1997*

background from existing sources) (Table 8-1). Assuming a threshold injury concentration of 1880 $\mu g/m^3$ for a 24 hour exposure period (Thompson et al., 1974) extrapolated to an annual value of 94 $\mu g/m^3$, this maximum concentration is 0.4 of the estimated threshold concentration. The 1-, 3-, 8-hour and 24-hour predicted NO_2 ambient concentrations from the Project are *1,780*, *970*, *359*, and *214* $\mu g/m^3$, respectively. These values, when compared with the conservative end of the range of threshold concentrations of *18,800* to 68,620 $\mu g/m^3$ for 1-hour, 22,560 for 3-hour, 4,324 to 9,024 for 8-hour and 1,880 to 4,324 for 24-hour exposures, are *0.09, 0.04, 0.08*, and *0.11* of the levels reported in the literature as resulting in minimal effects on relatively sensitive species. Therefore, there are not expected to be any adverse impacts on vegetation.

8.3.1.4 Sulfur Dioxide

The predicted maximum ground-level 1-hour, 3-hour, 8-hour, 24-hour and annual ambient concentrations resulting from operation of the Project are 650, 585, 455, 208, and 35 $\mu g/m^3$ (Project plus background from existing sources) (Table 8-1). These predicted concentrations would not exceed the existing ambient SO_2 concentrations since the annual and short-term SO_2 emissions from the Project will not increase over existing levels (either short-term or long-term). The predicted ambient concentrations during operation of the Project would be 0.5, 0.75, and 0.9, of the 1-hour, 3-hour, and 8-hour injury threshold concentrations (1,300, 785, and 472 $\mu g/m^3$) for sensitive vegetation as reported in the literature (Jacobsen, 1977; Jones et al., 1974; Linzon, 1973; and USEPA, 1976). The annual average of 35 $\mu g/m^3$ (including background from existing sources) is 0.3 of the annual value (118 $\mu g/m^3$) reported as resulting in no foliar injury on maples during a growing season (Fed Am Soc Exp Bio, 1973). The 1-hour and 3-hour predicted concentrations are 0.25 and 0.4 of the 1-hour and 3-hour SO_2 concentrations (2,620 and 1,572 $\mu g/m^3$, Jones et al., 1974) used to identify southern pines as sensitive to SO_2. Under these predicted ambient conditions, which would be similar to existing conditions, no injury symptoms would be expected within a 10 km radius of the Project and, while not specifically modelled under the AAQS analysis, similar concentrations would be expected to occur in the St. Marks NWA and slightly lower concentrations would be expected in the Bradwell Bay NWA, respectively.

The potential for physiological or chronic injury occurring cannot be predicted with certainty. The predicted maximum annual ambient concentration during operation of the Project is 35 $\mu g/m^3$. Most evidence in the literature suggests that levels around 118 $\mu g/m^3$ may be responsible for physiological or chronic injury. Since there is an 83 $\mu g/m^3$ difference between the predicted ambient concentration and the threshold concentration reported in the literature, the probability of physiological or chronic injury is low. In addition, SO_2 emissions from the Project will be maintained at or below existing levels, which supports the conclusion that there is a low probability of physiological or chronic injury since no injury symptoms have been reported to date.

Sulfur can also be added to soil through washout of atmospheric SO_2 by precipitation. In a study in Minnesota, annual sulfur additions from atmospheric SO_2 washout were found to range from 100 lbs/acre in urban areas to 5 lbs/acre in rural areas. In southern states, the annual average is about 5 lbs/acre (Kamprath, 1972). Sulfur is an essential nutrient for plants. In some cases, the amount of sulfur deposition is sufficient to meet crop requirements, although in rural area, the

the total endogenous concentrations over the life of the model plant. It was concluded that uptake by vegetation could not increase dramatically unless the forms of the deposited trace elements were considerably more available than the endogenous forms (Dvorak and Lewis et al., 1978; Environmental Research and Technology, 1978). The estimated annual concentration increases assuming the trace elements remained in the top 25 cm of soil over this period, ranged from 8.99 x 10^{-8} to 3.27 x 10^{-4} mg/kg/yr. These predicted increases over a 30-year period would be imperceptible at the locations of predicted highest concentrations in the vicinity of the Purdom Station and would be even less perceptible in the NWAs.

8.3.3 Wildlife

Compared with other threats to wildlife, such as pesticides, the toxicological relationships between air contaminants and effects on wildlife are not well understood (Newman and Schreiber, 1988). The limited understanding is based primarily on reports of symptoms observed in the field and on information extrapolated from laboratory studies. Information on controlled wildlife studies is limited in the scientific literature. Most studies report symptoms of various air contaminants but do not provide toxicity levels. Those studies that do provide toxicity levels are limited to four air contaminants: SO_2, NO_2, O_3, and particulate matter. Accordingly, this analysis addresses only those air contaminants for which sufficient data exist. As stated earlier, only the particulate matter analysis is required under PSD review; the other pollutant impacts are being voluntarily analyzed.

Effects on wildlife from air contaminants are summarized in Table 8-3. It should be noted that most of the effects noted in Table 8-3 occur below the national primary and secondary AAQS, where the data equate to a standard. The estimated annual particulate matter concentration (42 $\mu g/m^3$), based on the estimated background plus the predicted Project contribution is approximately 0.5 percent of the concentration reported to cause respiratory stress. Because the projected particulate matter concentrations are so far below the reported injury threshold, no adverse impacts to wildlife from the Project are expected.

As shown in Table 8-3, the predicted annual SO_2 concentration of 35 $\mu g/m^3$ (Table 8-1) falls within the range of concentrations (13-157 $\mu g/m^3$, continually for 5 months) that were reported in the literature to result in a decreased abundance of deer mice. The NWAs are well outside the geographical range of the deer mouse, however, and it is included in this analysis solely as an indicator organism that has been reported in the literature. This predicted concentration (35 $\mu g/m^3$) is well below the AAQS of 60 $\mu g/m^3$ which is generally protective of human health and the environment.

The predicted 3-hour O_3 concentration of 150 $\mu g/m^3$ (based on an extrapolation of the 1-hour and annual concentrations monitored at Sumatra) is below the low end of the range of concentrations reported in the literature to induce respiratory stress and increase the susceptibility to respiratory infection in mice, rats, and rabbits (Table 8-1). Since there are no increases in annual NO_2 concentrations predicted and a relatively small increase in VOC emissions (12 tpy) predicted, it is not anticipated that the operation of the Project will result in an increase in O_3 levels that would be harmful to indigenous wildlife. The predicted 3-hour NO_2 concentration of *970* $\mu g/m^3$ from the Project and existing sources (Table 8-1) is approximately *0.51* of the concentration (1917 $\mu g/m^3$) reported to cause respiratory stress in mice. Given the fact that the predicted SO_2

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VOLUME 3

CITY OF TALLAHASSEE ELECTRIC DEPARTMENT
FUTURE EMISSIONS UNIT INVENTORY
SOURCE - PURDOM GENERATING STATION

Unit No.	Emissions Unit	Emissions Unit Description	Regulatory [1] [2] Classification	Emission Unit Status
1	CT #1	Combustion Turbine - 228 mmBtu/hr	Regulated - Permit # AO37-242825	Existing
1a	Oil Vapor Extractor	Oil Vapor Extractor	Exempted Under Rule 62-213.430(6)	Existing
1b	Fuel Oil Piping	Fuel Oil Piping	Exempted Under Rule 62-213.430(6)	Existing
1c	Lube Oil Tank	Organic Liquid Storage	Exempted Under Rule 62-213.430(6)	Existing
2	CT #2	Combustion Turbine - 228 mmBtu/hr	Regulated - Permit # AO37-242825	Existing
2a	Oil Vapor Extractor	Oil Vapor Extractor	Exempted Under Rule 62-213.430(6)	Existing
2b	Fuel Oil Piping	Fuel Oil Piping	Exempted Under Rule 62-213.430(6)	Existing
2c	Lube Oil Tank	Organic Liquid Storage	Exempted Under Rule 62-213.430(6)	Existing
5	Steam Generator No. 7	Steam Generator - 621 mmBtu/hr	Regulated - Permit # AO37-242831	Existing
5a	Fuel Oil Piping	Fuel Oil Piping	Exempted Under Rule 62-213.430(6)	Existing
5b	Hydrogen Gas Vents	Hydrogen Gas Vents	Exempted Under Rule 62-213.430(6)	Existing
5c	Deareator Tank Vents	Deareator Tank Vents	Exempted Under Rule 62-213.430(6)	Existing
5d	Oil Vapor Extractors	Oil Vapor Extractors	Exempted Under Rule 62-213.430(6)	Existing
5e	Lube Oil Tank (storage)	Organic Liquid Storage	Exempted Under Rule 62-213.430(6)	Existing
5f	Lube/Fuel Oil Drip Pans	Lube/Fuel Oil Drip Pans	Exempted Under Rule 62-213.430(6)	Existing
5g	Noncondensable Gas	Noncondensable Gas Extractor	Exempted Under Rule 62-213.430(6)	Existing
6	Emergency Generator	Diesel Engine	Exempt per Rule 62-210.300(3)(a)21	Existing
6a	Diesel Driven Fire Pump	Diesel Engine	Exempt per Rule 62-210.300(3)(a)21	New
7	Fuel Farm	Fuel Oil Tank No. 1	Exempted Under Rule 62-213.430(6)	Existing
7a	Fuel Farm	Fuel Oil Tank No.3	Exempted Under Rule 62-213.430(6)	Existing
7b	Fuel Farm	Waste Water Tank	Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6)	New
7d	Fuel Farm	Waste Oil Tank	Exempted Under Rule 62-213.430(6)	Existing
8	No. 2 Fuel Oil Tank	Organic Liquid Storage	Exempted Under Rule 62-213.430(6)	Existing
8a	Diesel Tank (300 gallons)	Organic Liquid Storage	Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6)	New
8b	Truck Loading/Unloading	Fuel Dispensing Operation	Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6)	New
9	Gasoline Tank	Organic Liquid Storage	Exempted Under Rule 62-213.430(6)	Existing
9a	Fuel Dispensing Operation	Fuel Dispensing Operation	Exempted Under Rule 62-213.430(6)	Existing
10	Diesel Tank	Organic Liquid Storage	Exempted Under Rule 62-213.430(6)	Existing
10a	Fuel Dispensing Operation	Fuel Dispensing Operation	Exempted Under Rule 62-213.430(6)	Existing
11	Barge Unloading Station	Fuel Dispensing Operation	Exempted Under Rule 62-213.430(6)	Existing
12	Fuel Dispensing Operation	Truck Loading/Unloading Rack 1	Exempted Under Rule 62-213.430(6)	Existing
12a	Fuel Dispensing Operation	Truck Loading/Unloading Rack 2	Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6)	New
13	Solvent Cleaning	Parts Washer - Nonhalogenated	Exempted Under Rule 62-213.430(6)	Existing
13a	Solvent Cleaning	Parts Washer - Nonhalogenated	Exempted Under Rule 62-213.430(6)	Existing
13b	Solvent Cleaning	Parts Washer - Nonhalogenated	Exempted Under Rule 62-213.430(6)	Existing

CITY OF TALLAHASSEE ELECTRIC DEPARTMENT
FUTURE EMISSIONS UNIT INVENTORY
SOURCE - PURDOM GENERATING STATION

Unit No.	Emissions Unit	Emissions Unit Description	Regulatory [1] [2] Classification	Emission Unit Status
13c	Solvent Cleaning	Parts Washer - Nonhalogenated	Exempted Under Rule 62-213.430(6)	Existing
13d	Solvent Cleaning	Parts Washer - Nonhalogenated	Exempted Under Rule 62-213.430(6)	Existing
13e	Solvent Cleaning	Parts Washer - Nonhalogenated	Exempted Under Rule 62-213.430(6)	Existing
13f	Solvent Cleaning	Parts Washer - Nonhalogenated	Exempted Under Rule 62-213.430(6)	Existing
13g	Solvent Cleaning	Parts Washer - Nonhalogenated	Exempted Under Rule 62-213.430(6)	Existing
13h	Solvent Cleaning	Parts Washer - Nonhalogenated	Exempted Under Rule 62-213.430(6)	Existing
13i	Solvent Cleaning	Parts Washer - Nonhalogenated	Exempted Under Rule 62-213.430(6)	Existing
13j	Solvent Cleaning	Parts Washer - Nonhalogenated	Exempted Under Rule 62-213.430(6)	Existing
13k	Solvent Cleaning	Parts Washer - Nonhalogenated	Exempted Under Rule 62-213.430(6)	Existing
13l	Solvent Cleaning	Parts Washer - Nonhalogenated	Exempted Under Rule 62-213.430(6)	Existing
13m	Solvent Cleaning	Parts Washer - Nonhalogenated	Exempted Under Rule 62-213.430(6)	Existing
13n	Solvent Cleaning	Parts Washer - Nonhalogenated	Exempted Under Rule 62-213.430(6)	Existing
14	Space Heater	Space Heater	Exempt Rule 62-210.300(3)(a)12	Existing
14a	Space Heater	Space Heater	Exempt Rule 62-210.300(3)(a)12	Existing
14b	Space Heater	Space Heater	Exempt Rule 62-210.300(3)(a)12	Existing
14c	Space Heater	Space Heater	Exempt Rule 62-210.300(3)(a)12	Existing
14d	Space Heater	Space Heater	Exempt Rule 62-210.300(3)(a)12	Existing
14e	Space Heater	Space Heater	Exempt Rule 62-210.300(3)(a)12	Existing
14f	Space Heater	Space Heater	Exempt Rule 62-210.300(3)(a)12	Existing
15	Fugitive Dust	Paved Roads	Exempted Under Rule 62-213.430(6)	Existing
15a	Fugitive Dust	Unpaved Roads	Exempted Under Rule 62-213.430(6)	Existing
15b	Fugitive Dust	Heavy Construction Activities	Unregulated	Existing
15c	Fugitive Dust	Heavy Construction Activities (Unit 8)	Unregulated	Temporary (New)
15d	Fugitive Dust	Aggregate Handling & Storage	Exempted Under Rule 62-213.430(6)	Existing
17	Laboratory	Laboratory Equipment	Exempt Rule 62-210.300(3)(a)15	Existing
17a	Laboratory	Chemical Usage	Exempted Under Rule 62-213.430(6)	Existing
17b	Laboratory	Vacuum Pumps	Exempt Rule 62-210.300(3)(a)9	Existing
17c	Laboratory	Laboratory Fume Hoods	Exempted Under Rule 62-213.430(6)	Existing
18	Central Vacuum System	Central Vacuum System	Exempted Under Rule 62-213.430(6)	Existing
19	Maintenance Activities	Welding	Exempt Rule 62-210.300(3)(a)16	Existing
20	Plant Operations	Lube Oil Storage Tanks	Exempted Under Rule 62-213.430(6)	Existing
20a	Plant Operations	Surface Coating Operations	Unregulated	Existing
20b	Plant Operations	Surface Coating Operations (Unit 8)	Unregulated	Temporary (New)
20a	Plant Operations	Propane Storage Tanks	Exempted Under Rule 62-213.430(6)	Existing
21	Auxiliary Boiler	Steam Generator - 16.74 mmBtu/hr	Regulated - Permit # 1290001-002-AC	Existing
22	Unit 8	Combustion Turbine	Regulated	New
22a	Unit 8	Oil Vapor Extractor	Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6)	New
22b	Unit 8	Fuel Oil Piping	Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6)	New

CITY OF TALLAHASSEE ELECTRIC DEPARTMENT
FUTURE EMISSIONS UNIT INVENTORY
SOURCE - PURDOM GENERATING STATION

Unit No.	Emissions Unit	Emissions Unit Description	Regulatory [1] [2] Classification	Emission Unit Status
22c	Unit 8	Organic Liquid Storage	Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6)	New
22d	Unit 8	Heat Recovery Steam Generator	Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6)	New
22e	Unit 8	Fuel Oil Piping	Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6)	New
22f	Unit 8	Hydrogen Gas Vents	Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6)	New
22g	Unit 8	Deareator Tank Vents	Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6)	New
22h	Unit 8	Oil Vapor Extractors	Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6)	New
22i	Unit 8	Organic Liquid Storage	Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6)	New
22j	Unit 8	Lube/Fuel Oil Drip Pans	Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6)	New
22k	Unit 8	Noncondensable Gas Extractor	Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6)	New
23	Water Treatment	Zero Discharge Facility	Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6)	New
23a	Water Treatment	Cooling Tower	Unregulated	New

[1]Note: The designation "proposed exemption under critieria in Rule 62-213.430(6)" indicates that an exemption is requested for this unit pursuant to Rule 62-213.420(3)(m), F.A.C., in accordance with the provisions of Rule 62-213.430(6), F.A.C.

[2]Note: All trivial emissions units and activities are omitted per FDEP 3/15/96 guidance memo. In addition, all mobil sources are omitted as outside the scope of Title V stationary source permitting.

10.4 EXISTING STATE PERMITS

This section contains the following state permits:

1. *Industrial Wastewater Permit*
2. *Auxiliary Boiler Air Quality Construction Permit*
3. *Combustion Turbines 1 and 2 Air Quality Operating Permit*
4. *Boilers 5, 6, and 7 Air Quality Operating Permit*
5. *Consumptive Use Permit (Water)*
6. *PSC Determination of Need*

'ERMITTEE:

Mr. P. R. Ellis

I.D. Number: 1065MO2695
Permit/Certification Number: IO65-188446
Date of Issue: MAY 31 1991
Expiration Date: May 1, 1996

GENERAL CONDITIONS:

14. When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

SPECIFIC CONDITIONS:

15. Operation of the wastewater facilities shall be under the fulltime supervision of a person who is qualified by formal training and/or practical experience in the field of water pollution control.

16. All analyses and reports on the monitoring of water quality required by this permit shall be submitted to the Northwest District Office, Department of Environmental Regulation, 160 Governmental Center, Pensacola, Florida 32501-5794 within 20 days after the specified reporting period. A copy shall also be submitted to the Northwest District Branch Office, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400.

17. Solids, sludges, waste, or other pollutants removed in the ccurse of construction, treatment, or control of effluent shall be disposed of in such a manner so as to prevent said materials from entering waters of the State. Permittee shall obtain the Department's written approval prior to disposal of these materials.

18. Sampling, monitoring and effluent limitations for this facility are as follows:

A. Outfall 001*

Parameters	Frequency***	Type of Sample	Limitation
Temperature	Continuous**	Recorder	90°F (32.2°C) (mon. Avg) 95°F (35°C) (max.)
Chlorine Residual	Daily	Grab	0.01 mg/l

Northwest Florida Water Management District

Route 1, Box 3100, Havana, Florida 32333-9700
(On U.S. Highway 90, 10 miles west of Tallahassee)

(904) 539-5999 • (Suncom) 771-2080 • (Fax) 539-4380

Douglas E. Barr
Executive Director

March 27, 1996

City of Tallahassee
300 South Adams Street
Tallahassee, FL 32301

Consumptive Use Permit Application No. S05211
Individual Water Use Permit No. S960104

Dear Permittee:

Your Individual Water Use Permit was approved by the Governing Board of the Northwest Florida Water Management District at a public hearing on March 28, 1996. The permit issued is subject to the terms and conditions set forth in the enclosed permit document. As you are legally responsible for compliance with the conditions of the permit please read the document thoroughly. Pay close attention to any condition(s) of the permit which require the one-time or periodic submittal of information to the District.

If the property where the withdrawal facility is located changes ownership, you must contact the District to provide for the transfer of the permit to the new owner. If the permit is not transferred you will remain responsible for compliance with the conditions of the permit. A permit transfer request must be made on NWFWMD Form A2-F and approved by the District's Governing Board.

If you have any questions concerning the permit document or if the District can be of any other assistance, please let us know.

Sincerely,

W. G. Gowens, Chief
Bureau of Ground Water Regulation
Division of Resource Regulation

WWG/tp
Enclosure

cc: Thomas Kwader

NORTHWEST FLORIDA WATER MANAGEMENT DISTRICT
INDIVIDUAL WATER USE PERMIT

(NWFWMD Form No. A2-E)

Permit granted to:

City of Tallahassee
Sam O. Purdom Generating Station
300 South Adams Street

Tallahassee, Florida 32301
(Legal Name and Address)

Permit No.: S960104

Date Permit Granted: March 28, 1996

Permit Expires On: March 29, 2003

Source Classification: Floridan Aquifer and St. Marks River

Use Classification: Power Production

County: Wakulla Area: B/C

Application No.: S05211

Location: Section 34 1/4 Section _____

Township 3 South Range 1 East

Terms and standard conditions of this Permit are as follows:

1. That all statements in the application and in supporting data are true and accurate and based upon the best information available, and that all conditions set forth herein will be complied with. If any of the statements in the application and in the supporting data are found to be untrue and inaccurate, or if the Permittee fails to comply with all of the conditions set forth herein, then this Permit shall be revoked as provided by Chapter 373.243, Florida Statutes.

2. This Permit is predicated upon the assertion by the Permittee that the use of water applied for and granted is and continues to be a reasonable and beneficial use as defined in Section 373.019(4), Florida Statutes, is and continues to be consistent with the public interest, and will not interfere with any legal use of water existing on the date this Permit is granted.

3. This Permit is conditioned on the Permittee having obtained or obtaining all other necessary permit(s) to construct, operate and certify withdrawal facilities and the operation of water system.

4. This Permit is issued to the Permittee contingent upon continued ownership, lease or other present control of property rights in underlying, overlying, or adjacent lands. This Permit may be assigned to a subsequent owner as provided by Chapter 40A-2.351, Florida Administrative Code, and the acceptance by the transferee of all terms and conditions of the Permit.

5. This Permit authorizes the Permittee to make a combined average annual withdrawal of **85,288,000** gallons of water per day, a maximum combined withdrawal of **85,374,000** gallons during a single day, and a combined monthly withdrawal of **2,646,000,000** gallons. Withdrawals for the individual facilities are authorized as shown in the table below in paragraph six. However, the total combined amount of water withdrawn by all facilities listed in paragraph six shall not exceed the amounts identified above.

6. Individual Withdrawal Facility Authorization

WITHDRAWAL POINT ID NO.	LOCATION SEC,TWN,RNG	GALLONS/DAY AVERAGE	GALLONS/DAY MAXIMUM
SOP #4	Sec. 34, T3S, R1E		-0-
SOP #6	Sec. 34, T3S, R1E		216,000
SOP #7	Sec. 34, T3S, R1E		216,000
SOP #8	Sec. 34, T3S, R1E		216,000
SOP #9	Sec. 34, T3S, R1E		216,000
SOP/SW #4	Sec. 34, T3S, R1E		7,200,000
SOP/SW #5	Sec. 34, T3S, R1E		72,000,000
SOP/SW #6	Sec. 34, T3S, R1E		72,000,000
SOP/SW #7	Sec. 34, T3S, R1E		61,920,000
SOP/SW#GT	Sec. 34, T3S, R1E		2,937,600

7. The use of the permitted water withdrawal is restricted to the use classification set forth by the Permit. Any change in the use of said water shall require a modification of this Permit.

8. The District's staff, upon proper identification, will have permission to enter, inspect and observe permitted and related facilities in order to determine compliance with the approved plans, specifications and conditions of this Permit.

9. The District's staff, upon providing prior notice and proper identification, may request permission to collect water samples for analysis, measure static and/or pumping water levels and collect any other information deemed necessary to protect the water resources of the area.

10. The District reserves the right, at a future date, to require the Permittee to submit pumpage records for any or all withdrawal points(s) covered by this Permit.

11. Permittee shall mitigate any significant adverse impact caused by withdrawals permitted herein on the resource and legal water withdrawals and uses, and on adjacent land use,

which existed at the time of permit application. The District reserves the right to curtail permitted withdrawal rates if the withdrawal causes significant adverse impact on the resource and legal uses of water, or adjacent land use, which existed at the time of permit application.

12. Permittee shall not cause significant saline water intrusion or increased chloride levels. The District reserves the right to curtail permitted withdrawal rates if withdrawals cause significant saline water intrusion or increased chloride levels.

13. The District, pursuant to Section 373.042, Florida Statutes, at a future date, may establish minimum and/or management water levels in the aquifer, aquifers, or surface water hydrologically associated with the permitted withdrawals; these water levels may require the Permittee to limit withdrawal from these water sources at times when water levels are below established levels.

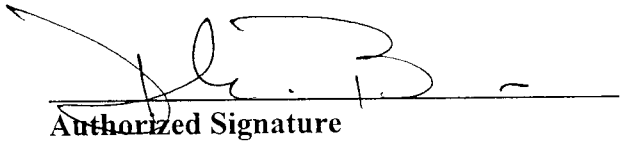
14. Nothing in this Permit should be construed to limit the authority of the Northwest Florida Water Management District to declare water shortages and issue orders pursuant to Section 373.175, Florida Statutes, or to formulate and implement a plan during periods of water shortage pursuant to Section 373.246, Florida Statutes, or to declare Water Resource Caution Areas pursuant to Chapters 40A-2.801, and 62-40.41, Florida Administrative Code

(a) In the event of a declared water shortage, water withdrawal reductions shall be made as ordered by the District.

(b) In the event of a declared water shortage or an area as a Water Resource Caution Area. the District may alter, modify or inactivate all or parts of this permit.

15. The Permittee shall properly plug and abandon any well determined unsuitable for its intended use, not properly operated and maintained, or removed from service. The well(s) shall be plugged and abandoned to District Standards in accordance with Section 40A-3.531, Florida Administrative Code.

16. Any Specific Permit Condition(s) enumerated in Attachment A are herein made a part of this Permit.



Authorized Signature
Northwest Florida Water Management District

ATTACHMENT
City of Tallahassee
Sam O. Purdom Generating Station

Individual Water Use Permit No. S960104
Individual Water Use Application No. S05211

1. The Permittee shall not exceed a withdrawal rate of 250 gallons per minute from the Floridan Aquifer System and shall continue to rotate the pumping of the wells in a manner designed to minimize the impact to the resource and any nearby permitted users.

2. The Permittee shall maintain, in working order, in-line totaling flow meters on all wells.

3. The Permittee shall report, by January 31 of each year, the amount of water withdrawn from each well each day, the monthly maximum daily use of ground water, and the total monthly ground water withdrawal. The first report is due by January 31, 1997.

4. The Permittee shall continue to return all of the surface water withdrawn back to the St. Marks River.

5. The Permittee shall provide for the efficient and non-wasteful use of water, and shall implement water conservation measures designed to enhance water use efficiency and reduce water demand and losses.

NORTHWEST FLORIDA WATER MANAGEMENT DISTRICT
INDIVIDUAL WATER USE PERMIT

(NWFWMD Form No. A2-E)

Permit granted to:

City of Tallahassee
Sam O. Purdom Generating Station
300 South Adams Street

Tallahassee, Florida 32301
(Legal Name and Address)

Permit No.: 960104 - Modification

Date Permit Granted: September 19, 1996

Permit Expires On: September 20, 2003

Source Classification: Floridan Aquifer
St. Marks River

Use Classification: Power Production

County: Wakulla Area: B & C

Location: Section 34 1/4 Section

Application No.: I05359

Township 3 South Range 1 East

Terms and standard conditions of this Permit are as follows:

1. That all statements in the application and in supporting data are true and accurate and based upon the best information available, and that all conditions set forth herein will be complied with. If any of the statements in the application and in the supporting data are found to be untrue and inaccurate, or if the Permittee fails to comply with all of the conditions set forth herein, then this Permit shall be revoked as provided by Chapter 373.243, Florida Statutes.

2. This Permit is predicated upon the assertion by the Permittee that the use of water applied for and granted is and continues to be a reasonable and beneficial use as defined in Section 373.019(4), Florida Statutes, is and continues to be consistent with the public interest, and will not interfere with any legal use of water existing on the date this Permit is granted.

3. This Permit is conditioned on the Permittee having obtained or obtaining all other necessary permit(s) to construct, operate and certify withdrawal facilities and the operation of water system.

4. This Permit is issued to the Permittee contingent upon continued ownership, lease or other present control of property rights in underlying, overlying, or adjacent lands. This Permit may be assigned to a subsequent owner as provided by Chapter 40A-2.351, Florida Administrative Code, and the acceptance by the transferee of all terms and conditions of the Permit.

5. This Permit authorizes the Permittee to make a combined average annual withdrawal of **108,116,000** gallons of water per day, a maximum combined withdrawal of **144,432,000** gallons during a single day, and a combined monthly withdrawal of **4,488,392,000** gallons. Withdrawals for the individual facilities are authorized as shown in the table below in paragraph six. However, the total combined amount of water withdrawn by all facilities listed in paragraph six shall not exceed the amounts identified above.

6. Individual Withdrawal Facility Authorization

WITHDRAWAL POINT ID NO.	LOCATION SEC,TWN,RNG	GALLONS/DAY AVERAGE	GALLONS/DAY MAXIMUM
SOP #4	Sec. 34, T3S,. R1E		-0-
SOP #6	Sec. 34, T3S,. R1E		216,000
SOP #7	Sec. 34, T3S,. R1E		216,000
SOP #8	Sec. 34, T3S,. R1E		216,000
SOP #9	Sec. 34, T3S,. R1E		216,000
SOP/SW #4	Sec. 34, T3S,. R1E		7,200,000
SOP/SW #5	Sec. 34, T3S,. R1E		36,000,000
SOP/SW #6	Sec. 34, T3S,. R1E		36,000,000
SOP/SW #7	Sec. 34, T3S,. R1E		61,920,000
SOP/SW #GT	Sec. 34, T3S,. R1E		2,937,600

7. The use of the permitted water withdrawal is restricted to the use classification set forth by the Permit. Any change in the use of said water shall require a modification of this Permit.

8. The District's staff, upon proper identification, will have permission to enter, inspect and observe permitted and related facilities in order to determine compliance with the approved plans, specifications and conditions of this Permit.

9. The District's staff, upon providing prior notice and proper identification, may request permission to collect water samples for analysis, measure static and/or pumping water levels and collect any other information deemed necessary to protect the water resources of the area.

10. The District reserves the right, at a future date, to require the Permittee to submit pumpage records for any or all withdrawal points(s) covered by this Permit.

11. Permittee shall mitigate any significant adverse impact caused by withdrawals permitted herein on the resource and legal water withdrawals and uses, and on adjacent land use,

which existed at the time of permit application. The District reserves the right to curtail permitted withdrawal rates if the withdrawal causes significant adverse impact on the resource and legal uses of water, or adjacent land use, which existed at the time of permit application.

12. Permittee shall not cause significant saline water intrusion or increased chloride levels. The District reserves the right to curtail permitted withdrawal rates if withdrawals cause significant saline water intrusion or increased chloride levels.

13. The District, pursuant to Section 373.042, Florida Statutes, at a future date, may establish minimum and/or management water levels in the aquifer, aquifers, or surface water hydrologically associated with the permitted withdrawals; these water levels may require the Permittee to limit withdrawal from these water sources at times when water levels are below established levels.

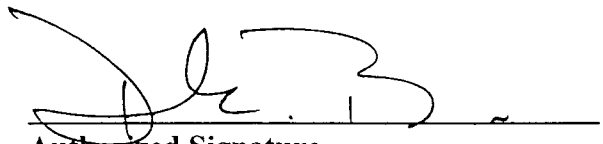
14. Nothing in this Permit should be construed to limit the authority of the Northwest Florida Water Management District to declare water shortages and issue orders pursuant to Section 373.175, Florida Statutes, or to formulate and implement a plan during periods of water shortage pursuant to Section 373.246, Florida Statutes, or to declare Water Resource Caution Areas pursuant to Chapters 40A-2.801, and 62-40.41, Florida Administrative Code

(a) In the event of a declared water shortage, water withdrawal reductions shall be made as ordered by the District.

(b) In the event of a declared water shortage or an area as a Water Resource Caution Area, the District may alter, modify or inactivate all or parts of this permit.

15. The Permittee shall properly plug and abandon any well determined unsuitable for its intended use, not properly operated and maintained, or removed from service. The well(s) shall be plugged and abandoned to District Standards in accordance with Section 40A-3.531, Florida Administrative Code.

16. Any Specific Permit Condition(s) enumerated in Attachment A are herein made a part of this Permit.



Authorized Signature
Northwest Florida Water Management District

ATTACHMENT
City of Tallahassee
Sam O. Purdom Generating Station

Individual Water Use Permit No. 960104
Individual Water Use Application No. I05359

1. The Permittee shall not exceed a withdrawal rate of 300 gallons per minute from the Floridan Aquifer System and shall continue to rotate the pumping of the wells in a manner designed to minimize the impact to the resource and any nearby permitted users.

2. The Permittee shall maintain, in working order, in-line totaling flow meters on all wells.

3. The Permittee shall, by January 31 of each year, submit for ground water withdrawals, a completed Water Use Summary Reporting Form (NWFWMD A2-I) for each month of the previous year. Water use amounts for each well may be calculated using flow meter readings at the plant divided by the pump rate of each well. The calculations must be provided with each submittal. The Permittee shall also submit a statement confirming that all water withdrawn from the St. Marks River has been returned. The first report is due by January 31, 1997.

4. The Permittee shall reference the power plant's wells by their Florida Unique Identification Number when corresponding with the District (pumping reports, etc.).

5. The Permittee shall continue to return all of the surface water withdrawn back to the St. Marks River.

6. The Permittee shall provide for the efficient and non-wasteful use of water, and shall implement water conservation measures designed to enhance water use efficiency and reduce water demand and losses.

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Petition to determine need for proposed electrical power plant in St. marks, Wakulla County, by City of Tallahassee.	DOCKET NO. 961512-EM ORDER NO. PSC-97-0659-FOF-EM ISSUED: June 9, 1997

The following Commissioners participated in the disposition of this matter:

JULIA L. JOHNSON, Chairman
SUSAN F. CLARK
JOE GARCIA

ORDER GRANTING PETITION FOR DETERMINATION OF NEED

BY THE COMMISSION:

On December 20, 1996, the City of Tallahassee (City) filed a Petition to Determine Need for a 250 megawatt (MW) combined cycle generating unit at the existing Purdom site located in St. Marks, Florida. This unit will be fueled by natural gas and is expected to be placed into service by May 15, 2000. Related facilities of the proposed plant include the reconductoring of two existing 115 kilovolt (kV) transmission lines connecting the Purdom site to the City's load center, an upgrade to the existing natural gas metering station, the construction of a waste treatment plant to allow the proposed unit to use treated sewage effluent from the city of St. Marks, and the possible addition of four miles of gas transmission pipeline.

The Legal Environmental Assistance Foundation (LEAF), Enpower, Inc. (Enpower), and LS Power LLC (LS Power) were granted leave to intervene in this proceeding. LEAF filed a Notice of Withdrawal from this proceeding on March 21, 1997. A hearing was held on April 3-4, 1997. Following the hearing, the parties filed post hearing statements.

The procedural aspects of the case are governed by the provisions of Chapter 120, Florida Statutes, and Chapter 25-22, Florida Administrative Code. The substantive aspects of this case are governed by Section 403.519, Florida Statutes, which contains

the following five areas for consideration by the Commission in determining the need for an electrical power plant: (1) the need for electric system reliability and integrity; (2) the need for adequate electricity at reasonable cost; (3) whether the proposed plant is the most cost-effective alternative available; (4) conservation measures taken by or reasonably available to the applicant which might mitigate the need for the proposed power plant; and (5) other matters within the Commission's jurisdiction which it deems relevant.

SUMMARY OF DECISION

We find that the City of Tallahassee's petition for determination of need for a 250 MW natural gas-fired combined cycle unit shall be granted. The City's petition for determination of need meets the statutory requirements of Section 403.519, Florida Statutes. As a result of the expiration of the City's two purchase power contracts, the City has a need for a minimum of 88 MW of capacity beginning in the year 2000. The City conducted a Request for Proposal process which identifies the City's self-build proposal (the Purdom Unit 8 project) as the most cost-effective alternative available to the City. The City Commission has ordered its staff to conduct a market test of short-term purchased power alternatives. If the market test identifies a more cost-effective alternative, the City should delay construction of Purdom Unit 8.

I. NEED FOR CAPACITY

We find that the City does have a reliability need for 88 MW of capacity in the year 2000, as a result of the expiration of the City's purchase power contract with Southern Company for 75 MW. The need for capacity is further impacted by the expiration of the City's contract with Entergy for 25 MW in the year 2002.

In order to determine whether it needs more capacity, the City used a capacity reserve margin criteria of 17% of forecasted peak system summer demand based on an assisted loss of load probability (LOLP) of 0.1 days per year. We find that this criteria is appropriate.

Prior to June 1995, the City used a 20% reserve margin as its reliability criteria. In 1995, the City contracted with R.W. Beck to perform a system reliability study. (EXH 18, p. 1) This system

reliability study used the industry guideline of a LOLP of 0.1 days per year. The study indicated that a 0.1 LOLP could be achieved by maintaining capacity reserves of 17% above forecasted peak system summer demand. This is consistent with industry guidelines, regional reliability requirements, and the reliability criteria used by other municipal utilities in the state. (EXH 2, p. 95)

The forced outage rates of the City's generating units' are higher, on average, than the industry standard. However, the City has initiated a corrective maintenance program to reduce forced outage rates. (EXH 18, p. 1) Also, forced outage rates reported in the need study were overstated due to several bookkeeping errors. The combination of the new maintenance programs and the bookkeeping corrections has resulted in forced outage rates which, according to the City, are significantly lower than those reported in the need study. (TR 434) In recognition of these improvements, R.W. Beck set the City's forced outage rates equal to the industry standard in the system reliability study. (TR 204) The assumption regarding forced outage rates in the City's reliability study appears reasonable. If the City's generating units' forced outage rates are higher than the industry standard in the future, the capacity reserves necessary to achieve the required 0.1 LOLP could be higher than 17%.

We find that the load forecast used by the City of Tallahassee to determine its need for a 250 MW unit is reasonable for planning purposes. The City's load forecast includes separate summer and winter peak demand models developed by R.W. Beck. These models include variables such as maximum/minimum temperatures, air conditioning/heating saturation rates, the residential price of electricity, and the total number of residential customers. These variables represent reasonable components of a load forecast model. Furthermore, the projected growth rates in peak demand are consistent with historical growth patterns. The City used historical data which is more than seven years old in its methodology that was used to produce the load forecast (Tr 367-369; EXH 26; EXH 28), however, the difference in values using more recent data yielded only minor differences from the City's forecast.

The City has a reliability need for additional capacity in the year 2000, but not a need for the full 250 MW of additional capacity expected to be supplied by the proposed Purdom Unit 8. The minimum amount of capacity the City needs to maintain a 17%

summer reserve margin is 88 MW in the year 2000 and increases to 187 MW in the year 2005. (EXH 2, p. 29)

The primary factor driving the City's forecasted need for capacity is the loss of 100 MW of firm capacity purchases -- 75 MW from Southern Company ending in the year 2000, and 25 MW from Entergy ending in the year 2002. By its own admission, the City is not expected to need the full 250 MW until the year 2007 (TR 374), but the City argues that it has an "economic" need for 250 MW of capacity in the year 2000.

Section 403.519, Florida Statutes, requires the Commission to consider conservation measures taken by or reasonably available to the applicant when deciding whether the proposed plant is needed. We find that there are no conservation measures reasonably available to the City of Tallahassee which might mitigate the need for the proposed combined cycle unit.

The City's 1996 DSM Plan, filed with the Commission on March 1, 1996 in Docket No. 950448-EG and approved by Order No. PSC-96-0716-FOF-EG, issued May 28, 1996, contains five residential programs and five commercial programs. The City's DSM strategy is to reduce electric demand, predominately winter peak demand, and annual energy consumption primarily through natural gas substitution programs. Low-interest loans are offered to residential and commercial customers for the installation of more efficient electric and natural gas-fired equipment. The City also provides energy audits, energy information, and a residential low-income ceiling insulation program. The City's DSM programs are expected to reduce peak demand by an additional 7.9 MW (summer) and 23.2 MW (winter) by the year 2000, the in-service date of Purdom Unit 8. (TR 122; EXH 2, pp. 69-79) The savings of these programs are already included in determining the City's need for a minimum of 88 MW of capacity in the year 2000.

We believe that the City has adequately demonstrated that it does have a need for additional capacity, which cannot be mitigated by reasonably available conservation measures. With respect the City's argument that it has an economic need for 250 MW, we note that it is not unusual for a utility to grow into the capacity of a large generating unit. In addition, as discussed in the section on cost-effectiveness, constructing the proposed combined cycle unit in separate stages to better match the City's capacity needs appears to be more costly than building the unit in one stage.

II. COST-EFFECTIVENESS

Section 403.519, Florida Statutes, requires that we take into account whether the proposed plant is the most cost-effective alternative available. Therefore, when a utility identifies a need for additional capacity, it should seek out all potential alternatives to assure that the need is met in the most cost-effective manner possible.

Prior to issuing the Request for Proposals (RFP), the City began the process of screening various generating technologies and other resources for evaluation in Integrated Resource Planning (IRP) studies. As discussed below, we reviewed the City's IRP studies and conclude that the City has adequately explored alternative generating technologies to determine the technology which would best meet its need for power.

In 1993, the City began an initial technology screening, which resulted in a short-list of viable supply-side options for the City's system. The four classes of technologies considered included coal-fueled, oil/gas fueled, renewable and repowered existing generation. Coal-fueled options were eliminated due to "uncertain operating economics compared to natural gas, permitting risk, and the financial risks associated with the relatively higher capital costs." (EXH 2, pp. 23-24) The screening process also eliminated municipal solid waste generation and photovoltaics due to the high cost of these technologies. The resource options which the City considered to be viable generating alternatives as a result of its initial technology screening included several generic oil/gas-fueled resource options, the repowering of units at the City's Purdom site, and fuel cells. While the capital cost of fuel cells is currently high, the City believed it was appropriate to retain fuel cells because technological improvements may reduce the cost of fuel cells in the future. (EXH 2, p. 24)

These technology options were then used in a Benchmarking IRP study to determine if the IRP process was an acceptable planning tool for the City. Upon finding the IRP process acceptable, the City began an Initial IRP study in February 1995 which included both the supply-side options which were considered viable alternatives and several demand-side options. The generic supply-side and repowering technology options were updated to reflect current information. The supply-side technologies used in the Initial IRP study included several generic oil/gas-fueled options, the repowering of Hopkins Unit 1, and a wood-burning unit. (EXH 2, pp. 25-27) The Initial IRP study resulted in a least cost plan which selected a high-efficiency combined-cycle unit as the next

generating unit, combined with additional demand-side management programs, the repowering of Hopkins Unit 1 in 2004 and a combustion turbine in 2011. The results of this Initial IRP study were used in the development of the City's RFP. (EXH 2, p. 26)

The City performed a final IRP study in 1996 with updated data, including the replacement of some of the generic options with the short-listed RFP proposals. To ensure that coal-fueled supply options had been appropriately excluded by the initial technology screening, coal-fueled options were further reviewed in the 1996 IRP study. The results of this study demonstrated that the potential savings attributed to a coal-fueled option under a high natural gas price scenario are low relative to the risks associated with the high capital costs. (EXH 2 pp. 52-53)

We also believe that the City has adequately explored and evaluated the availability of non-utility generation, including cogeneration. The City did not include any generic cogeneration in its IRP for evaluation (TR 181), however, the City has had ongoing discussions with some of its largest customers regarding cogeneration and retail wheeling. (TR 225) Witness Brinkworth testified that the City has also talked with these large customers about retail rates and service options that might result in retaining those customers on the City's system. (TR 181) Mr. Brinkworth also stated that the City would not encourage a customer to leave its system, even though a loss of load sensitivity in the City's risk analysis shows a reduction in the City's revenue requirements. (TR 182) The City's hesitancy to lose a large customer probably stems from the fact that while revenue requirements may be reduced, rates to all customers would increase. There is no evidence in the record, however, that indicates any cost-effective self-service generation alternatives are available to the City.

On August 31, 1995, the City released its RFP for the Supply of Electric Capacity and Energy. The RFP solicited proposals for purchased power and/or generating projects in amounts from 10 MW to 250 MW. At the October 16, 1995 due date, the City received five proposals from external suppliers along with two alternatives which were developed by the City. The City evaluated each of these proposals and identified the Purdom Unit 8 proposal developed by the self-build team to be the most cost-effective.

The City's RFP gave bidders the option to submit a fixed-price, guaranteed bid or a bid which passed through fuel costs to the City's ratepayers. Constellation/Enpower, LS Power, and Applied Energy Services (AES) all bid fixed-price proposals for 250 MW class combined cycle units. These external bids were evaluated

against the City's Purdom Unit 8 self-build option, using a pass-through of fuel costs. LS Power subsequently withdrew its proposal from further consideration. Exhibit 25 contains the annual and cumulative present worth revenue requirements (PWRR) of the AES, Constellation/Enpower, and Purdom Unit 8 proposals. These values include additional transmission costs needed to facilitate the City's ability to accept the capacity from each project. The 20-year, cumulative PWRR of each proposal, are shown below:

- Purdom Unit 8: $530,627,000
- AES: $622,298,000
- Constellation/Enpower: $693,728,000

The results of the PWRR analysis clearly indicate that Purdom Unit 8 is the most cost effective alternative of the RFP responses. However, the parties have expressed several concerns relating to the City's self-build proposal, the bid evaluation process, and the RFP requirements which we address below.

Enpower alleges the City's self-build project had an unfair advantage because it relied on natural gas prices which differed from those contained in the RFP. (TR 513) The natural gas prices contained in each proposal were made in the same time frame, reflecting each supplier's perception of the natural gas market. Constellation/Enpower and LS Power made the decision to bid a fixed-price, guaranteed contract in the hopes that risk aversion would favor their proposals.

To test Enpower's allegation that the City gained an unfair advantage by its non-use of the RFP natural gas prices, the City was requested to re-evaluate the cost of Purdom Unit 8 using RFP natural gas prices. This re-evaluation, also contained in Exhibit 25, resulted in a 20-year cumulative PWRR cost of $640,289,000. It should be noted that, both on an annual and cumulative basis, Purdom Unit 8 with RFP gas prices was still more cost-effective than Constellation/Enpower's original bid.

After the City completed its cost-effectiveness analysis, R.W. Beck reviewed the City's evaluation. R.W. Beck recommended some minor adjustments to the City's calculations, including the addition of omitted pipeline usage and compressor charges, the correction (reduction) of the City's debt service value, and an increase in Purdom 8's forecasted O&M costs. The net sum of these adjustments was an increase in Purdom Unit 8's cumulative PWRR cost by approximately $7 million. (EXH 18, p. 37; TR 198) The City agreed with these adjustments, and we find that they are appropriate. These adjustments do not change the ranking order of the projects.

Since the City's self-build proposal is not a fixed-price bid, the remaining question is whether the self-build option is sufficiently lower than the next lowest bid to withstand sensitivities. The City analyzed the impact of higher than forecasted natural gas prices, variations in economic assumptions, and the loss of 50 MW of load. Under each of these variations, Purdom Unit 8 was still the most cost-effective alternative. (EXH 2, p. 47; TR 329-330) Only if all of these risks and sensitivities occurred at once would Purdom Unit 8 cost more than the next lowest bid, AES. This event is unlikely.

The City was requested to analyze the cost-effectiveness of phasing the construction of Purdom Unit 8 to better match the City's need requirements. The analysis showed that phased construction cost $29 million more than the full installation of Purdom Unit 8 in 2000. (EXH 24, pp. 26-27) System fuel benefits from the early retirement of Purdom Units 5 and 6 outweigh the up-front capital cost of full construction. The City's analysis appears reasonable.

Enpower also alleged the City revised its bid but did not allow external bidders to revise and improve their proposals throughout the evaluation process. Since all three external bidders submitted fixed-price proposals, the City's decision to not consider subsequent, unsolicited proposals by Enpower after the RFP had closed appears to be reasonable. The City added the costs identified by R.W. Beck as appropriate and updated its fuel forecast projections. These costs, however, did not affect the cost-effectiveness ranking of the competing alternatives.

A RFP process must have closure at some time. The City's RFP required bids to be submitted by October 27, 1995. (EXH 4) However, Constellation/Enpower continued to submit revised bids long after this date. Although the City did not accept these subsequent revisions as legitimate bids, it evaluated them anyway as a sanity check. Enpower took over sole possession of Constellation's project after it withdrew from the process on April 9, 1996. (EXH 40, pp. 16-17; TR 621). Only the last price change submitted by Enpower appeared to cost less, by approximately $5 million on a cumulative PWRR basis, than Purdom Unit 8. (TR 623) However, Enpower could not supply the annual revenue requirements associated with its subsequent non-solicited bids. Furthermore, Enpower did not provide any supporting documentation for its claims, and it incorrectly assumed 100% debt, tax-free financing (TR 569-572) and exemption from ad valorem taxes. (TR 572) These assumptions are completely incorrect for a private sector project.

Enpower asserts that the bid evaluation process did not consistently treat the factors of risk, capital costs, financing costs, fuel costs and transmission system reliability when compared to the City's self-build proposal. As previously stated, Enpower submitted a fixed-price, guaranteed proposal in the hope that risk aversion would favor its project. However, the City performed several sensitivities to its base case proposal in an effort to assess the risk associated with the City's self-build proposal. We believe that the City correctly and consistently evaluated the City's self build proposal and the external bids as filed. (EX 47)

Enpower expressed concern with the RFP requirement that all external proposals located outside the City's service territory must secure their own transmission service. Mr. Brinkworth testified that the City made this decision to ensure that its transmission connections with Florida Power Corporation (FPC) and Southern Company remained available to meet contingencies such as loss of the City's largest unit. (TR 189-190) By the year 2000, the City's import capability from the Southern Company is expected to decrease from 225 MW to 175 MW. Since Enpower, LS Power, and AES all proposed projects in the 250 MW range, their use of the City's transfer capability would have precluded the City from buying emergency power if needed. Thus, we believe that this RFP requirement addressed a legitimate strategic concern, and it was reasonable for the City to chose to retain its transfer capability to serve its customers in the event of a loss of a large generating unit.

Enpower states that other onerous bid requirements resulted in a poor RFP response, in that only five external bids were received by the City. Enpower's witness Smith testified that approximately 40 companies attended the City's pre-bid conference, and 30 of these firms were there to sell system power. (TR 530) It is not clear how Mr. Smith was able to conclude that 30 of these companies were there to sell system power. The small number of proposals submitted is not, in and of itself, an indication that the RFP was flawed or unfair. City witness Wailes pointed out that the City has inherent advantages over privately developed projects with its tax-exempt financing and also pointed out the fact that the City has an existing power plant site with existing infrastructure. (TR 719)

Enpower and LS Power alleged that the RFP's requirement that resource proposals must provide for a minimum of 11 years may have eliminated consideration of viable short-term options to the construction of Purdom Unit 8. A similar concern was expressed during the RFP drafting process by a City employee.(EXH 23)

The City cites two primary reasons for the 11-year term requirement in its RFP: (1) ensures "stability" of the City's resource portfolio, because the City believes that potential volatility of purchased power markets may expose the City to "undue power supply uncertainty" during the 11-year period (TR 156, 165, 179); and (2) coincides with the retirement of Purdom Unit 7. (TR 618, 718)

The City's belief that purchased power markets are uncertain was discussed by the City's witness Brinkworth who testified that the City performed an informal analysis of the availability of purchase power and concluded that capacity margins in the southeast will decline after the year 2000. This conclusion was based partially on the most recent Southeastern Reliability Council (SERC) IE-411 report which gives existing and proposed capacity by utility in the southeast for a ten-year period. (TR 642) Mr. Brinkworth conjectured that purchased power could therefore be more expensive because it would be based on the cost of more expensive units than the ones that currently represent surplus capacity. (TR 642) Although this is speculative, it demonstrates that the City gave some consideration to regional availability and price of purchased power over the next several years.

During the RFP process, the City issued an RFP addendum which allowed potential bidders to submit purchased power bids lasting less than 11 years. (EXH 4, TR 70) For any bid that did not meet the 11-year requirement, the City proposed to add "generic supply options" to the bid until that particular resource plan meet the eleven year requirement. (EXH 2, p.39) We believe this is appropriate. The City will need resources beyond the short-term purchase, therefore, short-term solutions cannot be looked at in a vacuum.

In addition, the City analyzed 15 combinations of simulated purchased power alternatives. (EXH 29, pp. 1-2) Four of these cases represented short-term solutions. The results indicate that Purdom Unit 8 would be more cost-effective than these simulated cases.

At the hearing, Enpower offered a copy of a short term purchase agreement between Florida Municipal Power Authority (FMPA) and Tampa Electric Company (TECO) as evidence that there are cheaper purchased power alternatives than Purdom Unit 8. (EXH 48, TR 656) The agreement is dated October 2, 1996, so it represents recent market conditions. Mr. Brinkworth explained why this contract actually represented more costly power than the City's own Purdom Unit 8 proposal. (TR 650-660) On a comparable basis, the cost for Purdom Unit 8 is $25.90 per megawatt-hour and that for the

FMPA-TECO deal is $30.73. (TR 660) We agree that Mr. Brinkworth's comparison is appropriate.

While it is true that the RFP itself did not comprehensively test the short-term purchased power market, we believe the record in this case shows that the City has adequately addressed the short-term purchase issue. Since the short-term market can change quickly, a prudent utility would continue to test the market before committing to build a generating unit. The City Commission has recognized this concern and as a result, has ordered the City staff to conduct a market-test of short-term purchase power opportunities before committing construction funds for Purdom Unit 8. (TR 640-641) If a more cost-effective alternative is identified, the City will delay the construction of Purdom Unit 8. However, based on the record in this proceeding, we find that Purdom Unit 8 appears to be the most cost-effective alternative available to the City. The record reflects that the allegations and criticisms lodged by Enpower and LS Power are without merit.

III. PROJECT-SPECIFIC CRITERIA

We find that the information provided by the City on the site, design and engineering characteristics of Purdom Unit 8 was sufficient to permit a meaningful evaluation of the proposal. In addition, we find that the City appropriately considered whether any associated facilities and transmission improvements are required and included their costs in the proposal. As discussed below, the Purdom Unit 8 proposal contains specific details on each component of the plant, and the associated facilities to allow us make an informed decision.

Purdom Unit 8 will consist of a General Electric combustion turbine, heat recovery steam generator (HRSG), and steam turbine generator. This combined cycle technology is highly efficient because it recovers the exhaust heat from the combustion turbine and uses that heat to generate steam for the steam turbine. Purdom Unit 8 has an average efficiency which is approximately 40% better than the City's existing generating units. Purdom Unit 8 will be constructed under a fixed-price turn-key contract with Raytheon, Inc. (TR 406, 409, 418) The associated facilities are: the addition of a treated sewage effluent line associated with the zero-discharge water treatment system; the reconductoring of two existing transmission lines; and, a possible upgrade to a natural gas line.

The Engineering, Procurement and Construction (EPC) contract price for Purdom Unit 8 is $98,889,000. (TR 410) The contract includes guarantees for heat rate, output and schedule, and provides for liquidated damages of up to $29 million, or 30% of the contract price, if Raytheon fails to meet these guarantees. Under the fixed-price turn-key contract, approximately 91% of the initial capital costs are fixed and guaranteed. The contract provides for bonuses if Raytheon performs better than expected on the heat rate (lower than 7,020 BTU/kWh) and on the schedule. These bonuses are capped at $875,000. (TR 411-412) The total capital cost of the Purdom Unit 8 project, including contingencies, financing costs and transmission line upgrades, is approximately $122,659,572, or $489/kW. (EXH 2, p. 102)

The total capital cost of Purdom Unit 8 includes $23,770,572 of costs that are not included in the guaranteed-price EPC contract with Raytheon and are subject to variations. These costs include the following:

Permitting Costs: $2,750,000

During the initial design of the self-build alternative, the City reviewed the applicable land development codes and building requirements for the St. Marks area, which included the flood ordinances for the City of St. Marks and the appropriate building codes. These flood ordinances and building codes are based on a 100-year flood plain study. (TR 421, 428)

Gas Transportation Upgrade Costs: $1,350,000

Depending upon the final design of the project, some upgrades may be required to the Florida Gas Transmission (FGT) metering station located at the Purdom facility and the St. Mark lateral. (TR 409, 429) These upgrades are required due to the increased natural gas flow requirements. The costs of this upgrade, along with the relocation of the metering and the regulating station on the site, were estimated at $1,350,000. (EXH 2, p. 102, TR 429)

Spare Parts Costs: $3,442,569

These are the initial spare parts that are included in the direct project costs of Purdom Unit 8. (TR 413)

City's Labor Costs: $1,503,000
Performance Testing Support Costs: $100,000
Office and Warehouse Renovations Costs: $125,000

These are direct project costs of Purdom Unit 8. (TR 413)

Transmission Interface and Line Upgrades Costs: $1,450,000

The construction of Purdom Unit 8 will require no new transmission lines. However, two of the three existing 115 kV transmission lines serving the Purdom site will be reconductored to increase transmission capability. (TR 407-408) The required transmission line improvement costs are estimated at $1.3 million. (EXH 2 p. 51) As Enpower correctly points out in its position, this cost was omitted from the City self-build team's original bid. However, the City's evaluation team developed transmission costs for Purdom Unit 8 and each of the external proposals, as specified by the RFP. (TR 667) Transmission upgrade costs were not included in Phase II of the project analysis, the static analysis of costs at the busbar, from which the short list of proposals was selected. However, because the transmission upgrade costs are small relative to the total costs of each project, inclusion of these costs would not have changed the ranking of the proposals. (TR 376) Transmission upgrade costs were appropriately included in the project costs during the dynamic analysis of each of the proposed projects in Phase III. (TR 667)

Tower Relocation Costs: $250,000

Purdom Unit 8 will utilize closed-loop cooling with a new cooling tower. This cooling tower will eliminate the need for once-through cooling water from the St. Mark River. (TR 408)

Effluent Lift Station Costs: $250,000

Purdom Unit 8 will require the addition of a treated sewage effluent line, approximately one mile in length, connecting the City of St. Marks' sewage treatment plant to the Purdom site. (TR 429) This effluent line is associated with the zero-discharge water treatment system and will facilitate the reuse of treated sewage effluent from the City of St. Marks. The sewage effluent line and pumping station costs are estimated at $250,000. (EXH 2, p. 102)

Potable Water System Costs: $25,000

Purdom Unit 8 also includes a zero discharge wastewater treatment facility which results in no water discharge to the St. Marks River from Unit 8. This also allows for the elimination of three existing permitted discharges that currently flow into the St. Marks River, and allows for the elimination of groundwater withdrawals from the Purdom well fields. (TR 408)

Capitalized Interest Costs: $11,525,003

This is the expected debt service on bonds to finance the construction of Purdom Unit 8. (TR 446, 450).

Contingency Costs: $1,000,000

These dollars account for miscellaneous contingencies which may increase the installed cost of Purdom Unit 8. (TR 413)

We find that the City reasonably considered the costs of environmental compliance when it evaluated the Purdom Unit 8 proposal. In March, 1997, the City submitted its site certification application to the Department of Environmental Protection (DEP). On March 14, 1997, the City received notice that its filing was complete (TR 428) which indicates that the DEP determined that the City's filing included all information needed to evaluate the environmental issues and environmental compliance costs.

Enpower raised questions in two areas relating to environmental impacts associated with Purdom Unit 8: the costs of site clean-up of contaminated soil, and the cost-effectiveness of hurricane-proofing the unit. Remediation of contaminated soil was shown to be a pre-existing condition of the Purdom site and, therefore, not part of the costs associated with adding Unit 8. (TR 676-677; EXH 35) Enpower's witness admitted to this fact. (TR 603) The potential cost increase for hurricane-proofing arguments were directed to meeting design requirements for a 23-foot flood level and proper design of natural gas tanks. (TR 493, 499-501) However, no natural gas tanks are proposed for the Purdom site. All fuel oil tanks are flood-proofed at or above the 100 year mark, or 12.4 feet above sea level, as required for flood insurance. (TR 677, 681) The proposed turbine area is to be either constructed to 12.4 feet above sea level, or flood-proofed to that elevation. (TR 421-422, 493, 679-680) This appears reasonable because, as Enpower's witness discussed, the building requirement at the St. Marks site is the 12 foot elevation. (TR 487) There would be additional costs to build to a higher flood level, however, there is no requirement at the proposed site to build to a higher flood level than the 100 year mark.

We believe the City reasonably considered the costs of environmental compliance when it evaluated its future generation needs. The RFP required each respondent to state that its project would comply with all existing environmental requirements.

Therefore, the City assumed environmental compliance costs were included in the RFP responses. In July, 1996, the City Electric Staff and R.W. Beck presented to the City Commission an analysis which showed a $91 to $84 million cumulative net present value saving with the Purdom Unit 8 project over the other generation options. (TR 141; EXH 3, p. 1) As a result, the City Commission determined that the economic differential was so substantial that the non-price evaluation contemplated by the FRP (TR 209-210) was no longer needed. (TR 142, 199)

We find that Purdom Unit 8 will contribute to the provision of adequate electricity to the City and Peninsular Florida at a reasonable cost. Given that the City needs substantially less than 250 MW in the year 2000, Purdom Unit 8 will exceed the requirement for the provision of adequate electricity to the City. The 250 MW of additional capacity from Purdom Unit 8 will comprise 0.54% of the current aggregate capacity of Peninsular Florida's utilities. (EXH 2, p. 118) Thus, Purdom Unit 8 will minimally contribute to the provision of adequate electricity to Peninsular Florida. Whether or not Purdom Unit 8 contributes to the provision of reasonable cost can best be answered by determining whether the proposed unit is the most cost-effective alternative. As discussed previously, we find that the City has demonstrated that Purdom Unit 8 is the most cost-effective alternative.

We find that the Purdom Unit 8 contributes to the electric system reliability and integrity of the City of Tallahassee and Peninsular Florida. The addition of this unit will enable the City to meet and exceed its 17% reserve margin reliability criterion, and will minimally contribute to the reserve margin for Peninsular Florida. If placed into service as planned in the year 2000, Purdom Unit 8 will add 250 MW of capacity to the City's system at a time the City needs only 88 MW. (EXH 2, p. 29) The addition of 250 MW will more than contribute to the reliability and integrity of the City's electric system, as the City's capacity need is not forecasted to exceed 250 MW until 2007. (TR 374). Exhibit 2 illustrates that, assuming that the only change to the City's existing capacity resources is the termination of the Southern and Entergy purchased power contracts, the City has an immediate capacity need in the year 2000.

Purdom Unit 8, however, is expected to add only minimally to the reliability of Peninsular Florida's electric grid. Witness Brinkworth testified that, after Purdom Unit 8 is added, Peninsular Florida's reserve margin is expected to continue to decline toward

15%. (TR 126) There is no Commission or state policy which establishes a minimum reserve margin for Peninsular Florida. Peninsular Florida's summer peak demand is expected to increase from 30,537 MW in 1995 to 35,844 MW by 2004. (EXH 46, pp. 11-12) However, the capacity resource margins for the Peninsular Florida subregion are expected to be adequate during this period; therefore, Purdom Unit 8's minimal contribution to the reliability of Peninsular Florida causes no concern.

Purdom Unit 8 will not contribute to fuel diversity for the City system, or for Peninsular Florida; however, this is mitigated by other factors. The majority of the City's existing generation is fueled by natural gas, therefore, replacing purchased power with new gas-fired capacity from Purdom Unit 8 will further reduce the City's fuel diversity. (EXH 18, pp. 26-27) Purdom Unit 8 will not provide any fuel diversity advantage to the City in the form of reducing the risk of natural gas price increases or reduced availability. However, Purdom Unit 8 is expected to be highly efficient, with a heat rate of 7040 BTU/kWh (EX 2, p. 103); thus, it will require less natural gas to generate a unit of energy than the City's existing units. Even with the addition of Purdom Unit 8, the percentage of Peninsular Florida's natural gas-fired generation is expected to increase only from 19.5% in 1999 to 19.6% in 2000. (EXH 18, pp. 29-30) Also, the additional capacity from Purdom Unit 8 is small relative to the total capacity of Peninsular Florida's utilities. (EXH 46, pp. 11-12)

IV. FUEL SUPPLY, TRANSPORTATION AND STORAGE

We find that the fuel price forecasts used by the City as an input for the Benchmarking, Initial, and 1996 IRP studies are reasonable for planning purposes. The City relied upon three separate sets of fuel prices to conclude that Purdom Unit 8 was the most cost-effective alternative. (TR 371; EXH 2, Appendix 3, p. 19)

For the Benchmarking IRP study, which screened various types of supply-side and demand-side resources, the City used a March, 1993 internal forecast of fuel prices. In the Initial IRP study, which determined the type and timing of resource additions, the City used fuel price forecasts prepared in February, 1995 by ICF Resources, Inc. (ICF). (TR 371, EXH 24, pp. 42-45) ICF provided low, medium, and high price scenarios for natural gas, residual oil, and distillate oil, and a single price forecast for coal. Although the City does not currently own any coal-fueled

generation, and coal-fueled generation alternatives were eliminated during the Benchmarking IRP study, the City forecasted coal prices to assess the current and future costs of coal-based energy purchases (EXH 2, p. 89)

For the 1996 IRP study, the City used fuel prices which were derived from several sources. Fuel prices for residual oil, distillate oil, and coal were contained in the forecast prepared by ICF in February, 1995. (TR 265-268; EXH 24, pp. 42-45) The natural gas price forecast was derived from existing contract prices, recent bid responses, general industry forecasts, forecasts from ICF, and the NYMEX natural gas futures market. In August, 1995, the City released a Request for Bids (RFB) for the supply of natural gas to be used by the City's Self-Build Development Team as the fuel supply associated with Purdom Unit 8 (EXH 2, p. 83; EXH 2, Appendix 3, p. 19) The City selected RFB responses from two suppliers as "finalists": AGS (now PanEnergy) and Natural Gas Clearinghouse (NGC). (TR 259-260) The AGS bid was chosen by the City as the basis for its natural gas price forecast. (EXH 2, Appendix 3, p. 19) Although the City's natural gas price forecast is significantly lower than most external forecasts, the City considered this actual, competitive offer to be the best current indicator of future natural gas prices. (EXH 2, p. 84) The City also believes that long-term price bids typically include a risk premium in the later years, and thus represent a conservative (high) estimate of actual future prices. (TR 264)

Enpower claims, contrary to the City's testimony (TR 300), that the original City bid states "The Associated Gas pricing is subject to escalation during the evaluation period" (EXH 43, p. 20) This statement is true, but misleading. The escalation in the AGS bid is tied to the change in the "NYMEX 18-MONTH STRIP PRICE FOR NATURAL GAS FUTURES" index from October 16, 1995 to the date on which the gas contract is awarded. When the City's Self-Build Team submitted its bid on November 27, 1995, the change in the NYMEX 18-MONTH STRIP was a minus 0.020. This would result in a decrease in the AGS bid. (EXH 43, p. 20)

Enpower further asserts that the City's fuel forecasts have been altered significantly and have never been consistently applied to all of the bidders. However, we believe that the City did not alter its fuel price forecasts significantly. The Self-Build Team stated in its bid that "(w)e recommend the use of the Associated Gas pricing for this project, with the Natural Gas Clearinghouse pricing as a cap price for the natural gas". (EXH 43, p. 20) The

City's Evaluation Team then analyzed the Self-Build Team's bid based upon a fuel price forecast which utilized just the AGS bid as the price forecast. (EXH 2, Appendix 3, p. 19) During discovery, the City analyzed the cost of the Self-Build Team's bid along with the remaining alternatives with natural gas prices based upon escalation factors found in the City's RFP. (EXH 24, pp. 30-35) The intent of each "alteration" was to ascertain that the City's Self-Build alternative would remain the most cost-effective under increasingly more conservative natural gas price forecasts.

In summary, we believe the fuel price forecasts used as inputs for the Benchmarking, Initial, and 1996 IRP studies appear reasonable for planning purposes. For each fuel price forecast, we analyzed each fuel's year 2000 delivered price and its escalation rate during the forecast horizon. In addition, we performed a more detailed analysis of the City's natural gas price forecast in the 1996 IRP study, since natural gas is the primary fuel for the proposed Purdom Unit 8.

We also find that the City has provided adequate assurances regarding available primary and secondary fuel to serve the proposed facility on a long and short term basis at a reasonable cost. The City has identified two responses to its RFB who are both capable and willing to supply up to a maximum daily bid quantity in excess of the incremental natural gas requirements of the proposed Purdom Unit 8. The City also possesses capacity to store sufficient quantities of its secondary fuels (Nos. 2 and 6 fuel oil) systemwide.

The City's August, 1995 RFB for natural gas to supply Purdom Unit 8 generated proposals from ten respondents. (TR 275, 283) The two bidders who were short-listed are both capable and willing to supply up to a maximum bid quantity of 45,000 MMBTU daily, which exceeds Purdom Unit 8's expected requirements. (TR 260, 269; EXH 20, pp. 7-44) Both bidders have since updated their offers, and the City believes that it can purchase natural gas from either bidder at a lower cost than provided in each original bid. (TR 259-260; EXH 19, p. 1) The City has not executed a fuel supply contract since the City believes it would be imprudent to enter into a long-term natural gas supply this far in advance of the commencement of construction of Purdom Unit 8. (TR 261, 288) The City currently expects to finalize a gas supply contract closer to the beginning of construction in March or April, 1998. (TR 261, 288) We believe that this decision by the City is reasonable and prudent due to the many changes in the type and timing of the proposed unit which

could occur between the RFB response and construction of the proposed unit begins.

The City will use one percent sulfur No. 6 (residual) oil primarily as a backup fuel for Purdom Unit 8. The City can store oil at its generating plants, so this fuel is available during emergencies when natural gas may not be available. On rare occasions, when oil prices are less than natural gas prices, residual oil can displace natural gas for short durations. Low sulfur No. 2 (distillate) oil is also stored on-site at the generating plants and used as a backup fuel. Distillate oil is usually more expensive than residual oil; therefore, distillate fuel oil is used less frequently than residual fuel oil. (TR 269)

Currently, the City's storage capacity for residual oil is 152,000 barrels at the Purdom site and 380,000 barrels systemwide. (EXH 20, pp. 2-3) However, one of the existing tanks at the Purdom site will be converted to a wastewater storage tank. (EXH 2, p. 83) Therefore, the City's storage capacity for residual oil will fall to 97,000 barrels at the Purdom site and 325,000 barrels systemwide. The City does not have any current plans to expand backup fuel storage capacity to meet increasing peak demand requirements. (EXH 20, p. 3) For reliability purposes, the City maintains 200,000 barrels systemwide (EXH 20, p. 3) which represents sufficient fuel to replace all steam generation gas requirements on an average day of the system's peak month and 33 MW of spinning reserve for approximately 18.5 days. (EXH 2, p. 82) Since the City estimates that additional oil supplies can be delivered to the Purdom site within 15 days, the City would re-order more oil when its residual oil inventory falls below a 15-day supply. (EXH 2, p. 82)

Also, the City's storage capacity for distillate oil is 20,000 barrels at Purdom site and 30,000 barrels systemwide. With the addition of Purdom Unit 8, the City will maintain inventory on site for approximately 24 hours of full load operation of Unit 8 and both gas turbines. (EXH 2, p. 82) Moreover, the City's target supply of sufficient distillate oil for 18.5 days (at 8 hours run per day) is approximately 30,000 barrels. (EXH 20, p. 3) Although the City does not expect its need for distillate oil to exceed the stored capacity, the City can draw upon local suppliers if the need should arise. (EXH 2, p. 83)

We are slightly concerned about the City's target supply of secondary fuels exceeding systemwide storage capacity. The City

states that it "does not have any current plans to expand backup fuel storage capacity to meet increasing peak demand requirements". (EXH 20, p. 3) However, the City projects its peak demand to increase by approximately 40% over the next twenty years. (EXH 2, page 15 of Appendix 2) This may indicate that the City needs to increase its systemwide storage capacity of both secondary fuels to account for the increase in peak demand. We recognize, however, that the required lead time to increase storage capacity is relatively short.

The City has existing natural gas pipeline capacity of 63,040 MMBTU/day of Firm Transportation (FT) capacity on Florida Gas Transmissions' (FGT) system over the twenty-year period from 2000-2019. (EXH 2, p. 91) This pipeline capacity is sufficient to serve the Purdom Unit 8 and the rest of the City's needs. (EXH 2, p. 91, TR 270)

The City will have to make pipeline upgrades to accommodate the increase in gas supply to the Purdom site. These upgrades include: upgrading and relocating the FGT metering station, connecting the existing pipeline lateral to the new FGT 36" mainline, and hydrostatic testing for the increased pressure requirements. There may also be a need to add an additional four miles of 12" loop to the system once the ultimate delivered quantities of natural gas are known.

Enpower's position states that the City omitted the cost of the additional 12" loop in its original cost estimate. Enpower is incorrect; the cost of all pipeline upgrades is included as a line item in the City's initial capital cost estimate. The record shows that this cost was included as a specific line item which included "the cost to relocate and upgrade the natural gas regulating station, hydrostatic testing of the lateral, and the potential addition of a loop to the lateral." (EXH 18, p. 6)

Based on the existing, long-term FTS contracts of 63,040 MMBTU/day, we find that the City will have sufficient pipeline capacity available to transport natural gas to the proposed combined cycle unit. If the City's demand exceeds the capacity of its FTS contracts, the City can utilize ITS contracts or purchase capacity in the secondary market. The City also has backup fuel capability on site if needed. We find that the cost of upgrades including the 12" loop have appropriately been included in the initial capital cost estimate and appear to be reasonable.

V. ECONOMIC AND FINANCIAL ASSUMPTIONS

We find that the economic and financial assumptions used by the City in its IRP studies are reasonable. Based upon the representations and analyses provided by City witness Inzer, the only witness offering testimony on this issue, the financial and economic assumptions made by the City appear reasonable for planning purposes.

Mr. Inzer testified that the City assumed an inflation rate of 3.5%, a long-term debt rate of 5.43%, and a discount rate of 7.25%. (TR 447; EXH 2, p. 93) The 3.5% inflation rate was derived from the Energy Price Forecast prepared by ICF Resources, Inc. ICF used the Blue Chip Economic Indicator for inflation. According to Mr. Inzer, while the annual values for inflation vary from 3.5% in the near term to 3.2% in future years, the City used 3.5% as an approximate value for all years. We believe this rate is a reasonable expectation of inflation rates in today's environment. (TR 461)

Mr. Inzer also testified that the interest rates on the bonds would be a function of prevailing tax-exempt interest rates at the time the bonds were sold. (TR 443) At the time the City filed its need petition, the long-term debt rate was 5.43%. (TR 447; EXH 2, p. 93; EXH 32, pp. 2-6) Based on prevailing interest rates at the time of the hearing, the interest rate was approximately 5.75%. (TR 453; EXH 32, pp. 10-14) The only difference between the 5.75% and the 5.43% relied upon in the integrated resource planning study was timing. (TR 457)

After including the proposed bonds associated with the Purdom Unit 8 project, the City's interest coverage ratio would drop from 4.89 times to 2.34 times. However, since the City has not brought new generation on line since 1977 and the debt it currently has on its books compared to other utilities its size is low, Mr. Inzer testified this drop in its interest coverage ratio will bring it in line with the interest coverage ratios of other Florida municipal utilities. (TR 459-460) Further, the interest rate on the City's bonds would have to have an average coupon rate of 15%, which Mr. Inzer said was very unlikely, in order for the City to fail to meet the 1.4 times interest coverage ratio required by its existing debt instruments. (TR 458-459; EXH 32, pp. 15-17)

It was mentioned during the hearing that the City was assigned a negative outlook by Standard & Poor's. (TR 454-455, 460-461) The negative outlook indicates that a downgrade in the City's bond rating is possible in the next 1-3 years. If the City's bonds were downgraded from a double A rating to a single A rating, Mr. Inzer testified that the rate the City could expect to obtain on the new bonds would probably be in the neighborhood of five to ten basis points higher. (TR 460-461).

Based on an analysis of the City's electric system's projected debt coverage ratio, preliminary meetings with rating agencies, advice from its financial advisor and underwriters, the City's high bond rating, and the reputation that the City enjoys in the bond market, Mr. Inzer stated he believed the City will have no problem in issuing the required amount of bonds needed to finance Purdom Unit 8. (TR 443, 450-451)

Mr. Inzer stated he believed a discount rate of 7.25% is reasonable based upon historic interest rates, the level of inflation, and the projected level of interest rates available to the City. Typically, an entity's overall cost of capital is used as a discount rate for capital budgeting decisions. The higher the rate, the more weight is given to the out years where the result is less certain. The lower the rate, the more weight is given to the earlier years where there is greater certainty associated with the outcome. For this reason, the City used 7.25% as its discount rate to give greater credence to the earlier years where there is greater certainty of the cash flows and expenses relative to the out years. (TR 461-462) We believe this was appropriate.

VI. TIMING OF PETITION

We find that the timing of the petition for a need determination is reasonable considering the City has a reliability need of at least 88 MW in the year 2000. The City's project schedule for permitting and construction of Purdom Unit 8 shows nearly four years of tasks (EXH 30, p. 5), but this timetable includes six months taken to develop both the need study and the site certification application. (TR 435) The permitting process takes 14 to 16 months, followed by six months of equipment procurement activities and 16 months to construct the generating unit. (TR 435) All of these activities are expected to take a total of 36-38 months to complete. Any comparable construction alternative to Purdom Unit 8 would require an equal amount of lead

time. Only a combustion turbine (CT) unit or a short-term purchase option would require a shorter lead time. A CT unit does not require certification under the Electrical Power Plant Siting Act (Act) and could meet the City's capacity need in 2000. Purdom Unit 8 requires certification because the 100 MW steam portion exceeds the 75 MW threshold of the Act.

VII. ADVERSE CONSEQUENCES OF DELAY

We find that there will be adverse consequences to the City's customers if the proposed combined cycle unit is not completed in the time frame requested by the City. While the City should continue to pursue cost-effective purchased power alternatives, any undue delay of the certification of the proposed plant would adversely affect the City's flexibility to meets its need for additional capacity. If Purdom Unit 8 is not completed by May 15, 2000, there are two types of potential adverse consequences: reliability and cost.

As discussed above, the City will have an immediate need for 88 MW of new capacity in the year 2000. From a reliability perspective, the City's need could be met by either a combustion turbine unit or with new purchased power contracts.

The City expressed concern with relying on its transmission interconnections with Southern Company to import power in the event that Purdom Unit 8 is delayed. The City has decided to reserve interface capacity for contingencies such as the loss of Hopkins Unit 2, currently the largest unit on the City's system.

A short delay in the in-service date of Purdom Unit 8 will require the City to purchase short-term replacement power. However, the sole sensitivity performed by the City indicated that replacement power would cost $947,000 per month of delay. (EXH 18, p. 3; TR 184-186) This dollar amount is based on a current FPC Schedule B (short-term firm capacity) tariff, rather than a competitive market response. While this may be a correct calculation of Schedule B power, the City did not provide the net effect of not building Purdom Unit 8. Thus, we cannot conclude with certainty whether or not there exists a very short term (1 month) adverse consequence to delaying the construction of Purdom Unit 8.

Enpower asserts that other, more cost-effective purchased power alternatives exist. Enpower's position statement refers to purchased power costs contained in Table 10-1 of the need study. (EXH 2, p. 114) This table illustrates the bid price for a five-year, 40 MW block of purchased power which was part of another bidder's response to the City's RFP. While we share Enpower's concern that the City's $947,000/month estimate for replacement power was not based on a competitive bid, the City's estimate was at least based on FPC's Schedule B tariff rather than a five-year block. Enpower's comparison of the City's estimate based on FPC's short-term tariff to a bid based on a five-year block is essentially an apples and oranges comparison.

LS Power states that the City's insufficient analysis of short-term purchased power, and the associated uncertainty regarding the cost-effectiveness of this option, makes it impossible to reliably identify any adverse consequences if Purdom unit 8 is not completed on time. As discussed previously, we disagree with the allegations that the City's analysis of short-term purchased power was insufficient. The City has stated that it will delay the construction of Purdom Unit 8 if it identifies a more cost-effective purchased power alternative.

The City could also have phased the construction of Purdom Unit 8. This approach might have mitigated any adverse cost consequences of building the entire unit at once, but as previously discussed, it is $29 million more costly than Purdom Unit 8. (EXH 24, pp. 26-27)

If Purdom Unit 8 or any other capacity is not added in the time frame requested by the City, reliability of the City's electric system will degrade as discussed above. (EXH 2, p.29) For this reason, we believe that potential adverse consequences do exist for the City's electric customers if Purdom Unit 8 is not completed by May 15, 2000.

Based on the foregoing, it is

ORDERED by the Florida Public Service Commission that the City of Tallahassee's Petition to Determine Need is hereby granted as discussed in the body of this Order. It is further

ORDERED that this docket shall be closed.

By ORDER of the Florida Public Service Commission, this 9th day of June, 1997.

BLANCA S. BAYÓ, Director
Division of Records and Reporting

(S E A L)

VDJ

NOTICE OF FURTHER PROCEEDINGS OR JUDICIAL REVIEW

The Florida Public Service Commission is required by Section 120.569(1), Florida Statutes, to notify parties of any administrative hearing or judicial review of Commission orders that is available under Sections 120.57 or 120.68, Florida Statutes, as well as the procedures and time limits that apply. This notice should not be construed to mean all requests for an administrative hearing or judicial review will be granted or result in the relief sought.

Any party adversely affected by the Commission's final action in this matter may request: 1) reconsideration of the decision by filing a motion for reconsideration with the Director, Division of Records and Reporting, 2540 Shumard Oak Boulevard, Tallahassee, Florida 32399-0850, within five (5) days of the issuance of this order in the form prescribed by Rule 25-22.060, Florida Administrative Code; or 2) judicial review by the Florida Supreme Court in the case of an electric, gas or telephone utility or the First District Court of Appeal in the case of a water and/or wastewater utility by filing a notice of appeal with the Director, Division of Records and reporting and filing a copy of the notice of appeal and the filing fee with the appropriate court. This filing must be completed within thirty (30) days after the issuance of this order, pursuant to Rule 9.110, Florida Rules of Appellate Procedure. The notice of appeal must be in the form specified in Rule 9.900(a), Florida Rules of Appellate Procedure.

VOLUME 4

10.6.4 Surface Water Modelling

Stormwater Pond Drawdown Calculation.

FORM 5610 REV. 4/91

Raytheon
Engineers & Constructors
A Consolidation of Badger and UE&C

CALCULATION SUMMARY & CONTROL SHEET
Page 1 of 2

CALCULATION SET NO. 31			
PRELIM.	FINAL X	VOID	REVISION
DISCIPLINE Environmental			
J.O. 54140.354			

PROJECT TITLE Purdom Unit 8

STRUCTURE OF SYSTEM _____ DESIGN CLASSIFICATION _____

SUBJECT Stormwater Pond Drawdown

COMPLETED BY Hal Frediani DATE 4/22/97

CHECKED BY Susan Chin DATE 4/22/97

APPROVED BY _____ DATE _____
SDE OR MGR OF STAFF GROUP

REASON FOR REVISION:

TOTAL NUMBER OF SHEETS IN THIS ISSUE 5

SHEETS REVISED, ADDED OR DELETED

PROBLEM STATEMENT:

Purdom Unit 8 Stormwater Pond needs to meet FAC 62-25 requirements for detention. This includes the requirement that retained water be released within 36 hours, and filtered through at least two feet of sand.

SUMMARY/CONCLUSIONS:

Outlet design as shown on Sheets 3, 4, and 5 will work. It includes a bottom sand filter in the pond drained by an perforated pipe. The perforated pipe outlet needs to be kept outside of the wetlands.

HAROLD A. FREDIANI, JR. CERTIFICATE NO. 36394 STATE OF FLORIDA

Hal A Frediani
P.E. No. 36394
4/22/97

AMERICAN INSTITUTE OF HYDROLOGY Certificate Number 693 HAROLD A. FREDIANI, JR. Professional Hydrologist

P.H. No. 693

Raytheon Engineers & Constructors
145 Technology Park, Norcross, GA 30092

FORM 5610 REV. 4/91

CALCULATION SUMMARY & CONTROL SHEET
Page 2 of 2

CALCULATION SET NO. 31

PRELIM.	FINAL	VOID	REVISION
	X		

DISCIPLINE Environmental

J.O 54140.354

PROJECT TITLE Purdom Unit 8

DESIGN BASIS: See pages 1 and 2 within.

UNVERIFIED ASSUMPTIONS/OPEN ITEMS:

N/A

REFERENCES: (SPECIFICATIONS, DRAWINGS, CODES, CALCULATIONS, TEXTS, REPORTS, COMPUTER DATA, FSAR, ETC.)

Purdom Site Certification Application, FAC 62-275, other references as cited within

Form 5007 (Rev. 9/95)

Raytheon Engineers & Constructors — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 31	REV.	COMP. BY	CHK'D. BY
	PRELIM. / FINAL / VOID		DATE 4/16/97	DATE
PROJECT Purdom Unit 8	SHEET 1 OF 5		DATE	DATE 4/22/97
SUBJECT Stormwater Pond Drawdown	J.O. 54140.354			

per conversation with FDEP (see att 1 & 5), the Unit 8 stormwater pond (referred to as a swale in Section 3.8 of the SCS, see Attachment 2, p. 3.8-3) needs to be able to discharge the detention volume of one half inch of runoff through a sand filter of at least two feet of thickness

Assume we can put a sand area on the bottom of the pond with perforated pipes underneath to collect the water after it passes through the sand

From page 3.8-1 of att 2 the design volume is 4350 cubic feet

From atts 1 & 5, need to discharge this volume within 36 hours (72 hours with safety factor of two

$$\frac{4350\ ft^3}{36\ hours \times 60 \times 60} = 0.034\ cfs$$

per Wanielista & Yousef (see att 3), if we use sand we can expect a minimum infiltration rate of 2.27 inches/hour

convert our flow rate to cubic feet / hour

$$\frac{4350}{36} = 120.8\ ft^3/hour$$

assume we get $\frac{8.27\ "/h}{12\ "/ft} = 0.689\ ft/hour$

Form 5007 (Rev. 9/95)

Raytheon Engineers & Constructors — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 31	REV.	COMP. BY NAR DATE 4/16/97	CHK'D. BY DATE
PROJECT Purdom Unit 8	PRELIM. / FINAL / VOID			SAL DATE 4/22/97
SUBJECT Stormwater Pond Drawdown	SHEET 2 OF 5		DATE	
	J.O. 54140.354			

Solving for Area

$$A = \frac{120.8\ ft^3/hour}{0.689\ ft/hour} = 175.4\ ft^2, \text{ call it } 180\ ft^2$$

Assume we use a perforated pipe product such as ADS (see att. 4), for example ADS Drainguard with a nylon filter (see page 2 of att. 4)

Assume infiltration would equal exfiltration per Sheet 5 of Att. 4

We have 0.034 cfs = 15.3 gpm per Att 4, Sheet 5

for 3" pipe → 20 gpm/foot

see next pages for sketches of proposed drain arrangement

per att 5, assume width of sand filter is 3 feet and we can lay it out in the shape of a tee (see p. 3)

to get 180 ft^2 assume 3' * 60 ft

see sketch on page 3 for plan view

see sketch section on pages 4 & 5

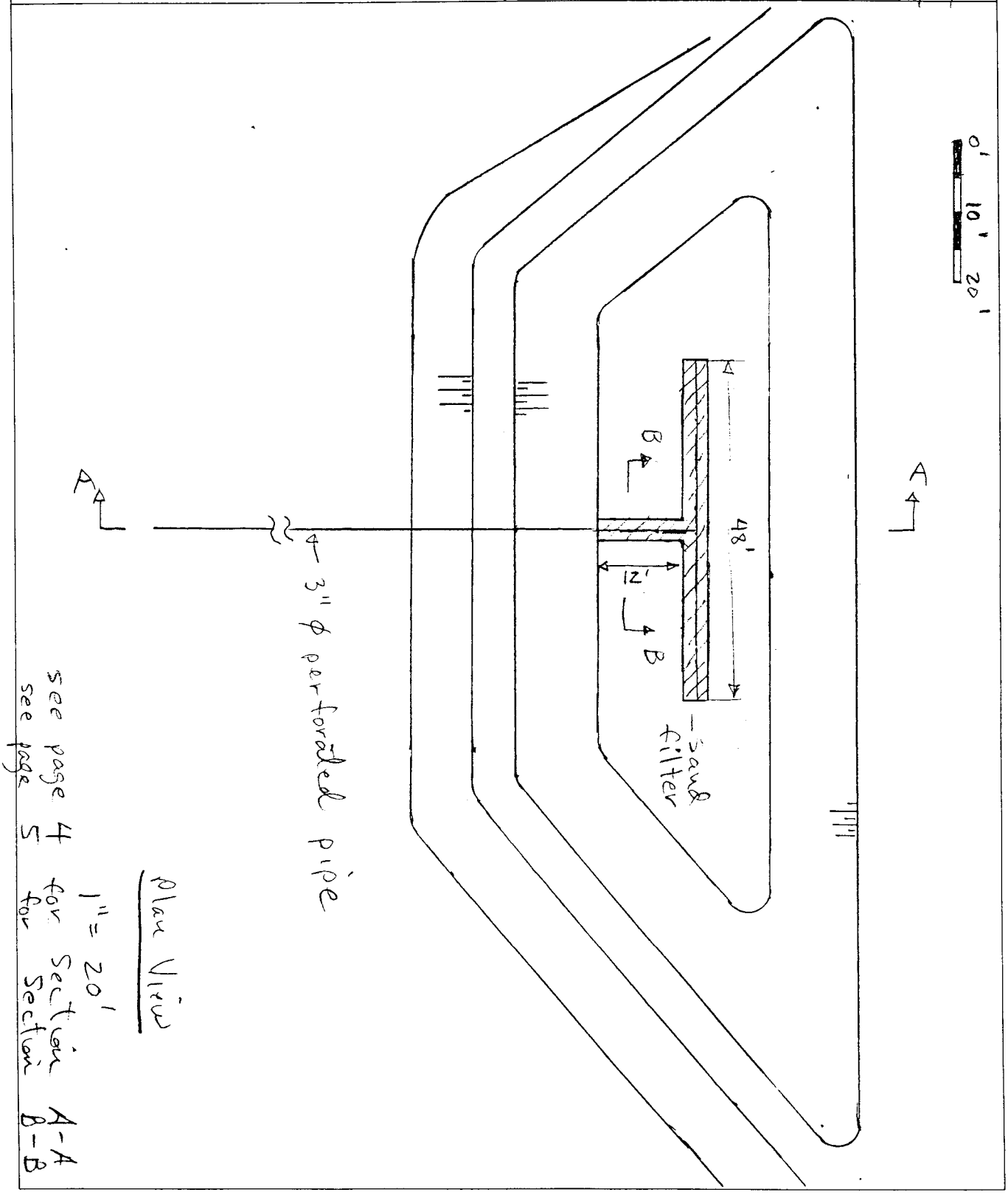
per Section BB on p. 5:

sand volume = 180 ft^2 * 2½ ft = 450 ft^3 (see p. 4)

450/27 = 16.7 cubic Yards

Form 5007 (Rev. 9/95)

Raytheon Engineers & Constructors	GENERAL COMPUTATION SHEET	CALCULATION SET NO. 31	REV.	COMP. BY NDP DATE 4/16/97	CHK'D. BY DATE
		PRELIM. / FINAL / VOID			
PROJECT Purdom Unit 8		SHEET 3 OF 5		DATE	DATE 4/22/97
SUBJECT Stormwater Pond Detention		J.O. 54140.354			



Plan View
1" = 20'

see page 4 for Section A-A
see page 5 for Section B-B

Form 5007 (Rev. 9/95)

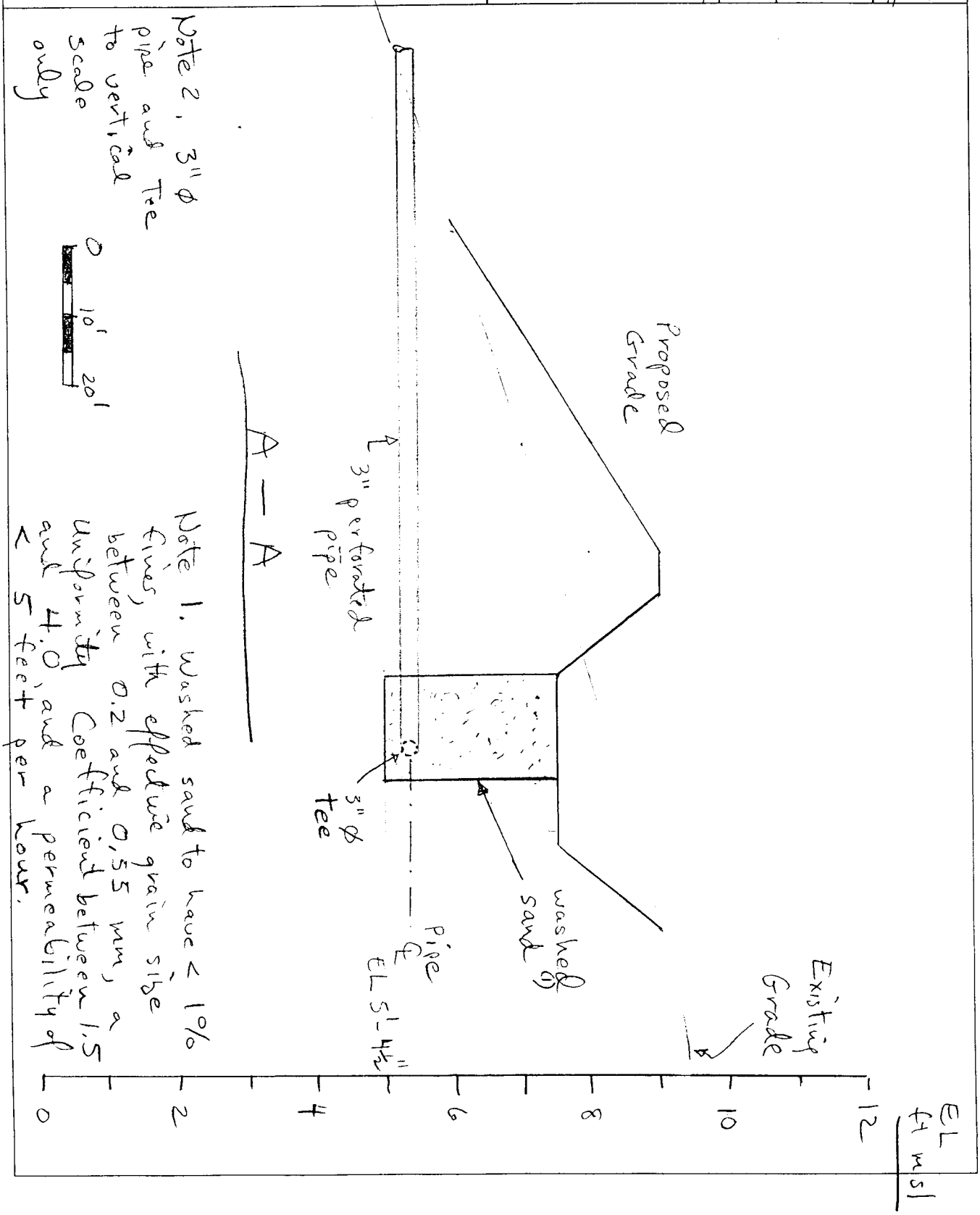
Raytheon Engineers & Constructors

GENERAL COMPUTATION SHEET

CALCULATION SET NO. 31			REV.	COMP. BY HAR	CHK'D. BY
PRELIM.	FINAL	VOID		DATE 4/18/97	DATE
SHEET 4 OF 5				DATE	SMC
J.O. 54140.354					DATE 4/21/97

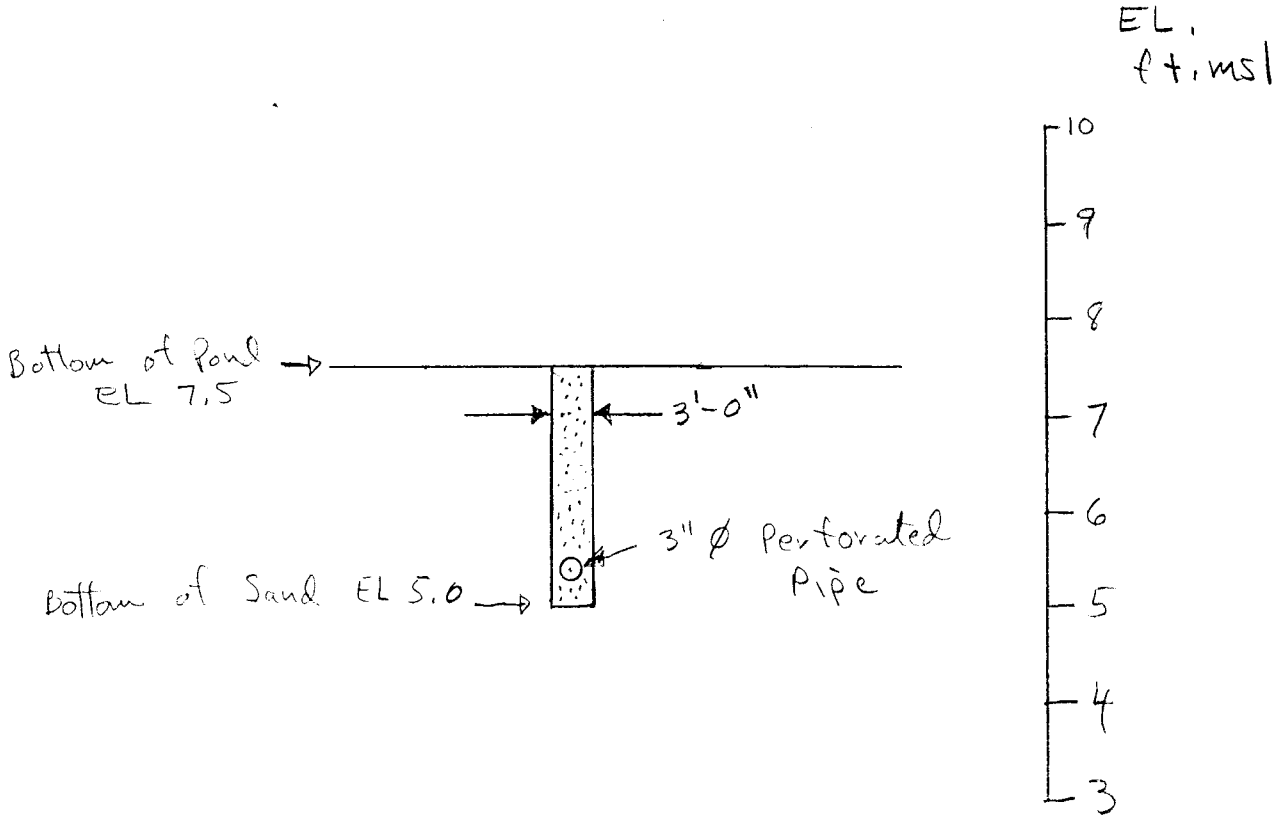
PROJECT Purdom Unit 8

SUBJECT Stormwater Pond Detention



Form 5007 (Rev. 9/95)

Raytheon Engineers & Constructors — GENERAL COMPUTATION SHEET	CALCULATION SET NO. 31	REV.	COMP. BY NAP	CHK'D. BY
	PRELIM. / FINAL / VOID		DATE 4/18/97	DATE
PROJECT Purdom Unit 8	SHEET 5 OF 5		DATE	DATE 4/22/97
SUBJECT Stormwater Pond Detention	J.O. 54140.354			



B – B

Note: 3" ø pipe not to scale

Cale 31
att 1

PURDOM 8 CONTACT FORM

DATE: 04/14/97	TIME: 4:10 PM	LOCATION: Telephone Call
PURDOM UNIT 8 PERSONNEL H. Frediani, RE&C		OTHERS: W. Schaal, Florida DEP, Northwest District 904-444-8300

SUMMARY:

I called Bill Schaal to discuss his concerns about stormwater treatment at Purdom Unit 8. He appears to have two concerns. The first concern is that Purdom Station does not have a state Stormwater Discharge Permit. His second concern is that he believes that what we have called a detention swale should actually be a detention pond, with the requirement that the half inch of rainfall storage capacity be recovered within 72 hours.

I explained to him that the soil conditions and high water table are not conducive to percolation of the detained half inch of runoff, and that we had called it a swale rather than a detention pond because it had no point source outlet.

He suggested that we could install an outlet structure including the placement of sand to act as a filter (minimum 2 feet thickness) and then perforated pipes to release the filtered half inch of stormwater to the wetland. He also said that we should retain our sheet flow overflow berm for the rest of the stormwater (in excess of the first half inch). If we add this type of outlet structure, we would meet the conditions for a General Permit for stormwater discharge.

ACTION REQUIRED:

Need to add design details showing required outlet structure (like a sand drain) and supporting calculation to show the required recovery after 72 hours. Need to make a supplement to the SCA to add the calculation to the Appendix and to revise the discussion in Section 3.8 to include the outlet and call it a detention pond with filtration.

Calc 31
att 2

3.8 ON-SITE DRAINAGE SYSTEM

3.8.1 Environmental Regulations

On-site drainage is regulated by federal, state, and local regulations. Federal regulation is accomplished through general NPDES stormwater permits. As part of the operational general permit, the facility is required to update the plant Stormwater Pollution Prevention Plan (SWPPP) annually. Areas subject to construction activities are covered under a construction general permit, which calls for an erosion and sedimentation control plan to be implemented during construction.

State regulations are encoded in Chapter 62-25, F.A.C., rules of the FDEP. These rules generally require retention, or detention with filtration, of the first half-inch of runoff for projects such as this which affect less than 100 acres; or percolation of the runoff from a 3-year 1-hour storm. They also encourage the prevention of increasing flows or pollution loadings to existing stormwater management facilities.

Local regulations require the use of a 25-year 24-hour design storm, and the implementation of an erosion and sedimentation control plan during construction.

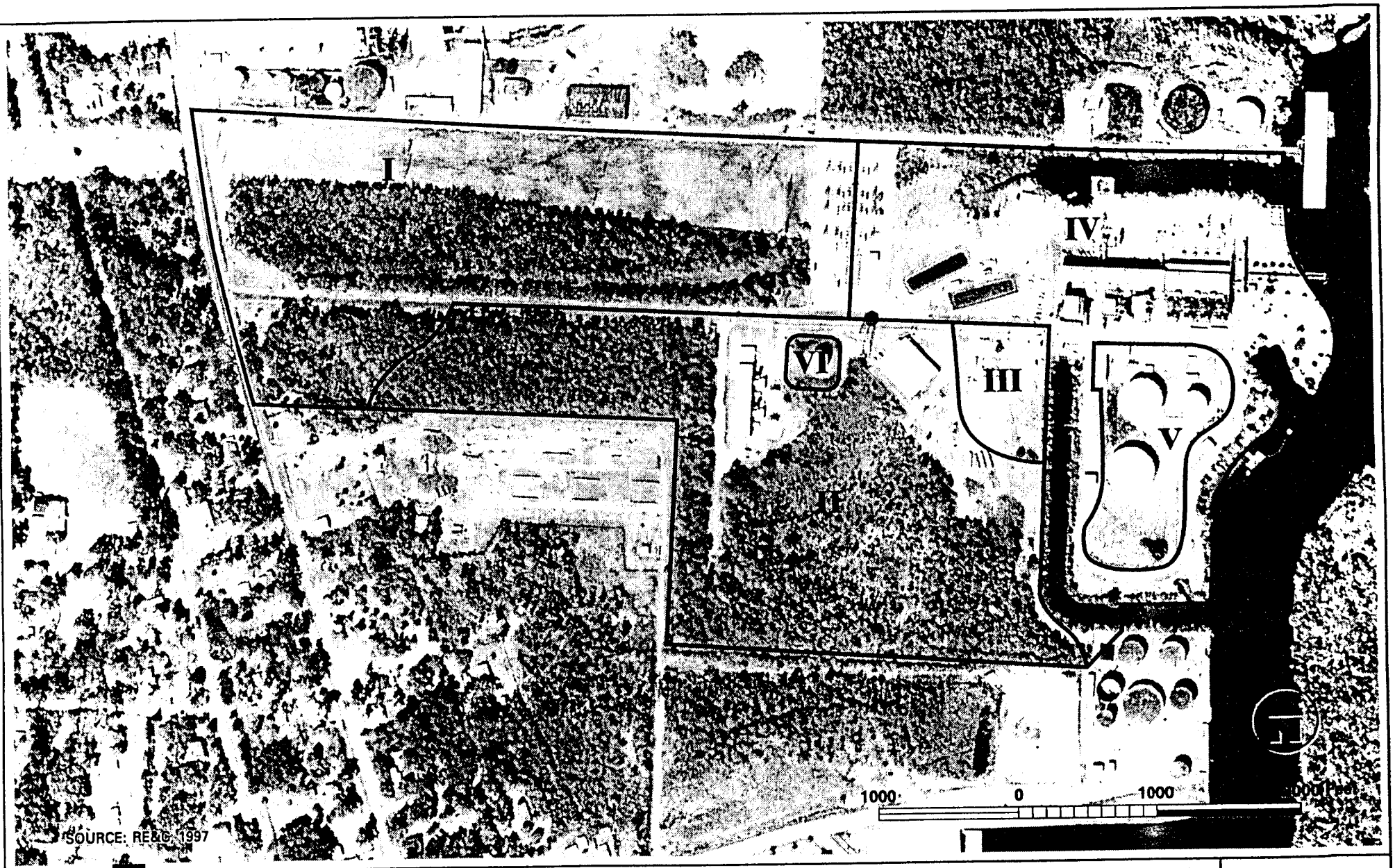
The Northwest Florida Water Management District (NWFWMD) has not been delegated authority by FDEP for stormwater management.

3.8.2 Design Parameters

Existing site drainage has been described in Section 2.3.4-1. The six drainage areas that comprise the site are shown on Figure 3.8.2-1 . Areas I, II, and III are unaffected by industrial activity, and drain respectively to outfalls OSN 007, OSN 010, and OSN 008 as described in Section 2.3.4-1. Area IV runoff is also unaffected by industrial activity, and drains mainly as sheet flow to the intake and discharge canals, and to the St. Marks River. Areas V and VI are the secondary containments for oil storage tanks. Runoff from Area V is detained and released through valved pipes, if it meets water quality limits, to the St. Marks River. Runoff from Area VI is similarly released to Wetlands Number VI (see Figure 2.3.4-41). The areas which will be affected by the Project are I, II, III and IV for construction, and II and III during operation. Based on the regulatory parameters discussed in Subsection 3.8.1, the design storm is the 24-hour event with a 25-year return frequency. This storm is about 9 inches (see Section 2.3.7). The design detention/retention volume is the first one-half inch of runoff. Based on the Unit 8 footprint area of about 2.4 acres, this volume is about 4,350 cubic feet.

3.8.3 Construction Phase Stormwater Runoff

Construction runoff in Area I will be that associated with the installation of the new effluent pipeline, the relocation of the gas yard, and the upgrading of the gas line (if required) along the plant road. Construction runoff in Area II will be that associated with the installation of the new effluent pipeline, the upgrading of the gas line (if required), the relocation of the gas yard, and the installation of the new unit. Construction runoff in Area III will be that associated with the installation of the new unit. Construction runoff in Area IV will be that associated with



CITY OF TALLAHASSEE

SITE DRAINAGE AREAS

PURDOM UNIT 8 PROJECT – ST MARKS FLORIDA

Calc 31 Att 2

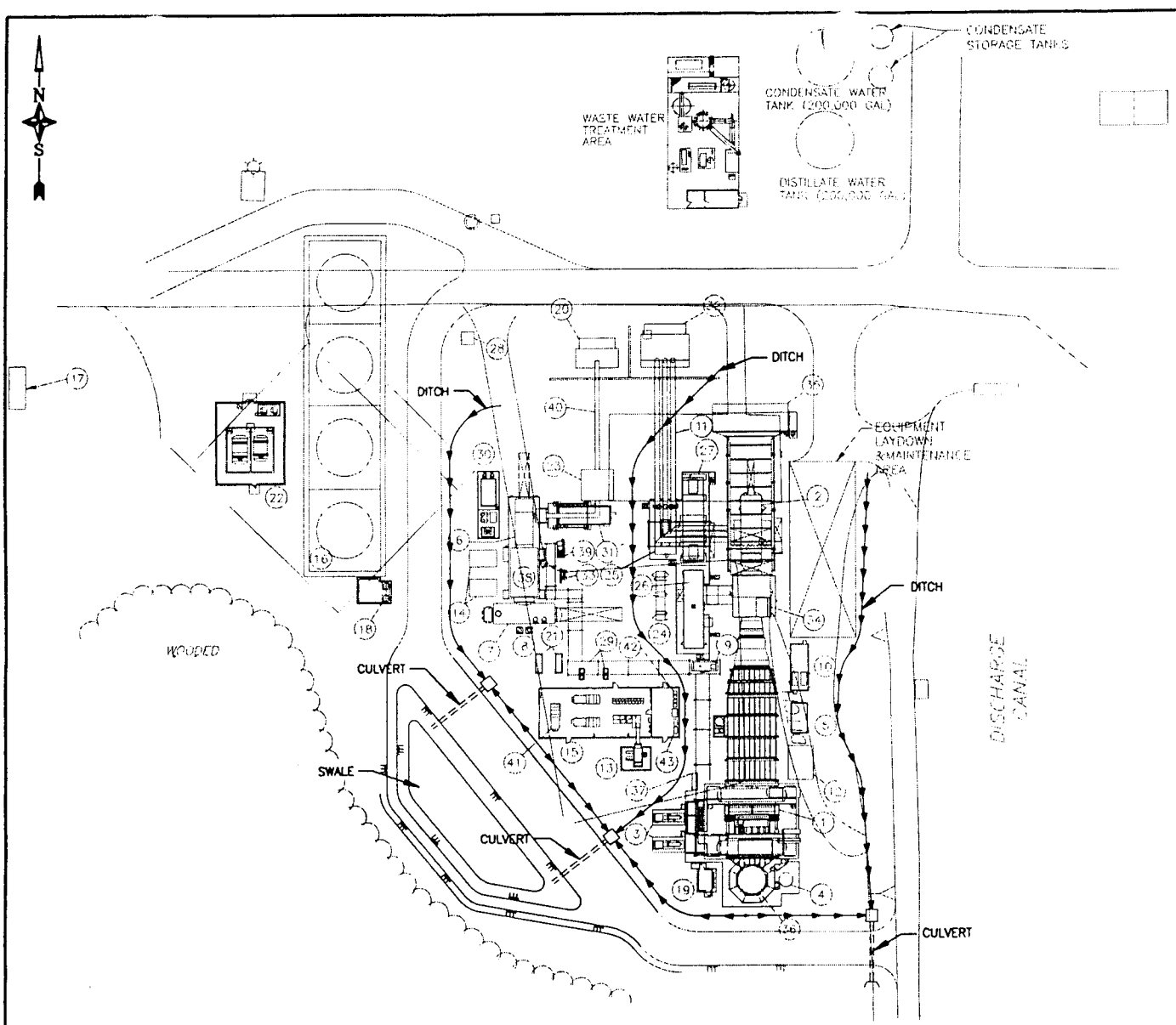
Figure 3.8.2-1

Calc 31
Att 2

installation of the zero discharge wastewater treatment system. Construction-affected runoff will follow existing drainage patterns, and will be controlled through the use of silt fences and hay bales.

3.8.4 Operational Phase Stormwater Runoff

The Unit 8 stormwater management system is shown on Figure 3.8.4-1. Rainfall in potentially oily areas of the facility will be isolated and routed to the cooling tower basin via oil/water separators. Non-contaminated runoff from the western and central Unit 8 area will be collected by a ditch system and conveyed via culverts to the swale to the southwest. Non-contaminated runoff from the eastern portion of the Unit 8 area will be collected in a ditch and conveyed via a culvert to existing outfall OSN 008. The swale is trapezoidal in plan view with lengths of about 145 and 75 feet, and a width of about 50 feet. Its depth is about 1.5 feet. It will have a volume in excess of one-half inch of runoff from the Unit 8 footprint, and will detain the runoff and then disperse it as sheet flow to the existing Wetland Number VI. The volume and peak flow of runoff to be routed to OSN 008 are approximately equal to those presently being discharged to OSN 007. The increase in area to drain to Wetland Number VI due to the Project will be about 1.6 acres (from the existing 57.2 acres to about 58.8 acres), an increase of less than 3 percent.



LEGEND:

1. HEAT RECOVERY STEAM GENERATOR
2. COMBUSTION TURBINE GENERATOR
3. FEEDWATER PUMPS
4. BLOWDOWN TANK
5. WATER WASH SKID
6. STEAM TURBINE GENERATOR
7. CONDENSER
8. CONDENSATE PUMPS
9. CO2 FIRE PROTECTION SKID
10. WATER INJECTION SKID
11. ISO PHASE BUS DUCT
12. HRSG CHEMICAL FEED SYSTEM
13. AUXILIARY TRANSFORMER
14. VACUUM PUMPS
15. SWITCHGEAR BUILDING
16. COOLING TOWER
17. FUEL OIL TRANSFER PUMPS
18. CIRCULATING WATER PUMPS
19. CONTINUOUS EMISSIONS MONITORING SYSTEM
20. STEAM TURBINE GENERATOR MAIN STEPUP TRANSFORMER
21. CLOSED COOLING WATER HEAT EXCHANGERS
22. COOLING TOWER CHEMICAL FEED SYSTEM
23. GENERATOR BREAKER
24. STATIC START SKID
25. COMBUSTION TURBINE GENERATOR BUS ACCESSORY COMPARTMENT
26. ACCESSORY MODULE
27. PACKAGED ELECTRICAL ELECTRONIC CONTROL CABINET
28. NATURAL GAS FILTER/SCRUBBER
29. CLOSED COOLING WATER PUMPS
30. STEAM TURBINE GENERATOR LUBE OIL SKID
31. STEAM TURBINE GENERATOR BUS ACCESSORY COMPARTMENT
32. COMBUSTION TURBINE GENERATOR MAIN STEPUP TRANSFORMER
33. GLAND STEAM CONDENSER
34. COMBUSTION TURBINE
35. INLET FILTER
36. STACK
37. SAMPLE PANEL
38. STEAM TURBINE
39. GLAND STEAM CONTROL VALVE SKID
40. NON SEGREGATED BUS DUCT
41. COOLING TOWER LOAD CENTER
42. BAILEY CONTROL CABINETS
43. STEAM TURBINE GENERATOR CONTROL CABINETS

60 0 60 120
SCALE IN FEET

SOURCE: RE&C, 1997

UNIT 8 STORM WATER MANAGEMENT SYSTEM

PURDOM UNIT 8 PROJECT - ST MARKS, FLORIDA

CITY OF TALLAHASSEE

Figure 3.8.4-1

Cole 31 Out 2

Cale 31 att 3

STORMWATER MANAGEMENT

Martin P. Wanielista, P.E., Ph.D.
Yousef A. Yousef, P.E., Ph.D.

JOHN WILEY & SONS, INC.
New York · Chichester · Brisbane · Toronto · Singap

8.1 DESIGN CONSIDERATIONS

Temporary storage in a pond is designed for a specific volume of rainfall excess from a design storm to improve water quality. Also, pond input hydrographs are attenuated. The temporary storage can be removed by infiltration, reuse by mechanical means (irrigation), or by gradual surface discharge.

8.1.1 Temporary Storage Removal by Infiltration and Irrigation

In some designs, volume reduction by infiltration and irrigation may be possible. The soil infiltration or irrigation rates must have the capacity to remove the temporary stored water between storm events. This is particularly suitable in areas with deep permeable soil. Infiltration rates are based on water storage capacity with example minimum infiltration rates for surrounding soils shown in Table 8.1. The effective water storage capacity of a soil is the void space available for water storage. The minimum vertical infiltration rates during saturated conditions can be simulated in the field using double-ring infiltrometers. Relationships between infiltration rates estimated using standard double-ring infiltrometers and infiltration rates for on-line swale systems with sandy, sandy loam, and loamy sand soils indicate that the infiltration rate in the swale is about one-third of that rate from the double-ring test. The estimates were based on a materials balance of swale input and swale output waters. Minimum rates of about 2 to 3 in./h were noted for the swales, while the double-ring infiltrometer results were about 5 to 10 in./h for the same sites. The soil texture specified in Table 8.1 is based on the U.S. Department of Agriculture soil texture triangle. It should be realized that minimum infiltration rates measured in the field may be reduced by continuous deposition of fine and colloidal particles and/or oil and grease films transported with runoff waters. Therefore, maintenance procedures are essential and should not be ignored.

TABLE 8.1 Hydrologic Soil Properties Suitable for Retention Basins

Soil Texture Class	Effective Water Capacity (in. water/ in. soil)	Minimum Infiltration Rate	
		in./h	cm/h
Sand	0.35	8.27	21
Loamy sand	0.31	2.41	6.1
Sandy loam	0.25	1.02	2.6
Loam	0.19	0.52	1.2

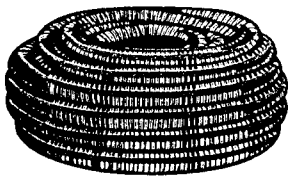
Source: Data from Rawls et al. (1982).

Calc 31 Sheet 1
Att. 4

ADS...for your t

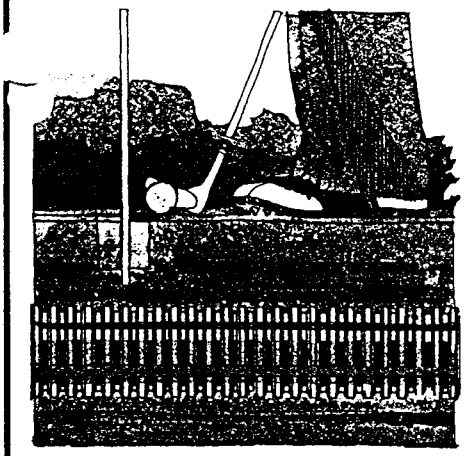
Trouble-free drainage is essential to healthy, stable soil. That's why strong and durable ADS polyethylene tubing is your best bet for landscapes that are as hardy as they are beautiful. ADS tubing provides year after year of reliable drainage with minimal maintenance—at a substantially lower cost-per-foot installed than alternate drainage system materials.

ADS... For all high-use turf areas

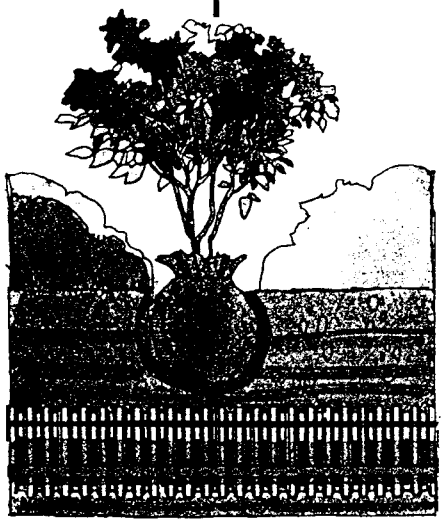


ADS tubing has other significant advantages over traditional drainage systems. Manufactured in long lengths, it's easy to install, requiring less labor and no heavy machinery. It's flexible, so it follows ground contours and adapts to underground obstacles. ADS tubing is manufactured of high density polyethylene resins—a virtually inert material—so it resists rot, and won't rust or break down during handling and backfilling. A full line of accessory fittings and couplings help simplify even the most challenging installations.

You can depend on ADS for your toughest turf jobs. At a cost of just pennies per foot, ADS tubing offers quality plus value!

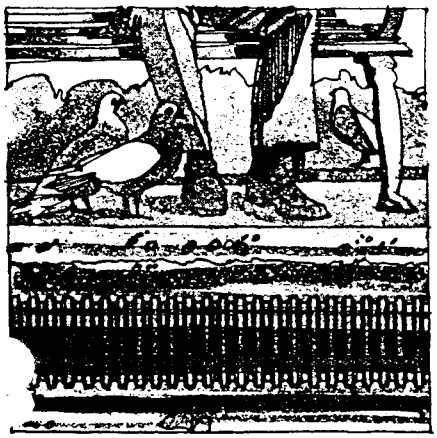


Flexible ADS drains your greens.

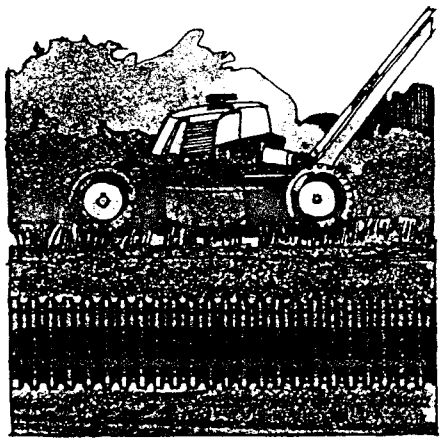


ADS helps maintain beautiful landscapes.

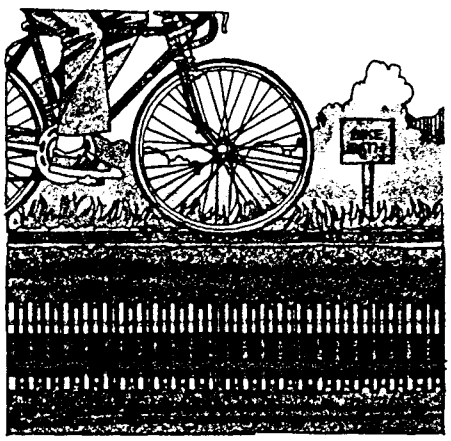
ADS keeps your athletic fields dry.



ADS controls water runoff in heavily trafficked areas.



ADS tubing—a small part of your turf care budget.



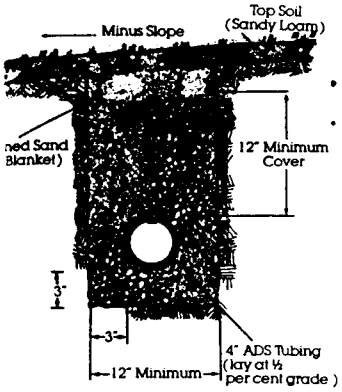
ADS—for years of trouble-free drainage.

ughest turf jobs.

Calc 31
att 4
Sheet 2

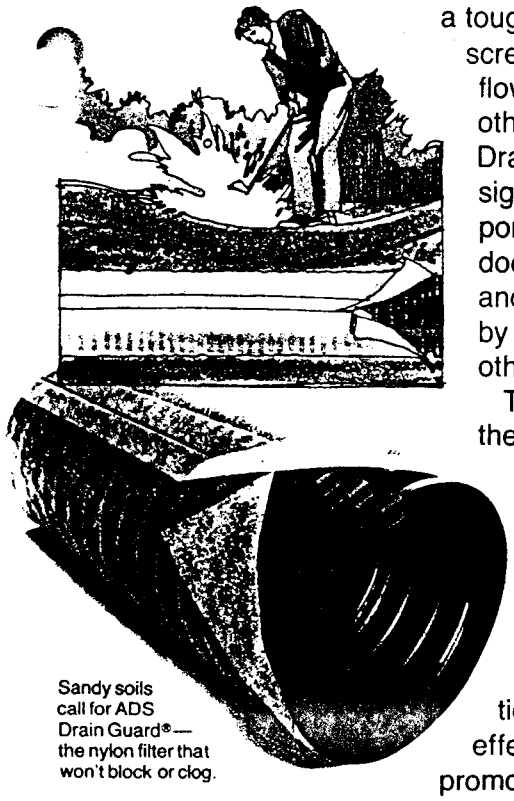
General Installation Guidelines

Slope Drain



In well-trafficked areas of parks and recreation facilities where the slope of the ground creates a water problem and makes the area hard to drain, a slope drainage system can be installed easily and at low cost using ADS tubing to provide control of water runoff, while promoting the healthy turf required for high usage areas.

ADS Drain Guard

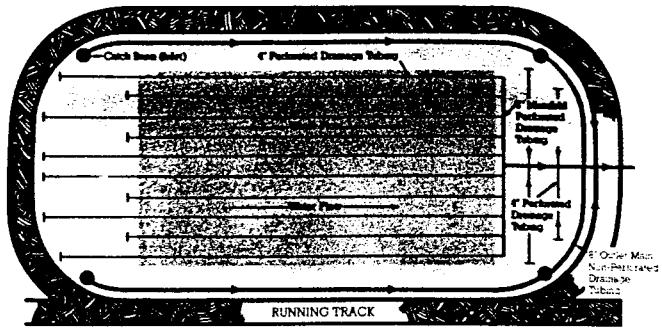


Sandy soils call for ADS Drain Guard®— the nylon filter that won't block or clog.

ADS combines corrugated polyethylene tubing with a tough, durable nylon screen to keep drains flowing in sandy or other problem soils. Drain Guard® is designed with a uniform pore size so that it does not mat down and become blocked by fine silts that clog other filter materials.

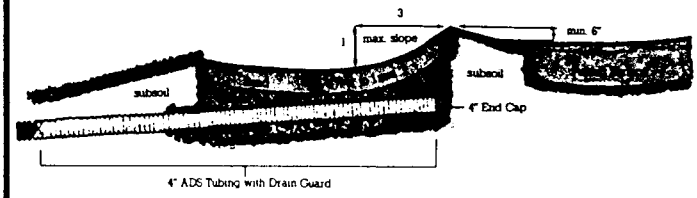
The entire length of the drain is wrapped in nylon screen; seams are lapped and welded for complete coverage. The Drain Guard® screen spans the corrugations, maintaining an effective inlet area to promote rapid drainage.

Athletic Fields



In the case of athletic fields and other places where it is desirable to use the areas as soon as possible after a downpour, a drainage system providing runoff that keeps up with rainfall may be justified. In areas of high intensity rainfall, design drainage rates as high as 1/3-inch per hour or 8-inch in 24 hours (160 gpm per acre) are used.

Sandy Soils



ADS drainage tubing is adaptable to a wide range of soil conditions, including sand traps that collect water or are subject to erosion. Sandy soils can be easily drained and stabilized with corrugated polyethylene underdrain. To prevent the drain-line from siltation blockage, the factory-installed Drain Guard® wrapping should be specified.

Proper installation is an important factor in the effectiveness of any drainage system. ADS provides detailed installation recommendations for every type of soil and topographical condition.

NOTE: For more detailed information see the ADS representative in your area, or write Advanced Drainage Systems, Inc., 3300 Riverside Drive, Columbus, Ohio 43221.

ADS®
ADVANCED DRAINAGE SYSTEMS, INC.

Easy-to-use heavy-duty ADS fittings

Calc 31
AH 4
Sheet 3

Split Coupling

3"–311 8"– 811
4"–411 10"–1011
5"–511 12"–1211
6"–611 15"–1511

Snap Coupling

3"–312 6"–612
4"–412 8"–812
5"–512 10"–1012

Internal Coupler

4"–415
5"–515
6"–615

Internal Reducing Coupler

5"–4"–425
6"–5"–526

Reducing Coupler

4"x3"–314 8"x6"–816
5"x4"–514 10"x 8"–1018
6"x4"–614 12"x10"–1210
6"x5"–516 15"x12"–1512

Snap Tee

3"–321 5"–525
4"–421 6"–626

Saddle Tee

4"–443 6"–646
5"–545 8"–843

Blind Tee

3"–341 5"–541
4"–441 6"–641

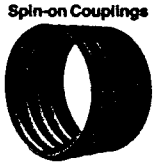
Reducing Tee (Single)

523–5" to 3" 624–6" to 4"
524–5" to 4" 625–6" to 5"

45° "Y"

3"–322 5"–522
4"–422 6"–622

Spin-on Couplings



18"–1811
24"–2411

Split End Cap

3"–331 8"– 831
4"–431 10"–1031
5"–531 12"–1231
6"–631 15"–1531

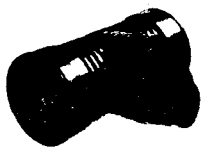
End Plug

18"–1833
24"–2433

Snap Adapter

3"–362 6"–662
4"–462 8"–862
5"–562

Reducing Tee (Multiple)



644–6" to 6"/6" to 5"
6" to 4"/6" to 3"
844–8" to 8"/8" to 6"
8" to 5"/8" to 4"
1044–10" to 10"/10" to 8"
10" to 6"
1244–12" to 12"/12" to 10"
12" to 8"
1544–15" to 15"/15" to 12"
15" to 10"
1844–18" to 18"

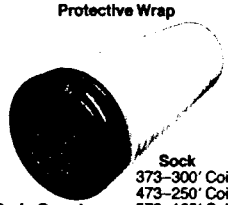
Perforated Tubing

3"–301–300' Coils
4"–401–250' Coils
5"–501–165' Coils
6"–601–100' Coils
8"–801– 20' Lengths
10"–1001–20' Lengths
12"–1201–20' Lengths
15"–1501–20' Lengths
18"–1801–20' Lengths
24"–2401–20' Lengths
(301 and 401 also available in bundles of ten–10' lengths.)

Non-Perforated Tubing

3"–351–300' Coils
4"–451–250' Coils
5"–551–165' Coils
6"–651–100' Coils
8"–851–20' Lengths
10"–1051–20' Lengths
12"–1251–20' Lengths
15"–1551–20' Lengths
18"–1851–20' Lengths
24"–2451–20' Lengths
(351 and 451 also available in bundles of ten–10' lengths.)

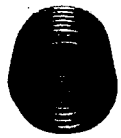
Protective Wrap



Drain Guard®
3"–372
4"–472
5"–572
6"–672
8"–872
10"–1072
12"–1272

Sock
373–300' Coils
473–250' Coils
573–165' Coils
673–100' Coils
873–20' Lengths
1073–20' Lengths
12"–1273–20' Lengths
15"–1573–20' Lengths
18"–1873–20' Lengths
24"–2473–20' Lengths

Heavy Duty Tubing

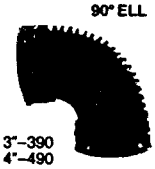


Perf.	Non-Perf.
8"–801	851–20' Lengths
10"–1001	1051–20' Lengths
12"–1201	1251–20' Lengths
15"–1501	1551–20' Lengths
18"–1801	1851–20' Lengths
24"–2401	2451–20' Lengths

45° ELL

4"–445

90° ELL



3"–390
4"–490

Advanced Drainage Systems, Inc., is America's leading manufacturer of quality corrugated polyethylene pipe. Manufactured of selected polyethylene resins, ADS pipe meets the strictest product quality standards and industry specifications.

In addition, ADS manufactures a complete line of fittings and couplings, simplifying installations for highway and construction drainage applications.

From coast to coast, ADS tubing is available through the industry's most extensive distribution network. For the name of your local distributor, contact the nearest ADS sales office.

Nationwide Sales and Manufacturing Network

CALIFORNIA		**MICHIGAN**	
Madera	209-674-0903*	Owosso	517-725-7893*
Madera	209-674-0054	Bad Axe	517-269-9506
COLORADO		Owosso	517-723-5208
Fort Collins	303-493-7234*	**NORTH CAROLINA**	
FLORIDA		Charlotte	704-527-0137*
Lakeland	813-665-8668	Rowland	919-422-3303
GEORGIA		**OHIO**	
Montezuma	912-472-7556	London	614-852-4067*
ILLINOIS		London	614-852-9554
Monticello	217-762-9448*	Napoleon	419-599-9565
Harvard	815-943-5477	Wooster	216-264-4949
IOWA		**PENNSYLVANIA**	
Iowa City	319-338-3689*	Muncy	717-546-7686
Creston	515-782-8565	**TENNESSEE**	
Eagle Grove	515-488-5101	Brentwood	615-373-9964*
Iowa City	319-338-9448	**TEXAS**	
KENTUCKY		Ennis	214-875-6591
Livermore	502-733-4324	**VIRGINIA**	
Versailles	606-873-8046	Buena Vista	703-261-6131
MASSACHUSETTS		**WASHINGTON**	
Ludlow	413-589-0515*	Washougal	206-835-8522*

*Regional Sales Office

Insist on the ADS green stripe.

It's your sign of quality—#1 in the land.

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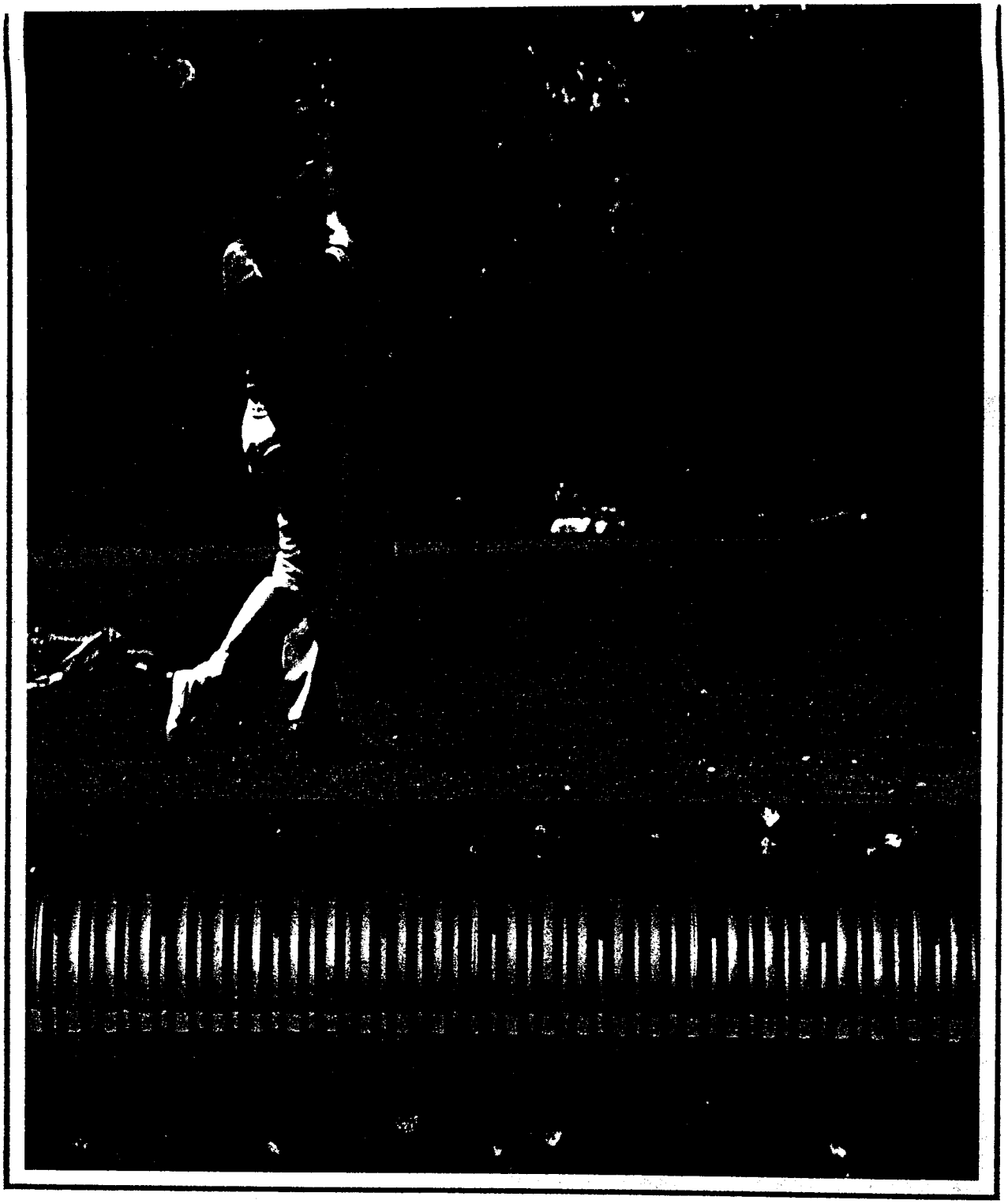
Calc 31
Att 4
Sheet 4



Keep recreation areas lush, green and playable with ADS drainage tubing.

ADS®
ADVANCED DRAINAGE SYSTEMS, INC.

Calc 31

Technical Notes

Tech Note No. 2.105-1 Att 4
Re: Outflow From Tubing Sh. 5

Date: December 8, 1986
By: J. B. Goddard

2.105-1 Outflow from ADS Corrugated Polyethylene Pipe (Exfiltration)

Tubing I.D. (inches)	Flow Rate in Gallons per minute per foot (gpm/ft)		
	ADS Plain Tubing	AASHTO M-176 "Infiltration" Minimum Specification	Walker Poroswall Concrete Pipe
3"	20	NA	NA
4"	57	4	8
5"	55	NA	NA
6"	55	6	12
8"	26	8	16
10"	17	10	17
12"	35	12	18
15"	60	15	23
18"	26	18	24
24"	28	24	26

Exfiltration tests were in accordance with AASHTO Standard Specification M-176 for porous wall concrete pipe. Water was allowed to flow freely from pipe through slots - there was no soil involved. "Infiltration" is assumed to equal the measured exfiltration rates.

It should be noted that at these flow rates, the percolation rates of virtually any backfill or soil will control the rate of flow into or out of the pipe.

Calc 31

Att 4
Sheet 6

ADS

Technical Notes

Tech Note No. 2.111
Re: Slot Dimensions

Date: February 1985
By: James B. Goddard

TN-2.111 TYPICAL SLOT DIMENSIONS AND CONFIGURATIONS
ADS Corrugated Polyethylene Pipe

General

ADS pipe is perforated for water entry with slots centered in the valleys of the corrugations. The shearing blades used for slotting are registered against each corrugation so that the slots are cleanly cut and centered. The 18 and 24" diameter pipe have drilled perforations centered in the valley of the corrugations at 10" centers.

Standard Specifications

Unless otherwise specified, ADS pipe is manufactured to comply with industry standards, ASTM F-405, ASTM F-667, and SCS Code 606. These standards specify maximum slot dimensions and minimum water inlet area. Minimum inlet area is specified to insure sufficient open area per unit length of pipe for proper functioning. Maximum slot dimensions are specified to insure no reduction in pipe strength. The dimensions listed herein are typical slot dimensions, not absolute values.

Highway tubing is manufactured to comply with peforations and water inlet area requirements specified in AASTHO M-252.

ADS Perforations

TABLE 1: Typical Perforation Dimensions

Nominal I.D. (inch)	Number Perforations Per Foot	NOMINAL DIMENSIONS Width (inch)	Length (inch)	Inlet Area (in²/ft)	SPEC REQUIREMENTS Width Max. (inch)	Length Max. (inch)	Inlet Area Min. (in²/ft)
3	24	0.060	1.00	1.44	0.125	1.25	1.0
4	106	0.060	0.63	4.00	0.125	1.13	1.0
5	106	0.060	0.63	4.00	0.125	1.25	1.0
6	106	0.060	0.63	4.00	0.125	1.50	1.0
8	18	0.070	1.15	1.57	0.125	1.50	1.0
10	12	0.070	1.50	1.26	0.125	1.75	1.0
12	36	0.075	1.50	3.38	0.125	1.75	1.0
15	20	0.100	1.50	4.50	0.125	1.75	1.0
18	25	0.3125 dia.		1.91	0.3125 dia.		1.0
24	27	0.3125 dia.		2.07	0.3125 dia.		1.0

Calc 31
att 5

PURDOM 8 CONTACT FORM

DATE: 04/21/97	TIME: 9:59 AM	LOCATION: Telephone Call
PURDOM UNIT 8 PERSONNEL H. Frediani, RE&C		**OTHERS:** W. Schaal, Florida DEP, Northwest District 904-444-8300

SUMMARY:

I returned a call from Bill Schaal to discuss his comments on the calculation/sketches I sent to him last Friday. He had two comments which he described as minor:

1. Rule FAC 62-25.025 (3) requires a safety factor of 2 in designing filtration systems. We can meet this requirement by doubling the filtration area of the sand. Also, based on their experience, a sand filter width of 3 feet is about the maximum that works well. If we narrow the sand width from 4 to 3 feet, and double the area from 90 to 180 square feet, we can use a 'T' shaped plan view to fit it in our pond.

2. The washed sand shown on sheet 4 of the calculation should be further specified to be washed, with less than 1% fines, with an effective grain size between 0.2 and 0.55 mm, a Uniformity Coefficient between 1.5 and 4, and a permeability of less than 5 feet per hour. The supplier of the sand should be required to provide a certification that the sand meets the above requirements.

He said that if we make these minor changes, we will have satisfied his informational requirements.

ACTION REQUIRED:

Need to make the described changes, forward a finalized calculation to Bill Schaal, and then to make a supplement to the SCA to add the calculation to the Appendix and to revise the discussion in Section 3.8 to include the outlet and call it a detention pond with filtration.