4.0 ENVIRONMENTAL EFFECTS OF SITE PREPARATION AND PLANT AND ASSOCIATED FACILITIES CONSTRUCTION

The purpose of this section is to describe the environmental effects of site preparation and construction of the proposed CR3 Uprate Project.

The CR3 Uprate Project will occur during two phases. The first phase (Phase I) will occur during a 2009 planned refueling outage and scheduled steam generator replacement. The improvement and retrofit of the low pressure turbines and electrical generator and replacement of the main steam reheaters will increase the efficiency of power production at CR3 and increase megawatt output by 40 MW.

During the second phase (Phase II), PEF will retrofit the high-pressure turbine, turbine/generator coolers and replace the circulating water pumps, condensate and feedwater booster pumps, and motors resulting in an additional 140 MW of power output.

As previously discussed, PEF will request authorization to support site disturbance of those areas that will be used to support construction activities related to the SGRP and subsequently the CR3 Uprate Project through a separate Environmental Resource Permit (ERP).

A new South Cooling Tower has been proposed to offset the increased circulating water rejected heat from the CR3 Uprate Project and to replace the existing modular HCT. Land, topography, soil, surface water and ecology impacts associated with the construction of the South Cooling Towers will be addressed during the submittal of an ERP (and other appropriate environmental permits), separate from the site certification process. Detailed design will be addressed as part of the NPDES renewal process in 2009.

4.1 Land Impacts

4.1.1 General Construction Impacts

The CR3 site includes the reactor building, turbine building, access/security building, auxiliary building, maintenance training facility, reactor head storage building and miscellaneous warehouses and other buildings and comprises approximately 26.86 acres of developed land within the CREC.

During the construction phases associated with the CR3 Uprate Project, a total of 17.24 acres will be utilized to support construction activities (Figure 4.1.1-1). Construction laydown and parking areas will be constructed at the existing site elevation.

Foundation installation and dewatering activities are not required. Fugitive dust generation is not anticipated and explosives will not be used during the demolition and construction phase of the CR3 Uprate Project.

Solid waste materials generated during construction will be disposed of in accordance with applicable rules and regulations. Construction and demolition wastes, such as scrap wood and metal, will be transferred to a specified storage area on the CR3 site where they will be separated for salvage and recycling. General waste materials (i.e., typical of municipal solid wastes) will be collected in appropriate waste collection containers for disposal at an approved offsite location. All hazardous wastes generated during construction activities will be properly stored, transported and disposed of in accordance with applicable regulations and internal procedures.

During construction, the construction labor force will use portable chemical toilets and/or permitted holding tanks. A licensed contractor will pump all sanitary sewage from the portable toilets and holding tanks as needed and will transport the waste to an approved offsite treatment facility.

Potable water for consumption during construction will be obtained from bottled potable water. Potable water for emergency eyewash and shower stations will be supplied from temporary potable water systems.

4.1.2 Roads

Primary access to CR3 is provided via U.S. Highway 19, which is located east of the site. No new roads are proposed to connect with state roads.

4.1.3 Flood Zones

The CR3 Uprate Project is located within Zone VE, an area potentially inundated by 100-year flooding with velocity hazard (wave action) (Figure 2.1.5-1). Construction activities associated with

the CR3 Uprate Project will not adversely impact site flood elevations for adjacent areas and will not cause any adverse flooding or related impacts to offsite property (Section 2.1.5).

4.1.4 Topography and Soils

Grading and filling activities will not be required for the CR3 Uprate Project. Site topography will not be affected by construction-related activities. Slight changes in percolation rates in localized areas may occur following construction of laydown and parking areas associated with the SGRP; however, no changes in percolation rates are anticipated with the CR3 Uprate Project.

No effects on existing aesthetics or view shed due to changes in the topography of the plant are anticipated. Elevations of the land surface after construction will be similar to existing elevations; no significant changes in topography will be observable from offsite locations. Offsite groundwater levels will not be affected by the CR3 Uprate Project.

4.2 Impact on Surface Water Bodies and Uses

4.2.1 Impact Assessment

Due to the existing nature of the CR3 site, surrounding surface waters will not be adversely affected by the CR3 Uprate Project. Equipment modification and retrofit activities will not impact wetlands and nearby surface waters.

4.2.2 Measuring and Monitoring Program

There are no construction impacts to surface water bodies from the CR3 Uprate Project; therefore, no new measuring and monitoring programs are proposed.

4.3 Groundwater Impacts

4.3.1 Impact Assessment

Due to the existing nature of the CR3 site, groundwater will not be adversely affected by the CR3 Uprate Project.

4.3.2 Measuring and Monitoring Program

There are no construction impacts to groundwater from the CR3 Uprate Project; therefore, no new measuring and monitoring programs are proposed.

4.4 Ecological Impacts

4.4.1 Impact Assessment

Due to the existing nature of the CREC and CR3 site, and limited amount of disturbance associated with the uprate project, no adverse impacts to threatened or endangered species are anticipated as a result of the CR3 Uprate Project.

4.4.2 Measuring and Monitoring Programs

There are no impacts to aquatic/wetland systems or threatened and endangered species, therefore, no new measuring and monitoring programs are proposed.

4.5 Air Impacts

4.5.1 Air Emissions

Construction activities will result in the generation of fugitive particulate matter (PM) emissions and vehicle exhaust emissions. Fugitive PM emissions will result primarily from vehicular travel over paved and unpaved roads from the existing site. Vehicular traffic will include heavy-equipment traffic and traffic due to construction workers entering and leaving the CREC Site. Construction personnel and equipment will enter the site exclusively via the U.S. Highway 19 and the existing entrance roadway. Exposed land areas may also generate fugitive dust due to wind erosion. Table 4.5.1-1 presents the estimated air emissions during construction.

Emissions of fugitive PM from these activities are difficult to quantify because of their variable nature. They can only be estimated since emissions are dependent upon a number of factors, including specific activities conducted, level of activity, meteorological conditions, and control measures utilized.

Both EPA and FDEP have promulgated AAQS for PM_{10}. Fugitive PM_{10} emissions may result from vehicles entering and leaving the CREC site and from wind erosion from open areas around the site. The areas subject to wind erosion will generally be small due to the nature of construction activities and control measures taken, such as seeding.

For PM_{10}, the PSD significant emission rate is 15 TPY. The estimated PM_{10} emissions are not cumulative since the construction activities are preformed in series. The estimated fugitive emissions are not expected to significantly affect air quality outside the CREC boundary, given their small magnitude compared to the PSD significant emission rate.

Combustion-related emissions will result from onsite construction equipment and onsite vehicle traffic. Construction equipment will consist of fork lifts, cranes, trucks, compressors, and/or electrical air compressors. This equipment, as well as onsite vehicular traffic, will produce emissions of PM_{10}, NO_X, SO_2, CO, and VOC. Emissions estimates were based on EPA emission factors for non-road diesel engines, assumptions on vehicle miles traveled, and fuel consumption. These emission estimates are presented in Table 4.5.1-1. Emission levels of this magnitude will not cause significant impacts to air quality in the vicinity of the CREC site.

4.5.2 Control Measures

A number of control measures will be implemented during the construction period in order to minimize air emissions and potential impacts. After grading, the lightly traveled areas will be either paved or vegetated to minimize fugitive PM and wind erosion. Heavily traveled unpaved construction laydown areas and unpaved roads may be stabilized with rock. Watering will be conducted on an as-needed basis to control fugitive dust from highly traveled areas. The entrance roads are paved, which minimizes dust emissions from vehicles entering the CREC Site.

4.6 Impact on Human Populations

Construction projects can affect human populations by altering demographic patterns; by placing demands on infrastructure elements such as housing, transportation, and educational facilities; and by contributing noise to the environment. Due to the patterns of local employment, traffic patterns and daily commuting, the demographic impact of the CR3 Uprate Project is expected to be minimal.

Section 7.0 of this SCA provides analysis of the income, employment, tax revenue and service needs associated with the uprate project workforce. This section is limited to a discussion of workforce requirements and the minor impacts of project-related traffic, housing, education and noise.

4.6.1 Construction Workforce

A traffic study was prepared to review the expected impact on the roadway transportation network during construction of the CR3 Uprate Project (See Appendix 10.6).

Construction is anticipated to commence in 2009 and conclude in the 2011. The majority of construction workers are expected to commute to the CR3 site from within a distance of up to 75 miles. Contractors will be responsible for hiring the construction workforce. During outage and construction activities, PEF will generally implement practices which stagger construction workers and/or stage truck trips in order to prevent congestion within the CREC. A more detailed discussion of the workforce, payrolls, and economic impacts of the workforce is found in Section 7.0.

4.6.2 Construction Traffic

Peak CR3 construction employment is estimated to increase the total of onsite employees to approximately 2,950 workers in late 2009. The magnitude of the traffic impact will be directly related to the number of construction workers. A traffic impact study was completed to identify the impact of the CR3 Uprate Project to traffic operations.

Traffic volumes were projected for the peak construction period in 2009 by adding the trips generated as a result of the CR3 Uprate Project to the 2007 existing traffic volume using a linear 3.1 percent annual growth rate based on the annual average daily traffic volumes for U.S. Highway 19 for the previous five years (Figure 4.6.2-1).

Trips generated by the project in the A.M. peak hour are expected to be more than the P.M. peak hour. Therefore, the roadway capacity analysis was based on the A.M. peak hour trips. In the future 2009 construction scenario, the CR3 Uprate Project is anticipated to generate 969 new (temporary) trips to the roadway network in the A.M. peak hour (Table 4.6.2-1).

Table 4.6.2-1

Roadway Capacity Analysis Summary

Road Name	From/To	Lanes	Peak Hour Service Volume LOS D	2009 Peak Hour Project Volume	Percent Impact
U.S. Highway 19/98	South of Powerline Street	4D	5,140	656	12.76%
	North of Powerline Street	4D	5,140	313	6.09%
West Power Line Road	West of U.S. Highway 19/98	2U	1,190	969	81.4%

(1) Level of Service D Capacity obtained from Table 4-6 of the Florida Department of Transportation 2002 Q/LOS Manual.

A four lane divided uninterrupted flow highway for a Level of Service (LOS) B has a peak hour two-way traffic volume of 2,800 vehicles (DOT, 2002 Quality/Level of Service Handbook). U.S. Highway 19/98 operates below the 2,800 two-way peak hour traffic volume established by FDOT for a Level of Service B four lane divided uninterrupted flow highway (Table 4.6.2-2).

Table 4.6.2-2

Two-Way Peak Hour Traffic Volumes Summary

Time Period	Florida Dot Generalized Los B Two-Way Peak Hour Traffic Volume	2009 No-construction		2009 Construction	
		NB	SB	NB	SB
A.M. peak hour	2,800	919	687	1,575	1000
P.M. peak hour	2,800	1,092	902	1,268	1,024

NB = Northbound
SB = Southbound

Traffic generated during the construction activities is considered a temporary condition. Additionally, the peak construction period includes construction activities associated with other activities that will be ongoing at the CREC. The capacity analyses demonstrate that the intersection is anticipated to perform at a LOS D in the A.M. peak hour and at a LOS B in the P.M. peak hour (Table 4.6.2-3). The sections of U.S. Highway 19/98 north and south of Powerline Street are expected to operate at or better then LOS B.

Table 4.6.2-3

Intersection Capacity Analysis Summary

Intersection	Time Period	Existing 2007		No-Build 2009		Build 2009	
		LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)
U.S. Highway 19/ U.S. Highway 98 and West Power Line Road	A.M. peak hour	B	19.8	B	2.0	D	40.7
	P.M. peak hour	A	8.4	A	8.5	B	13.1

The CR3 Uprate Project represents less than a one percent impact to the LOS service volume for both U.S. Highway 19/98 and Powerline Street. Due to the temporary and fluctuating conditions expected in 2009, PEF intends to consider Travel Demand Management techniques (i.e., flexible work hours, staging of truck deliveries, etc.) to help facilitate peak operating conditions. Additionally, PEF will monitor the intersection at U.S. Highway 19/98 and Powerline Street and coordinate special events with the local public agencies, such as the Citrus County Sheriff's Department, to help ensure acceptable traffic operations as necessary.

4.6.3 Housing

The number of employees will vary during the CR3 Uprate Project, with a total construction and permanent employment peak of 2,950 employees at CREC. Many of these 800 construction employees for CR3 Uprate will be employed for only a portion of the period due to the changing skill requirements of the CR3 Uprate Project. There is a significant labor pool of construction workers in the surrounding counties and metropolitan Tampa area, as a result, it is expected that few construction workers will be relocating to the area for the construction term. Most workers that do relocate will use the available lodging accommodations in Citrus County (approximately 2,259 licensed lodging units).

4.6.4 Education

Because of the relatively short duration of employment, few construction workers are expected to relocate with their families. As a result, there will be little immigration of school-aged children

resulting from project construction. No significant adverse effects on local elementary, middle, or high school enrollment are anticipated.

4.6.5 Construction Noise Impacts

The impacts of noise on human populations are dependent upon the proximity of institutional and residential land uses to construction activities and the type and extent of noise sources. The nearest locations that could potentially be impacted by noise (i.e., critical receptor) from the proposed facility construction area are located approximately three miles south of the power block. The location is Fort Island County Park in the city of Crystal River.

Construction of the CR3 Uprate Project will require demolition of the current steam turbine and erection of the new steam turbine and cooling system. The use of construction equipment, such as dump trucks, cranes, bulldozers, front-end loaders, air compressors, grinders, and welders will be required. These sources have maximum noise levels ranging from about 70 to 90 dBA (measured at a distance of 50 ft).

The evaluation of noise impacts from construction activities was performed using previous results from noise propagation computer programs to estimate noise levels (CADNA A). Noise source levels are entered as octave band sound power levels. The user can specify coordinates, either rectangular or polar. To determine noise impacts from the CR3 Uprate Project's construction activities, the receptor grid used for the modeling was 10 x 10 meters out to a distance of 4 kilometers. All noise sources are assumed to be point sources; line sources can be simulated by several point sources. Sound propagation is calculated by accounting for hemispherical spreading and three other user-identified attenuation options: atmospheric attenuation, path-specific attenuation, and barrier attenuation. Atmospheric attenuation is calculated using the data specified by the American National Standard Institute Method for the Calculation of the Absorption of Sound by the Atmosphere (ANSI, 1999). Path specific attenuation can be specified to account for the effects of vegetation, foliage, and wind shadow. Direction source characteristics and reflection can be simulated using path-specific attenuation. Giving the coordinates and height of the barrier can specify attenuation due to barriers. Barrier attenuation is calculated by assuming an infinitely long barrier perpendicular to the source-receptor path. Total and A-weighted SPLs (filtered to approximate human hearing) are calculated. Background noise levels can be incorporated into the program and are used to calculate overall SPLs.

The model was performed to predict the maximum noise levels produced by a combination of likely noise sources with and without background noise levels. A conservative estimate of the number and types of construction equipment was assumed to calculate construction noise levels.

Table 4.6.5-1 lists the major types of equipment expected to be used during the construction of the Project and their associated noise characteristics. For the purpose of the construction noise impact analyses, all of the equipment was conservatively assumed to be operating simultaneously at peak power. Mechanical and electrical installation activities may occur at night; however, these activities have minimal noise levels and are much less than the existing plant.

The noise levels resulting from these combinations of equipment were input as multiple sources to the model. Octave bands were estimated from *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliance* (EPA, 1971). It is unlikely that all the equipment would be operating simultaneously and continuously, and, therefore, this impact assessment is conservative. Background SPL values were incorporated into the model to calculate impacts at the locations identified in Section 2.3.8. Only the atmospheric attenuation option was enabled during the noise modeling runs.

The construction noise impacts at three plant property-line monitoring locations shown in Figure 4.6.5-1 are presented in Table 4.6.5-2. The L_{10} and L_{eq} are from background noise monitoring and the background with construction impacts are presented in the table. As shown in Table 4.6.5-2, the estimated L_{eq} noise levels during the construction of the Project are estimated to be less than 73 dBA. The predicted noise levels are not expected to adversely impact the sensitive receptors identified in the vicinity of the Project Area. The noise estimates are conservative and include only atmospheric attenuation. The actual or measured noise levels due to construction are expected to be lower than predicted. Elevated noise during initial start up is not accounted for in these predictions.

4.7 Impacts on Landmarks and Sensitive Areas

Results of a search of the Florida Master Site File conducted for the CR3 Uprate Project indicates that within Citrus County, there are 174 known archaeological sites, eight known structures, and two recorded cemeteries. Activities related to the CR3 Uprate Project will not affect the cultural resources in the identified review area.

4.8 Special Features

There will be no unusual products, raw materials, solid waste disposal, incinerator effluents, or residues produced during the construction activities associated with the CR3 Uprate Project that will have influence on the environment or ecological systems of the CREC, or adjacent areas.

4.9 Benefits of Construction

The construction phase associated with the CR3 Uprate Project will contribute both short and long-term economic benefits to the surrounding region. Construction benefits will include construction employment that will average several hundred over the four year construction period. Construction wages will increase the demand for goods and services in the region. Direct purchases of construction materials will have both direct and indirect economic benefits. Construction activities will increase tax revenues to the county and state governments due to sales taxes from the purchase of equipment and material to support construction activities. This includes construction materials (e.g., concrete and steel for foundations), rental equipment (e.g., construction cranes, pumps), food services, and transportation services. These benefits are presented in detail in Section 7.0.

4.10 Variances

No variances from applicable regulatory standards due to the construction of the CR3 Uprate Project are being sought as part of this SCA.

4.11 References

Florida Department of Transportation 2002 Q/LOS Manual.

Trans Associates. Progress Energy CR3 Uprate Project, Traffic Impact Study, 2007.

TABLES

TABLE 4.4.1-1
Estimated Air Emissions During Construction of CR3 Uprate Project

Construction Activity	Type Operation	Amount	Units	Pollutant	Emissions	Units	Controls
Site Preparation Equipment	IC Engines	65,000	gallons/yr	PM_{10}	0.20	tons/yr	EPA Non-Road Tier 3
				NO_x	3.65	tons/yr	EPA Non-Road Tier 3
				SO_2	0.22	tons/yr	EPA Non-Road Tier 3
				CO	3.52	tons/yr	EPA Non-Road Tier 3
				VOC	0.41	tons/yr	EPA Non-Road Tier 3
Open Areas	Wind Erosion	5	acres	PM_{10}	0.6	tons/yr	Watering
Vehicle Traffic	Paved Roads	847,321	VMT	PM_{10}	5.3	tons/yr	Watering as necessary
Installation	IC Engines	155,040	gallons/yr	PM_{10}	0.48	tons/yr	EPA Non-Road Tier 3
				NO_x	8.72	tons/yr	EPA Non-Road Tier 3
				SO_2	0.53	tons/yr	EPA Non-Road Tier 3
				CO	8.39	tons/yr	EPA Non-Road Tier 3
				VOC	0.97	tons/yr	EPA Non-Road Tier 3

Note: VMT = vehicle miles traveled; acres based on open areas at any one time.

Sources: USEPA, 1992 Fugitive Dust Background and Technical Information Document for Best Available Control Measures; Section 2.3.1.3.3, Wind Emissions from Continuously Active Piles.
USEPA, 2006; AP-42, Section 13.2.4 for Aggregate Handling and Storage Piles.
USEPA, 2001; AP-42, Section 11.12 Concrete Batching.
USEPA, 2006; AP-42, Section 13.2.2 Unpaved Roads.
USEPA, 2004; Exhaust and Crankcase Emissions Factors for Nonroad Engine Modeling-Compression Ignition.

TABLE 4.6.5-1

Summary of Demolition and Construction Noise Sources Associated with Heavy Construction Activities

Source	Modeled Source Height[a] (m)	Sound Power Level (dB) for Octave Band Center Frequency (Hz)									Overall Sound Power Level	
		31.5	63	125	250	500	1K	2K	4K	8K	(dB)	(dBA)
Front End Loader 1	1.8	0.0	111.6	118.6	116.6	114.6	109.6	104.6	98.6	92.6	122.4	115.5
Front end Loader 2	1.8	0.0	111.6	118.6	116.6	114.6	109.6	104.6	98.6	92.6	122.4	115.5
Truck 1	1.8	0.0	0.0	118.6	116.1	113.1	109.6	106.1	102.1	0.0	121.7	115.3
Truck 2	1.8	0.0	0.0	118.6	116.1	113.1	109.6	106.1	102.1	0.0	121.7	115.3
Truck 3	1.8	0.0	0.0	118.6	116.1	113.1	109.6	106.1	102.1	0.0	121.7	115.3
Bulldozer 1	1.8	0.0	106.6	103.6	101.6	102.6	99.6	96.6	94.6	96.6	105.3	110.9
Bulldozer 2	1.8	0.0	106.6	103.6	101.6	102.6	99.6	96.6	94.6	96.6	105.3	110.9
Crane 1	1.8	0.0	111.6	118.6	116.6	114.6	109.6	104.6	98.6	92.6	122.4	115.5
Crane 2	1.8	0.0	111.6	118.6	116.6	114.6	109.6	104.6	98.6	92.6	122.4	115.5
Welder 1	1.8	0.0	102.6	110.6	105.6	98.6	98.6	93.6	88.6	84.6	103.6	112.7
Welder 2	1.8	0.0	102.6	110.6	105.6	98.6	98.6	93.6	88.6	84.6	103.6	112.7
Grinder 1	1.8	0.0	102.6	110.6	105.6	98.6	98.6	93.6	88.6	84.6	103.6	112.7
Grinder 2	1.8	0.0	102.6	110.6	105.6	98.6	98.6	93.6	88.6	84.6	103.6	112.7
Grinder 3	1.8	0.0	102.6	110.6	105.6	98.6	98.6	93.6	88.6	84.6	103.6	112.7

TABLE 4.6-5-2

Baseline and Impacts of Construction

Baseline Site	Location	Time	Baseline Sound Levels (dBA)		Sound Levels with New Unit (dBA)		Increase (dBA)	
			L_{10}	Leq	L_{10}	Leq	L_{10}	Leq
5	Northeast corner of fence line	Day	51	50	51	50	<1	<1
		Night	57	55	57	55	<1	<1
6	Intersection of Tallahassee and Powerline Rd	Day	56	53	56	53	<1	<1
		Night	74	73	74	73	<1	<1
7	Middle of Powerline Rd	Day	62	59	62	59	<1	<1
		Night	47	46	47	46	<1	<1

Source: Golder, 2007

FIGURES

F:\PROJECTS\2007 PROJ\073-89531 CR 3 Nuclear Uprate (SCA)\A-PG Crystal River Nuclear Site Upgrade\GIS\MXD\073-89531A035 Crystal River Unit 3 Uprate Construction Site Plan.mxd

LEGEND

- SGRP Construction/Laydown/Parking Areas
- CR3 & Ancillary Facilities

0 500 1,000 1,500 Feet

REFERENCE

1. 2006 Southwest Florida Water Management District Aerial.
2. Laydown Area's provided by Progress Energy.

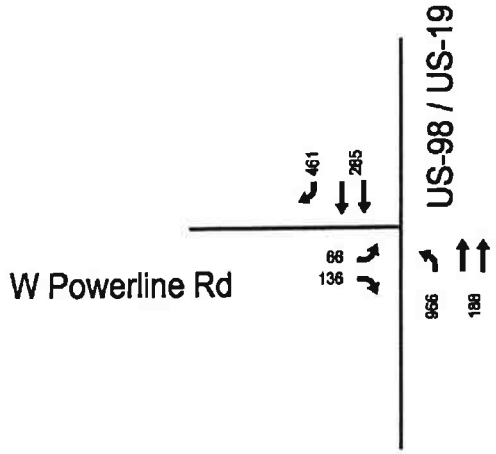
PROJECT
PROGRESS ENERGY FLORIDA, CRYSTAL RIVER NULCEAR UNIT 3 UPRATE PROJECT

TITLE
CRYSTAL RIVER UNIT 3 UPRATE CONSTRUCTION SITE PLAN

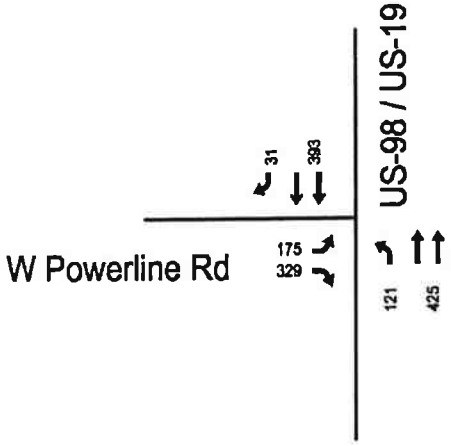
Golder Associates
Tampa, Florida

PROJECT No. 073-89531			SCALE AS SHOWN	REV. 0
DESIGN	JG	May 01, 2007	**FIGURE**	
GIS	JG	May 25, 2007		
CHECK	KG	May 25, 2007		
REVIEW	MM	May 25, 2007	**4.1.1-1**	

AM PEAK HOUR



PM PEAK HOUR



N

SCALE: N.T.S.

Trans Associates

Transportation Solutions for Today and Tomorrow
Park Tower Suite 1140 /400 North Tampa Street
Tampa, Florida 33602 /(813) 386-3630

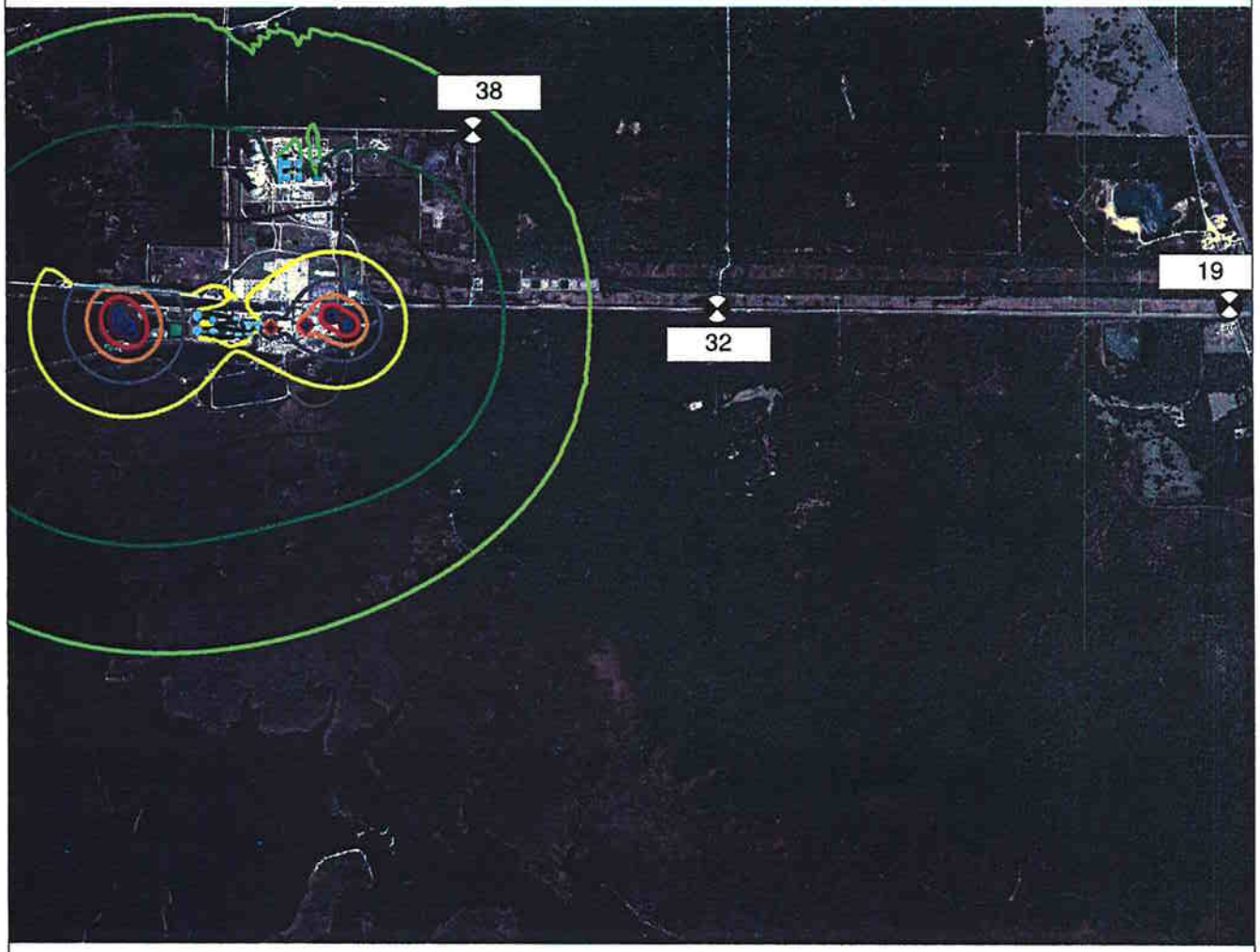
PROJECT NO. GOLAS00-07199

PROJECT: CR3 UPRATE PROJECT

TITLE: CR3 2009 CONSTRUCTION TRAFFIC VOLUME

FIGURE 4.6.2-1

D.B. cad
C.B. cad
REV.



LEGEND:

- Point Source
- Building
- Cylinder
- Receiver

- > 30.0 dB(A)
- > 35.0 dB(A)
- > 40.0 dB(A)
- > 45.0 dB(A)
- > 50.0 dB(A)
- > 55.0 dB(A)
- > 60.0 dB(A)
- > 65.0 dB(A)
- > 70.0 dB(A)
- > 75.0 dB(A)
- > 80.0 dB(A)
- > 85.0 dB(A)

Figure 4.6.5-1
Construction Noise Map
Progress Energy Florida
Crystal River Unit 3 Uprate Project

Golder Associates

5.0 EFFECTS OF PLANT OPERATION

5.1 Effects of the Operation of the Heat Dissipation System

5.1.1 Temperature Effect on Receiving Body of Water

As described in Section 3.5, the final condenser cooling water flow rate for CR3 has not been determined, however, the potential will range up to a maximum expected flow rate of 830,000 gpm from the current 680,000 gpm. The corresponding flow rate for CR 1, 2, and 3 will thus range up to 1,468,000 gpm (potential maximum). The use of the proposed new SCT will ensure that the heat rejection rate from the three units will be limited so as not to exceed the present maximum rate of 10.91 Billion Btu per hour at the POD. Because the temperature rise is proportional to the heat rejection rate, the full load temperature rise at the maximum expected flow rate, without the use of the existing HCT but using the recirculating portion of the new SCT, will be 13.79 °F.

Since the discharge temperature from CR 1,2 and 3 prior to use of the new SCT is estimated to range between the present value of up to 16.74° F, to a future value between 13.79 ° F and 16.74 ° F, there is not expected to be any measurable thermal impact due to change in combined flow discharge temperature. Also, because the total quantity of heat rejected via the discharge canal at the POD is not changing, the shape and extent of the thermal plume (the location and amount of acreage enclosed within each temperature isotherm) is not expected to change with the CR3 Uprate Project.

5.1.2 Effects on Aquatic Life

PEF has been in the process of quantifying baseline aquatic impingement and entrainment impacts at the CREC in order to develop a Comprehensive Demonstration Study (CDS) for submittal to the FDEP in compliance with the federal Clean Water Act 316(b) rule. However, the U.S. Court of Appeals for the Second Circuit recently remanded most of the substantive portions of the USEPA's July 2004 316(b) Rule. PEF anticipates that EPA will re-promulgate the Phase II 316(b) regulations at some time in the future. In the interim, PEF intends to continue to evaluate impingement and entrainment impacts associated with the CR3 Uprate Project within the CREC existing monitoring program. This data will be used to evaluate impacts and identify measures to reduce aquatic impacts during the next CREC NPDES permit renewal (scheduled in late 2009).

The magnitude of any changes in overall facility effects on aquatic life due to the uprate project is expected to be small.

There are no expected changes in effects on aquatic organisms due to changes in the release of heat, because there is no change in the quantity of heat at the POD as measured in Btu per hour, and because the temperature rise associated with the release of heat will be the same as, or slightly reduced from, the current discharge temperatures.

As described in Section 3.5, the total quantity of water withdrawn from the Gulf of Mexico through the intake canal will not be increased by the uprate project; therefore, the total rate of entrainment should also not increase. In fact, since the amount of cooling water that will be recirculated by the six-cell portion of the new cooling towers (152,136 gpm) exceeds the potential increase in cooling water flow associated with the uprate project (150,000 gpm), the net inflow into the intake canal from the Gulf of Mexico is estimated to decrease slightly with the uprate project.

Impingement mortality is generally considered a function of both through-screen velocity and of total flow rate. Although the uprate may cause the through-screen velocity to increase by as much as 22 percent (from 1.65 fps maximum to 2.02 fps maximum), the actual concentration of impingeable organisms is more likely controlled by the velocity entering the intake canal, as that is the velocity those organisms must overcome to escape impingement. As described in Section 2.3.4, the existing intake canal velocity which corresponds with the maximum through-screen velocity (at MLW) is estimated to be about 1.3 fps. Since the uprate project will actually reduce the overall cooling water flow into the intake canal from 1,318,000 gpm to at most 1,315,684 gpm (1,468,000 gpm – 152,136 gpm), the maximum intake canal velocity would be expected to be reduced slightly, on the order of about 0.002 fps.

Based on the discussion above, PEF proposes to continue to evaluate the entrainment and impingement impacts associated with CREC ongoing facility operations as well as the impacts associated with the CR3 Uprate Project. PEF intends to quantify aquatic impacts to offset impacts during the CREC NPDES renewal (scheduled for submittal in 2009) process. Pending the outcome of the ongoing studies, PEF will propose the best technology available for minimizing impacts. Based on current information, the proposal may include a physical barrier, diversion technology or expanded onsite restoration (i.e., expansion of the Mariculture Center).

5.1.3 Biological Effects of Modified Circulation

The CR3 uprate project is not expected to cause any significant modification to water circulation in the site vicinity. The existing condition includes the circulation patterns superimposed by the CREC on the ambient environment. As described in section 5.1.2 above, the magnitude of the change to the velocity entering the intake canal is estimated to be a reduction of approximately 0.002 fps. Changes of this magnitude are not measurable.

5.1.4 Effects of Offstream Cooling

Because the new SCT withdraws water from the discharge canal, it is withdrawing water that has already been screened and passed through a condenser. Therefore, that withdrawal of water will not cause any increase in impingement mortality or entrainment relative to the existing levels.

5.2 Effects of Chemical and Biocide Discharges

5.2.1 Industrial Wastewater Discharges

Compliance with applicable state and federal discharge regulations and water quality standards for industrial wastewaters, is presently being achieved through the implementation of the CR 1, 2, and 3 NPDES permit. The CR3 Uprate Project will not cause any changes in the quantity or characteristics of industrial wastewaters generated by the facility; therefore, no change in that compliance achievement status due to the uprate project is expected.

5.2.2 Cooling Tower Blowdown

The proposed new SCT associated with the CR3 Uprate Project will not generate any "blowdown". Additionally, the evaporation associated with the recirculating portion of the new SCT is not expected to exceed 1,718 gpm, an amount that will not significantly increase the TDS of the cooling water discharge. At this maximum expected evaporation rate, the change in TDS concentration assuming an existing value of 28,000 mg/L would only be about 37 mg/L or 0.1 percent. This effect is insignificant relative to the natural range of TDS of 7,000 mg/L (31,000 – 24,000) at the CREC site as shown on Figure 2.3.4-6.

The facility's existing NPDES Permit requires monitoring to demonstrate compliance with applicable state and federal regulations and water quality standards for industrial wastewaters, and will continue to do so after the CR3 Uprate Project.

5.3 Impacts on Water Supplies

5.3.1 Surface Water

The CR3 Uprate Project will not cause any changes in hydrologic or water quality conditions due to diversion, interception, or additions to surface water flow.

5.3.2 Groundwater

The CR3 Uprate Project will not require any changes in the withdrawal rates of ground water by CREC. It will also not cause any change in the impacts of plant pollutants on ground water.

5.3.3 Drinking Water

There will be no quality, quantity, or hydrological changes due to the CR3 Uprate Project water use, either by withdrawal or discharge to a drinking water source. Therefore, the uprate will have no impacts on drinking water.

5.3.4 Leachate and Runoff

The CR3 Uprate Project includes no coal or materials storage areas, ash and wastewater ponds, or flue gas desulphurization storage areas or ponds. Therefore, the uprate will have no impacts on ground or surface water quality, or on terrestrial and aquatic environments, due to leachate or runoff from such facilities.

5.3.5 Measurement Programs

No such programs are applicable.

5.4 Solid/Hazardous Waste Disposal Impacts

5.4.1 Solid Waste

The uprate will have no impact to disposal of solid wastes on-site, or to directly affected off-site landfilling operations. The CR3 Uprate Project will result in a small increase in the spent fuel discharge rate. These fuel assemblies will continue to be stored in the onsite NRC approved spent fuel storage facilities.

5.4.2 Hazardous Wastes

The uprate will have no impact on hazardous waste handling and/or disposal at CREC.

5.5 Sanitary and Other Waste Discharges

The uprate will not result in any increase of on-site staff, so will not generate any additional domestic wastewater. It will not require any changes in configuration or operation of the existing extended aeration domestic wastewater treatment plant.

5.6 Air Quality Impacts

This section presents a summary of the air quality requirements, air modeling methodology, and results of air quality impact analyses for the CR3 Uprate Project. Detailed information is contained in Appendix 10.1.5, Air Construction and PSD Application.

5.6.1 Impact Assessment

Wet cooling towers such as the proposed SCT for the CREC site provide direct contact between cooling water and air passing through the tower. Cooling tower drift is created when a small amount of the cooling water becomes entrained in the air stream and carried out of the tower. PM emissions from cooling towers are related to the total dissolved solids (TDS) and amount of drift through the cooling tower. Drift eliminators will be used to reduce the amount of drift and secondarily reduce the amount of PM emissions.

5.6.1.1 *Regulatory Applicability*

The permitting of the drift from the new SCT to be installed to maintain increasing thermal conditions at the CREC site requires an air construction permit and PSD approval. The new SCT for the CR Uprate Project will be a modification to an existing major air emissions source. The U.S. Environmental Protection Agency (EPA) has implemented regulations requiring PSD review for new or modified sources that increase air emissions above certain threshold amounts. That increase results from increased PM emissions from the new SCT.

EPA's PSD regulations are promulgated under Title 40 of the Code of Federal Regulations (CFR), Parts 51.166 and 52.21, and are implemented in Florida through the approved PSD program of the FDEP. FDEP has adopted PSD regulations codified in Rule 62-212.400, Florida Administrative Code (F.A.C.).

PSD applicability for the Project is summarized below.

Pollutant	Annual Emissions (TPY)	PSD Threshold (TPY)	PSD Review Required (Y/N)
PM	97.6	25	Y
PM_{10}	5.9	15	N

A PSD review is required for particulate matter (PM) as total suspended particulate matter (TSP).

Citrus County has been designated as an attainment, maintenance or unclassifiable area for all criteria pollutants. The county is also classified as a PSD Class II area for PM_{10}, SO_2, and NO_2. Therefore, the new source review will follow PSD regulations pertaining to such designations.

5.6.1.2 *Analysis Approach and Assumptions*

Because PM, and not PM_{10}, was the only pollutant that triggered PSD review in the form of drift from the SCT , an air quality impact analysis was not conducted.

5.6.1.3 *Additional Impact Analysis*

In addition to air quality impact analyses, federal and State of Florida PSD regulations require analyses of the impairment to visibility and the impacts on soils and vegetation that would occur as a result of the proposed source [Rule 62-212.400]. These analyses are to be conducted

primarily for PSD Class I areas. Impacts as a result of general commercial, residential, industrial, and other growth associated with the source also must be addressed.

Because PM was the only pollutant that triggered PSD review, and not PM_{10}, additional analysis of impacts due to the proposed Project on soils, vegetation, visibility, growth, and air quality related values (AQRVs) in the nearest PSD Class I areas were not necessary.

Impacts Due To Direct Growth

Construction of the project will occur during two phases, concurrent with the facility refueling outages in 2009 and 2011. It is anticipated that many of these construction personnel will be drawn from surrounding metropolitan areas and will commute to the job site. The workforce needed to operate the project, once completed, will essentially remain unchanged from current conditions. Finally, there are expected to be no air quality impacts due to associated industrial/commercial growth given the project's location. The existing infrastructure should be more than adequate to provide any support services that the project might require.

Impacts on Soils, Vegetation, Wildlife, and Visibility

Wet cooling towers provide direct contact between cooling water and air passing through the tower. Cooling tower drift is created when a small amount of the cooling water becomes entrained in the air stream and carried out of the tower. PM emissions from cooling towers are related to the total dissolved solids (TDS) and amount of drift through the cooling tower. Drift eliminators will be used to reduce the amount of drift and secondarily reduce the amount of PM emissions.

It should be noted that, although cooling towers will emit particulates in the form of salt, the overall contribution to the area from cooling towers will be minimal. The CREC is located approximately one mile from the Gulf of Mexico. It is expected that the natural contributions of salt deposition from wave action to this area will be substantially greater than that which will be emitted from the cooling towers.

5.6.2 Monitoring Programs

5.6.2.1 Ambient Air Quality Monitoring

In accordance with requirements of 40 CFR 52.21(m) and Rule 62-212.400(5)(f), F.A.C., any application for a PSD permit must contain an analysis of continuous ambient air quality data in the area affected by the proposed major stationary facility or major modification. For a new major facility, the affected pollutants are those that the facility would potentially emit in significant amounts. For a major modification, the pollutants are those for which the net emissions increase exceed the significant emission rates, as described above.

An exemption from the preconstruction ambient monitoring requirements is available if certain criteria are met. If the predicted increase in ambient concentrations, due to the proposed modification, is less than specified *de minimis* concentrations, then the modification can be exempted from the pre-construction air monitoring requirements for that pollutant per FDEP rule. The proposed Project will result in PSD review for only PM emissions and, as such, no preconstruction ambient monitoring is required.

5.6.2.2 Air Emissions Monitoring

Continuous emission monitoring (CEM) for the pollutant of concern (PM) is not technologically feasible for a project of this type. In lieu of air emissions monitoring, the permittee typically certifies that the cooling towers were constructed and installed to achieve the specified drift rate. This certified drift rate, in combination with monitoring of the circulating water flow rate, serve as a surrogate for demonstrating air emissions compliance.

5.7 Noise Impacts

5.7.1 Impacts

Sound propagation involves three principal components: a noise source, a person or a group of people, and the transmission path. While two of these components, the noise source and the transmission path, are easily quantified (i.e., direct measurements or through predictive calculations), the effects of noise to humans is the most difficult to determine due to the varying responses of humans to the same or similar noise patterns. The perception of sound (noise) by

humans is very subjective, and just like odors and taste, is very difficult to predict a response from one individual to another.

The noise predictions for the CR3 Uprate Project were developed using the CADNA A computer model. The noise impacts of the CR3 Uprate Project were evaluated using the sound power levels (L_w) (Appendix 10.5.1) for the various operating equipment associated with the CR3 Uprate Project. The location of each noise source was based on its location in the computerized plot plan. The computerized drawing was imported into the CADNA A model for the noise analysis.

CADNA A is an environmental noise propagation computer program that was developed to assist with noise propagation calculations for major noise sources and projects. Noise sources are entered as octave band sound power levels, L_w. Locations of the noise sources, buildings, and receptors are input directly on the base map and can be edited throughout the modeling process. All noise sources are assumed to be a point, line, area or vertical area source, and can be specified by the user. Sound propagation is calculated by accounting for hemispherical spreading and three other user-identified attenuation options: atmospheric attenuation, path-specific attenuation, and barrier attenuation. Atmospheric attenuation is calculated using the data specified by the Calculation of the Absorption of Sound by the Atmosphere (ANSI, 1999). Path-specific attenuation can be specified to account for the effects of vegetation, foliage, and wind shadow. Directional source characteristics and reflection can be simulated using path-specific attenuation. Barrier attenuation is calculated by assuming an infinitely long barrier perpendicular to the source-receptor path. Total and A-weighted SPLs are calculated. Sources modeled included the cooling towers.

Table 5.7.1-1 presents the noise impacts of the CR3 Uprate Project. When predicted levels from cooling towers are combined with baseline noise levels there is no significant increase to the noise level at monitoring sites 5, 6, and 7. With the exception of Site 6 Night, the predicted noise levels of the baseline sites would be at or lower than Citrus County noise standards for residential land use of 60 dBA during the daytime and 55 dBA during the nighttime. The predicted noise levels are not expected to adversely impact the sensitive receptors identified in the vicinity of the Project Area.

Figure 5.7.1-1 shows the maximum predicted noise level compared with the L_{eq} baseline sound level observed during the nighttime at Site 6. This figure also shows a comparison of various noise sources and their respective sound levels.

Intermittent noise sources during routine startup, testing, and maintenance, and emergency conditions will include steam venting. Such activities would not normally occur simultaneously and would last for a short duration. The noise impacts of these conditions would not be expected to cause a nuisance.

5.8 Changes to Non-Aquatic Species Population

5.8.1 Impacts

No adverse impacts to non-aquatic species are anticipated during the operation of CR3 following completion of the CR3 Uprate Project. All of the CR3 facilities will be located primarily upon previously-impacted areas which does not provide suitable natural areas for wildlife. The existing CR3 site has been disturbed during prior construction of the existing CR3 facilities, including removal of vegetative communities, topographic grading, and hydrologic alteration. The CR3 facility does not provide critical habitat for wildlife; therefore the operation of CR3 is not anticipated to result in the reduction of any populations of non-aquatic species.

No adverse impacts to federal- or state-listed terrestrial plants or animals are expected during facility operations, due to the existing developed nature of the habitat within the site. No long term change in the populations of any threatened or endangered species is anticipated as a result of operation of CR3.

No changes in wildlife populations at the adjacent undeveloped areas are anticipated, including listed species. Noise and lighting impacts are minimal, and not anticipated to deter the continued use of the undeveloped forested areas within the vicinity by listed species of wildlife based upon evidence from existing power facilities in Florida.

5.8.2 Monitoring

Because no significant impacts to non-aquatic species populations are anticipated, no monitoring program is proposed.

5.9 Other Plant Operation Effects

5.9.1 Operations Traffic

A traffic study was prepared to review the expected impact on the roadway transportation network during normal plant operations following the conclusion of the CR3 Uprate Project (Appendix 10.6).

For the purposes of the traffic study, it is anticipated that no increase in operations personnel will occur beyond the conclusion of the construction activities in 2011. The 2012 operations traffic volume assumes that no new trips are projected as compared to the 2007 existing conditions (Figure 5.9.1-1). The future 2012 build-out scenario is anticipated to be completed with no new additional employees (Table 5.9.1-1).

TABLE 5.9.1-1
Roadway Capacity Analysis Summary

Road Name	From/To	Lanes	Peak Hour Service Volume LOS D	2012 Peak Hour Project Volume	Percent Impact
U.S. Highway 19/98	South of Powerline Street	4D	5,140	0	0.0%
	North of Powerline Street	4D	5,140	0	0.0%
West Powerline Street	West of U.S. Highway 19/98	2U	1,190	0	0.0%

(1) Level of Service D Capacity obtained from Table 4-6 of the Florida Department of Transportation 2002 Q/LOS Manual.

The total build-out condition represents a total of 1,400 permanent employees. Results of the 2012 scenario capacity analyses demonstrate that the intersection is anticipated to perform at a Level of Service C in the A.M. peak hour and at a LOS B in the P.M. peak hour. The sections of U.S. Highway 19/98 north and south of Power Line Road are expected to operate at or better the LOS B for the build-out condition. The proposed uprate project does not represent any additional trips at build-out and all roadway LOS conditions are expected to be maintained at the completion of the proposed project. (Table 5.9.1-2).

TABLE 5.9.1-2
Intersection Capacity Analysis Summary

Intersection	Time Period	Existing 2007		Build 2012	
		LOS	Delay (sec)	LOS	Delay (sec)
U.S. Highway 19/98 and West Powerline Street	A.M. Peak Hour	B	19.8	C	20.4
	P.M. Peak Hour	A	8.4	B	10.0

5.9.2 Effect of Train Operations

As indicated in Section 5.9.1, it is expected that trains will continue to be used during normal CREC site operations and will not be impacted or increased by the CR3 Uprate Project.

5.10 Archaeological Sites

No sites of historic or archaeological significance will be impacted due to the operation of CR3. No sites listed, or eligible for listing in the *National Register of Historic Places*, are located in close proximity to the site. No direct or indirect impacts are anticipated from any operation aspect of the CR3 Uprate Project.

5.11 Resources Committed

There are no major irreversible and irretrievable commitments of national, State, and local resources due to the CR3 Uprate Project.

5.12 Variances

No variances from any applicable standards of any State, regional or local government agency are being requested as part of this application.

5.13 References

Level of Service D Capacity obtained from Table 4-6 of the Florida Department of Transportation 2002 Q/LOS Manual.

FIGURES

LEGEND:

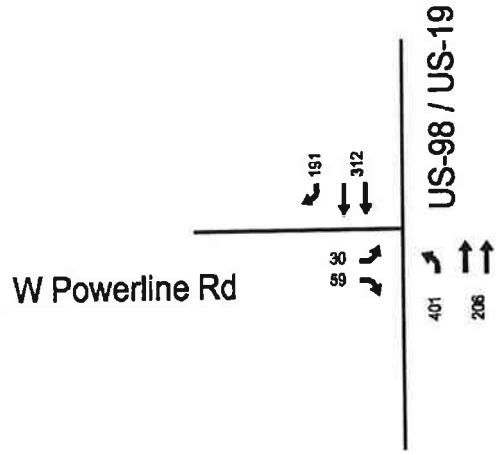
- Point Source
- vert. Area Source
- Building
- Cylinder
- Receiver

- > 30.0 dB(A)
- > 35.0 dB(A)
- > 40.0 dB(A)
- > 45.0 dB(A)
- > 50.0 dB(A)
- > 55.0 dB(A)
- > 60.0 dB(A)
- > 65.0 dB(A)
- > 70.0 dB(A)
- > 75.0 dB(A)
- > 80.0 dB(A)
- > 85.0 dB(A)

Figure 5.7.1-1
Operations Noise Map
Progress Energy Florida
Crystal River Unit 3 Uprate Project

Golder Associates

AM PEAK HOUR



PM PEAK HOUR

N

SCALE: N.T.S.

Trans Associates

Transportation Solutions for Today and Tomorrow
Park Tower Suite 1140 /400 North Tampa Street
Tampa, Florida 33602 /(813) 386-3630

PROJECT NO.	GOLAS00-07199
PROJECT:	CR3 UPRATE PROJECT
TITLE:	2012 Build Traffic Volumes

FIGURE 5.9.1-1

D.B. cad
C.B. cad
REV.

6.0 TRANSMISSION LINES AND OTHER LINEAR FACILITIES

CR3 generates electric power at 22 kV which is fed through an isolated phase bus to the unit main transformers where it is stepped up to 500 kV transmission voltage and delivered to the 500 kV substation. The 500 kV substation is a ring bus. The 230 kV substation is connected to the existing Progress Energy Florida transmission network by five lines which leave the site on three independent rights-of-way and terminate in three separate substations. The 500 kV substation is connected to the existing PEF transmission network by two full capacity lines (each line is physically capable of handling full output of Units 3 and 5 generation) which leave the site in independent rights-of-way and terminate in separate substations.

No new off-site electrical transmission facilities or other associated facilities are required for the CR3 Uprate Project.

7.0 ECONOMIC AND SOCIAL EFFECTS OF PLANT CONSTRUCTION AND OPERATION

The purpose of this section is to identify the economic and social effects of construction and operation of the CR3 Uprate Project and quantify the project's benefits and costs in the area surrounding the CR3 site as well as to the Citrus County economy and to the state of Florida. The CREC, being the largest power-producing facility in the state of Florida, currently provides power to over 1.6 million customers in Florida.

Socioeconomic effects are either direct or indirect. Direct effects are those that are the direct result of the construction or operation of the CR3 Uprate Project. Indirect effects are costs and benefits that affect people and business interests near the project who, because of their relative proximity to the CR3 site, may experience changes in their local socioeconomic environment, such as increased spending due to project construction and operation. Some of these effects are estimated through economic studies that rely on generally accepted assumptions to assess the relative values of expected costs and benefits.

This section is divided into two parts. Section 7.1 addresses both the direct and indirect socioeconomic benefits of the project and consists of an analysis of the construction and operational expenditures. Section 7.2 addresses the temporary and long-term indirect costs involving the construction and operation of the CR3 Uprate Project as well as the construction and operational use of private and public services in the vicinity of the site and in Citrus and the surrounding counties. All cost and benefit values are based on 2006 dollar values.

7.1 Socioeconomic Benefits

7.1.1 Direct Socioeconomic Benefits

The CR3 Uprate Project will have two direct economic benefits to the local economy, local communities, and the surrounding area: construction employment opportunities and increased public revenue. Employment opportunities will be associated with the construction-related needs of the CR3 Uprate Project. Increased public revenue will result from the anticipated property tax changes from the facility improvements and additions.

7.1.1.1 Project Economic Profile

PEF currently employs approximately 700 permanent and long-term contract staff at the CR3 site during normal operations. During refueling outages, which are scheduled for 2009 and 2011, approximately 800 additional employees (i.e., craft and technical staff) are anticipated. Construction of the CR3 Uprate Project will take place in two phases. The first phase (Phase I) will occur in the fall of 2009 and the second phase (Phase II) will occur in the fall of 2011. Construction activities associated with the CR3 Uprate Project will occur concurrent with these refueling outages and will result in an additional 650 construction workers in 2009 and 580 construction workers in 2011. It is anticipated that during peak construction activities (in late 2009 and 2011) the total workforce at the CREC site could total up to 2,950 employees (in 2009) and 2,080 employees (in 2011) during completion of both the SGRP and CR3 Uprate Project (Table 7-1).

TABLE 7-1

CREC EMPLOYEE DATA
(Permanent and Temporary)

	2007	2008	2009	2010	2011	2012	2013
Existing project Information							
CREC	1400	1400	1400	1400	1400	1400	1400
CR3 Refueling Outages[1]	800		800		800		800
Clean Air Project Construction[2]	600	600	600				
CR 4 and 5 Trucks[3]	125	125	125	285	285	285	285
CR 1 or 2 Outage[4]	350			300	40	350	100
CR 4 or 5 Outage[4]	20	350			100	50	100
Steam Generator Replacement Project[5]			800				
CR3 Uprate Project Information							
Uprate Project	**305**	**400**	**650**	**405**	**580**		

1. Employees anticipated onsite during 4 quarter only.
2. Construction employees associated with Clean Air Project (Icon, 2006).
3. Truck trips associated with operation of the CR 4 and 5.
4. Outage scheduled during 1st or 2nd quarter – and does not occur with CR3 outage.
5. Construction employees associated with Steam Generator Replacement Project during 3rd and 4th quarter only.

The additional labor demands associated with construction activities will not create labor shortages. Due to the proximity of the CR3 Uprate Project to the Tampa metropolitan area labor market, which includes Citrus County, the labor demand is expected to be met by labor in Citrus County, the Tampa metropolitan area and nearby counties. Population and housing impacts will be minimal because construction employees are anticipated to currently reside in the area and the potential for migration into the area during construction is anticipated to be modest. The existing communities have sufficient resources to accommodate the expected modest increase in employment, wages, and sales.

The proposed construction activities will require skilled labor for the anticipated installation and equipment modifications; therefore, construction workers could be paid higher wages than the local market pays. This increase in wages will also benefit the surrounding area by using workers within local labor unions that, in turn pay taxes and purchase goods and services within the community. Ongoing operation of the plant will not require additional staff; therefore, the existing workforce of approximately 600 employees will continue following the completion of the CR3 Uprate Project.

The total cost for the CR3 Uprate Project is $250 million for the installation and equipment upgrade requirements at the CR3 facility. These costs are split between the two construction phases: Phase I has an estimated $100 million and Phase II has an estimated at $150 million in project costs. The major costs associated with this construction project include major equipment and materials (about $200 million) and labor (about $20 million) over the four-year construction period. The remaining costs of $30 million for development of the project are associated with engineering, licensing, contingencies, and other miscellaneous costs.

PEF is a private enterprise that provides a service to the public; however, a measurable benefit is accrued through payments received for services rendered. Therefore, financing costs for facility upgrades and modifications are met through cost recovery as a result of electric bill payments made by the consumers.

7.1.1.2 Fiscal Impacts

The net economic impact of a project on its host government and local communities, for the life of the project, is the difference between the total operating revenue and operating costs. Operating revenues consist of *ad valorem* tax revenue, franchise fees, occupational licenses, building permits, utility taxes, state revenue proceeds, charges for county services, etc, paid by project owners to

various governmental agencies. Operating costs include costs for services such as financial and administrative expenses, emergency and disaster relief, legislative and executive expenses, and comprehensive planning incurred by governmental agencies. The county government also earns capital revenues and pays capital expenses. Capital revenues are based on impact fees and capital expenses are costs related to purchases for roads, fire rescue, law enforcement, etc.

The CREC is the largest power-producing facility in the state of Florida and is located entirely within Citrus County. Therefore, annual property taxes are paid to one local government or municipality; Citrus County. Citrus County then distributes these funds to the Board of County Commissioners, the Citrus County Hospital Board, the Citrus County School Board, SWFWMD, the Homosassa Special Water District, the Mosquito Control District, and the county's municipalities to fund their respective operating budgets (Citrus County Tax Collector's website).

For the past four years (2002 through 2005), property taxes from CREC to Citrus County have averaged at $8,764,210 per year, which has represented a 6.7 percent of Citrus County's total property tax revenue. Table 7-2 presents the total property taxes received by the County, property taxes paid by PEF and the estimated percent of total provided by PEF for the past four years.

TABLE 7-2

Year	Citrus County Total Tax Revenue[1]	Progress Energy Property Tax Payment[2]	Citrus County Percent of Revenues
2002	$109,976,197	$10,314,467	9.4
2003	$118,857,916	$8,130,644	6.8
2004	$134,797,365	$8,044,270	6.0
2005	$157,764,712	$8,567,459	5.4

Source:
1. Waldemar, 2007.
2. Citrus County Property Appraiser's Database

The total net economic benefit to Citrus County is based on current tax rates for each taxing authority, as determined for the state of Florida and Citrus County and an estimated property and onsite facility value. As tax rates, property values, and facility values change for each taxing authority over the life of the project, revenues will change accordingly. Following the CR3 Uprate Project, property tax revenues for the overall CREC facility is estimated to increase to approximately

$10 to 12 million subsequent to construction and commercial operation. This will result in a substantial economic benefit to the County.

Because CR3 and CREC are largely self-sufficient, public utilities or services (i.e., water, wastewater, and transportation links) which are generally provided to property owners by Citrus County will not be required. The *ad valorem* revenue that will accrue to the water management district during the next 20 years of operation period will be used for a wide variety of purposes including environmentally sensitive land acquisition programs and land stewardship of these properties. Payments made to the School Board are applied to operations as well as capital expenditures for new or upgraded facilities.

In addition to local government fiscal benefits and sales tax benefits will accrue to the state of Florida. It is estimated that sales tax revenue will accrue during construction and operation. These taxes will be placed in the state's general fund and will be available for use as deemed appropriate by the state.

7.1.1.3 Economic Impacts

Among the primary direct benefits of plant construction and operation will be the increase in job opportunities for Citrus County and adjacent areas. It is anticipated that construction employment will peak to 650 workers during peak construction-related activities, over the four-year construction period. With the completion of the CR3 Uprate Project in 2012, the CR3 Uprate Project will not result in any new employment positions at the CREC. PEF is currently hiring to meet company needs, but these new hires are not anticipated to be permanently located at the CREC. Therefore, payroll for CR3 employees is estimated to average $5 million per year during construction and is estimated to remain at approximately $50 M per year during full operations thereafter.

7.1.2 Indirect Economic Benefits

The proposed project will have several indirect, economic benefits to the local economy, the local communities, and the surrounding area. These benefits include equipment and material purchases and rentals; secondary employment opportunities; increased demand of goods and services; and increased spending power.

It is anticipated that various construction materials such as concrete, fill material, lumber, and miscellaneous buildings materials will be purchased from local suppliers on a competitive basis, as would miscellaneous tools, office supplies, automotive parts, hardware, first aid and safety supplies, fuels, and lubricants. Site contractors could also obtain construction equipment and vehicle rentals from local sources when available in the area. While the large, hardware items to be installed at the facility will be custom-made pieces imported from outside the U.S. based on manufacturing availability, the majority of the construction-related materials and equipment items (as previously mentioned) would provide a substantial benefit to the local businesses and service providers. Additionally, indirect jobs could be created in the county and surrounding areas by expenditures for materials and supplies such as paint, lumber, hardware, office supplies and the like required for construction-related activities as well as ongoing operation and maintenance.

It is anticipated that majority of the construction wages paid by contractors for construction-related activities will be spent within Citrus County and the surrounding area. The wages earned in the area could create additional demands for goods and services as the workers spend some of their earnings within the community. As this money is spent, it will create a ripple effect within the area, thereby generating economic activity, including additional jobs and earnings to meet the additional demands. It is possible that the construction workers could be transient workers that could place a strain on the community, in the short run. For example, some construction workers will utilize community services (e.g., roads, schools, and health services) and will not be paying individual property tax. The estimated earnings will result in indirect or secondary benefits to the community, which will benefit other companies whose payrolls could increase from the construction project.

7.1.3 Other Economic Benefits

The major expenditures for the CR3 Uprate Project will be the delivery of the custom-made, large equipment and machinery to be installed at the facility. These costs not only include the cost of the commodity but the cost of transportation to the site. Based on the large-scale needs, deliveries to the project site could use the existing CSX Transportation rail line that abuts the PEF property. The existing rail spur is located just south of the West Powerline Street, which is the access road to the facility. Routine equipment and materials required for construction and general operation will be delivered to the site using the existing West Powerline Street access road, after general improvements planned to enhance traffic flow and safety considerations during construction and operation are completed.

The increase of electrical generation resources at the CREC will result in an economic benefit to consumers and the community by providing cleaner energy while reducing total fuel costs. The new technology will reduce fuel costs, and therefore, will provide a savings to customers that will result in more than $2.6 billion through 2036. In addition, the increase of gross output from CR3 Uprate Project will allow PEF to service an additional 110,700 households.

7.1.4 Social Benefits

7.1.4.1 Recreational and Environmental Benefits

Construction and operation of the uprated facility will not cause a significant impact on the recreational and environmental value of the area. The potential disturbance during construction-related activities will be insignificant to non-existent at the closest receptor since majority of the construction activities will take place within the existing structure. Related activities that will be outside of the existing structure will consist of lay-down area for equipment and materials, construction worker parking, and deliver of construction-related equipment and materials. To prevent construction-related impacts upon the environment, the following actions will be implemented:

- Construction-related activities will be kept on property currently owned by PEF;
- Ground disturbances will be minimized;
- Stormwater management systems will be maintained for areas outside the existing facility;
- Upward light spill and glare will be minimized with outdoor lighting plans that incorporate lighting standards and fixtures; and
- Washdown of equipment and materials will be conducted to prevent the transfer of materials and dust onto roadways when leaving the property.

7.1.5 Summary of Benefits

Impacts to the economy associated with the construction and operation of the CR3 Uprate Project are expected to be positive. Labor demands associated with the construction and operation of the uprated facility are not expected to create labor shortages. Additionally, construction expenditures for

CR3 Uprate Project materials, equipment, and workers will boost the economic activity and income

in Citrus County and the surrounding communities. Population and housing impacts associated with the CR3 Uprate Project will be slight due to minimal migration into the area.

Construction activities will increase tax revenues to the county and state governments due to sales taxes, property taxes, and the purchase and rental of equipment and material to support construction activities. Upon completion of the CR3 Uprate Project, Citrus County and its taxing authorities are expected to receive millions of dollars in tax revenues.

Temporary transportation impacts are expected to be related primarily to increased traffic associated with the daily commute of construction workers and deliveries to and from the CR3 site. Construction worker traffic will vary during the two construction phases in 2009 and 2011. The level of service will temporarily decline on local roadway segments and intersections during morning and afternoon peak hours during peak construction in late 2009. Upon completion of the CR3 Uprate Project, transportation impacts on area roads will be negligible and effects from train deliveries will return to its previous activity. As presented in Subsection 5.9.1, truck traffic and automobile traffic from operations and maintenance workers should not impact other traffic using roadways nor should they impact levels of service on local roadways.

Overall land use impacts from the construction and operation of the CR3 Uprate Project are expected to be minor due to the remote location of the proposed project, the buffers to adjacent properties, and since the majority of the construction activities will be taking place within the existing building. No direct land use impacts are anticipated in association with the CR3 Uprate Project. Visual impacts from the construction and operation of the CR3 Uprate Project will be minimal and localized. No sites of historic or cultural significance are located on the CR3 site; therefore, cultural and historical resources will not be affected by the CR3 Uprate Project.

Overall, socioeconomic impacts associated with the proposed project in general will be favorable. Although the local community may experience some temporary impacts during peak construction periods, overall economic impacts will be positive.

7.2 Socioeconomic Costs

7.2.1 Temporary External Costs

The CR3 Uprate Project will require highly trained and skilled workers to meet the anticipated peak construction worker demand of 650 employees. With ample labor supply existing within the surrounding area, it is anticipated that many workers will be hired within the region. As is typical with shorter construction projects, it is not anticipated that workers will relocate to the immediate area and alter the demands on public facilities and services.

During the construction periods, peak activities are anticipated to take place during regularly scheduled refueling outages. Minimal to no impacts are anticipated to traffic, air and noise conditions within the surrounding areas, as discussed in Sections 4.5.5 and 4.5.2, respectively. In addition, the majority of the construction-related activities will be conducted within the existing buildings and therefore, not create impacts to the natural resources surrounding the project site.

7.2.2 Long-term External Costs

The proposed project's external cost impacts will be minimal and localized. The CR3 Uprate Project will consist of system modifications to accommodate nuclear fuel enrichment, resulting in increased generation capacity from the company's lowest cost fuel source. The modifications will occur within existing buildings located on the CREC property. These system modification will improve the operation of CR3 and will not cause any impairment to recreational values, result in any deterioration of aesthetic and scenic values, or restrict access to areas of scenic values. The CR3 Uprate Project also will not displace any persons or result in any significant costs to local government.

Since there will not be an increase in operational workforce, no changes are anticipated from the direct and indirect impacts upon the local services (e.g., schools, police). The uprated facility will result in modifications to the existing property value that will in turn increase the *ad valorem* revenue. This long-term costs paid to Citrus County will be significantly greater than the minimal cost for services associated with CREC. Overall, the project will have a long-term economic benefit for Citrus County and the surrounding communities.

7.3 References

Progress Energy. 2006. Applicant's Environmental Report, Operating License Renewal Stage Crystal River Unit 3.

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8.0 SITE AND DESIGN ALTERNATIVES

This optional chapter is not being submitted as part of this SCA because an Environmental Impact Statement required by the National Environmental Policy Act is not required for the CR3 Uprate Project.

9.0 COORDINATION

State, regional, and local agencies were contacted to provide input to the CR3 Uprate Project. The contacts included agency meetings and discussions, as well as meetings with several public organizations. The following is a list of meetings that were held to support the CR3 Uprate Project:

9.1 Citrus County

May 11, 2007: Crystal River, Florida
Introduction of CR3 Uprate Project to Citrus County Planning and Zoning staff (Gary Maidhoff and Tina Gilson).

May 24, 2007: Crystal River, Florida
Discussion of CR3 Uprate Project traffic study methodology with Citrus County staff (Cynthia Jones and Heather Urwiller).

9.2 Florida Department Environmental Protection

March 15, 2007: Tallahassee, Florida
Introduction of CR3 Uprate Project to FDEP PPSA Siting Team (Mike Halpin, Cindy Maulkey and Scott Gorland).

May 3, 2007: Tampa, Florida
Introduction of CR3 Uprate and SGRP projects to FDEP Southwest District staff (Mike Halpin, Bill Kutash, Yanisa Angulo, Al Gagne, Susan Pelz, Dennis Pearson and Mara Nasca).

May 9, 2007: Tallahassee, Florida
Introduction of CR3 Uprate Project to FDOT staff (Ms. Sandra Whitmire and Sheauching Yu).

May 9, 2007: Tallahassee, Florida
Introduction of CR3 Uprate project to FDEP NPDES staff (Mike Halpin, Marc Harris, Allen Hubbard, David Whiting, Nia Wellendorf, Edward Smith, Bala Nori and Cindy Malkey).