SITE CERTIFICATION APPLICATION
SEMINOLE GENERATING STATION UNIT 3
PALATKA, FLORIDA

VOLUME II OF III

SUBMITTED BY:

SEMINOLE ELECTRIC COOPERATIVE INC.
16313 NORTH DALE MABRY HIGHWAY
TAMPA, FLORIDA 33688

Golder Associates Inc.
5100 West Lemon Street, Suite 114
Tampa, Florida 33609

March 2006

VOLUME II OF III

10.0 APPENDICES

10.1 Federal Permit Applications or Approvals
- 10.1.1 316 (a) and (b) Demonstrations
- 10.1.2 NPDES Permit Modification Application
- 10.1.3 Hazardous Waste Disposal Application
- 10.1.4 Section 10 or 404 Application/Nationwide Permit Application
- 10.1.5 Prevention of Significant Deterioration

10.2 Zoning Descriptions
- 10.2.1 Putnam County Zoning Approval
- 10.2.2 Putnam County PUD Amendment

10.0 APPENDICES

10.1 Federal Permit Applications or Approvals

The following pages contain Federal Permit Applications or Approvals.

10.1.1 316 (a) and (b) Demonstrations

10.1.1.1 316(a) Demonstration

A 316(a) thermal variance is not required. The thermal component of the discharge is projected to be consistent with Units 1 and 2. As shown in Table 10.1.2-5, the existing thermal mixing zone for Units 1 and 2 is 39 m^2 and is proposed to be increased to 120 m^2 to accommodate the cooling tower blowdown from the combined discharge from Units 1, 2 and Unit 3.

10.1.1.2 316(b) Demonstration

Seminole's original application for SGS Units 1 and 2 included a detailed analysis of potential impacts associated with the plant surface water intake structure location, design, and capacity. Seminole's analysis demonstrated that SGS' total intake was a very small percentage of the flow in the St. Johns River, that the intake velocity was optimized by not exceeding 0.5 feet per second (fps), that the specific location of the intake structure would minimize potential adverse impacts, and the screen design also would minimize potential adverse impacts.

SGS Unit 3 will use the same intake structure as Units 1 and 2. The annual average projected intake flow will increase from approximately 25 to 33 MGD, but this will remain a very small fraction of the overall flow in the river (annual average of 3,200 MGD based on USGS location #02244040, (period of record 1995 – 2003). The intake velocity will remain less than 0.5 feet per second (fps) and the benefits of the optimized location of the intake structure will continue to be realized. The same screen design will be utilized, as well. Two of the existing intake screen ports that currently are sealed may be used in conjunction with Unit 3. However, this will not create any adverse impacts.

Similar to Units 1 and 2, Unit 3 will also employ closed-cycle cooling and therefore, the capacity of the withdrawal rates will continue to be minimized compared to once-through cooling systems. Maximum design withdrawal for Units 1, 2 and 3 is anticipated to be 48.7 MGD, less than the EPA regulatory threshold of 50 MGD for the new Phase II 316(b) rule, and therefore, the new Phase II 316(b) rule is not applicable. It is noteworthy that if the Phase II 316(b) rule was applicable, SGS would amply comply with that rule by utilizing closed-cycle cooling technology and maintaining an intake velocity that does not exceed 0.5 fps.

It was previously determined that the SGS cooling water intake structure meets the Section 316(b) criteria for "…best technology available for minimizing environmental impact". Based on the prior 316(b) determination, the minimal changes associated with Unit 3, and the fact that the new Phase II rule is not applicable, an additional 316(b) determination is not required for the SGS Unit 3 project.

10.1.2 NPDES Permit Modification Application

The SGS is authorized to operate under NPDES Permit No. FL0036498 which is currently being processed for renewal. It is anticipated that the renewal NPDES permit will be issued during the second quarter of 2006. This SCA and NPDES permit modification application is specific to the SGS Unit 3 project (See Attachment A).

10.1.2.1 SGS Unit 3 Project

The SGS Unit 3 project consists of the addition of a new unit (Unit 3) and related appurtenances onto the existing SGS Site. Existing plant systems such as the process wastewater treatment system, surface water intake and discharge structures will be utilized to support the new unit. The primary water uses for SGS Unit 3 will be for cooling tower makeup, wet FGD makeup, steam cycle makeup and process service water. Cooling water will continue to be withdrawn from the St. Johns River. Condenser cooling for Unit 3 will be provided by a new mechanical draft cooling tower. The existing intake structure will continue to be used.

An additional intake pipe will be added in the river between the intake structure and the river water pump house. New pumps will be installed in the river pump house. Additionally, a new pipe will be added within the existing easement between the existing river pump house and SGS Unit 3. The source of water for the FGD makeup will be river water and treated wastewaters. Process service water will also come from river water.

Circulating Water Heat Rejection System

An induced draft, counterflow, rectangular in-line design mechanical draft cooling tower will be used to reject the heat load of about 3.4 Btu/hr for SGS Unit 3. It is estimated that the cooling tower will consist of 26 cells, each with a 200 HP fan. The circulating water (C.W.) flow rate to the cooling tower is estimated to be 360,000 gpm, with a drift rate estimated at 0.0005 percent of the C.W. flow rate (about 1.8 gpm). Cooling tower blowdown from Unit 3 will be combined with cooling tower blowdown from Units 1 and 2, and discharged to the St. Johns River. Table 10.1.2-1 provides an estimate of the monthly evaporation and blowdown rates of the Unit 3 cooling tower, and Table 10.1.2-2 provides the associated estimated blowdown temperatures. The cooling tower is designed typically to operate at 3.5 cycles of concentration.

Process Wastewater

All process wastewater streams other than cooling tower blowdown from Units 1, 2 and 3, will be treated and recycled as make-up water to the FGD scrubber system. Wastewater from the FGD system will be treated in a new zero liquid discharge (ZLD) system that will remove dissolved solids from the wastewater. Condensate from the ZLD system will be recovered as make-up to the steam cycles from Units 1, 2 and 3. The waste concentrate from the ZLD system will be evaporated in a spray dryer and disposed in the onsite landfill or offsite in permitted landfills. Existing process wastewater discharge to the St. Johns River from Units 1 and 2, as well as from the proposed SGS Unit 3, will be eliminated; the only SGS process wastewater proposed to be discharged to the St. Johns River from Units 1, 2, and 3 will be cooling tower blowdown, which primarily passes-through pollutants from the intake water.

10.1.2.2 SGS Units 1, 2 and 3 Water Quality

The quantitative water-use diagram/water budget for SGS Unit 3 is presented in Figure 10.1.2-1. The water quality typical of the St. Johns River in the vicinity of the SGS D-001 outfall is presented in Table 10.1.2-3. The water quality data primarily was collected from the St. Johns River Water Management District (SJRWMD, Watershed Action Volunteers Database) and is representative of the period of record from 1993 to 2005 (See Attachment B for raw data).

As discussed above, the existing process wastewater discharge from Units 1 and 2 will be eliminated from Outfall D-001 (except for cooling tower blowdown). For permitting purposes, the anticipated effluent discharge will consist of intake (river) water that has been cycled through the cooling tower 3.5 times. Therefore, the predicted effluent water quality is anticipated to be 3.5 times the representative water quality in the river (based on the value 95th percentile data) (See Table 10.1.2-3) and Form 2CS (See Attachment A).

10.1.2.3 Mixing Zone Analysis

Methodology

Seminole is proposing to remove the 12-inch diameter nozzle from the discharge port, resulting in a discharge port diameter of 16-inches. Seminole has utilized the FDEP-approved CORMIX discharge model to evaluate the impact of the proposed discharge from Units 1, 2 and 3 and quantify proposed mixing zones for certain water quality criteria. CORMIX-GI (Cornell Mixing Zone Expert System) version 4.03b (1999) was used to simulate initial jet turbulent mixing and the transformation of the pollutant plume by buoyant spreading, turbulent dispersion, and advective mixing. The model is capable of simulating single submerged port, multiport submerged and surface discharges. The proposed mixing zones for temperature, oil and grease, specific conductance, cadmium, copper, cyanide, iron, lead, mercury, silver and selenium were determined based on the model output for the dilution factors identified in Table 10.1.2-4.

Model Inputs

Inputs into the CORMIX model include river geometry (depth and width), flow velocity or rate, ambient temperature or density, location of the discharge (depth and distance from bank), discharge flow rate or velocity, discharge temperature or density, constituent concentration, discharge port diameter or area, port height, and discharge vertical and horizontal angles. The river geometry is 3.05 m deep, 1,829 m wide, and has a slight meander. Six flow velocity scenarios were calculated by the consulting firm ECT for the existing NPDES permit renewal. The same scenarios were used for this modeling. The scenarios are:

- 90th Percentile Flood Current (0.22 fps)
- Median Flood Current (0.084 fps)
- 10th Percentile Flood Current (0.015 fps)
- 90th Percentile Ebb Current (0.22 feet fps)
- Median Ebb Current (0.084 fps)
- 10th Percentile Ebb Current (0.015 fps)

The ambient density was also calculated by ECT as 997.58 kilograms per cubic meter. The discharge was placed at 2.14 m deep and 274.3 m from the left bank of the river. The annual average discharge flowrate is 8.598 MGD from the Units 1, 2 and 3 flow diagram and the discharge temperature is 89.2°F. The discharge port is assumed to be a 16-inch pipe (the 12-inch diffuser is to be removed) in the river at a vertical angle of 20° and a horizontal angle of 290° and a port height of 0.184 m (See Attachment C for Model Output Files).

Proposed Mixing Zones

The results for each of the six flow scenarios and a composite envelop for each of the water quality parameters is provided in Table 10.1.2-5. A summary of the requested mixing zones in association with the Unit 3 project for the parameters identified above, along with a comparison to the previous mixing zones requested in the current permit renewal, is provided in Table 10.1.2-5.

Water Temperature

As previously discussed, the blowdown from the proposed Unit 3 mechanical draft cooling tower will be combined with that of the Units 1 and 2 natural draft cooling towers and discharged to the St. Johns River. Table 10.1.2-2 tabulates the predicted average and maximum temperatures of the blowdown discharges, and the maximum and average ambient river temperatures, on a monthly basis. Because the predicted summertime (June-September) discharge temperatures with Unit 3 blowdown included are less than the existing Units 1 and 2 discharge temperatures, the addition of Unit 3 will not result in an increase in the temperature effect of the effluent during the summer months.

Table 10.1.2-4 summarizes the worst case discharge temperature for the remainder of the year, and the worst case temperature, as well as the average, maximum, and 95th percentile values for the river, as well as the associated Class III water quality standard. The number of dilutions (5.39) of ambient river water required to lower the discharge temperature rise to the standard are also shown on Table 10.1.2-4.

The resultant mixing zone for temperature, as well as the present required mixing zone size for Units 1 and 2, are shown in Table 10.1.2-5. The highest predicted effluent temperature for the SGS Units 1, 2 and 3 discharge is 89.2°F. The low 95th percentile ambient temperature is 57.3°F. This discharge will result in a temperature rise of 31.9°F (See Table 10.1.2-4). A dilution factor of 5.4 is required to meet the temperature rise limitation of 5°F. As a result, the proposed mixing zone for temperature involves an increase from 39 square meters (m^2) to about 120 m^2. A mixing zone of this size remains a relatively small portion of the St. Johns River in the site vicinity and therefore, no adverse impacts are anticipated as a result of the addition of Unit 3.

Oil and Grease

For Units 1, 2 and 3, the predicted effluent oil and grease concentration is 10.8 mg/L. The predicted effluent is above the water quality standard of 5 mg/L. A dilution factor of 3.0 is required and a mixing zone of 42 m^2 is proposed.

Specific Conductivity

The Units 1, 2, and 3 predicted discharge concentration is anticipated to be 4,645 (µmhos/cm). The 95th percentile ambient concentration is 1,327 µmhos/cm. A dilution factor of 4.0 is required to meet the water quality standard and a mixing zone of 73 m^2 is proposed.

Cadmium

The Units 1, 2 and 3 discharge predicted discharge concentration is anticipated to be 3.5 mg/L compared to the water quality standard of 1.765 mg/L. The 95th percentile in the river is 1.0 mg/L, therefore the required dilution factor is 2.3 and a mixing zone of 27m^2 is proposed.

Copper

For Units 1, 2 and 3, the predicted effluent concentration is 17.5 µg/L and the water quality standard is 15.1 µg/L. The 95th percentile ambient concentration is 5.0 µg/L, therefore, a dilution factor of 0.2 is required and a proposed mixing zone of 1.30 m^2 is currently proposed.

Cyanide

For Units 1, 2 and 3, the predicted effluent concentration is 9.1 µg/L compared to a water quality standard is 5.2 µg/L. The 95th percentile ambient concentration is 2.6 µg/L, therefore, a dilution factor of 1.5 is required and a mixing zone of 12.8 m^2 is requested.

Iron

For Units 1, 2 and 3, the predicted effluent concentration is 1.5 mg/L and the water quality standard is 1.0 mg/L. The 95th percentile ambient concentration is 0.43 mg/L. A dilution factor of 0.9 is required and a mixing zone of 5.9 m^2 is requested.

Mercury

For Units 1, 2 and 3, the assumed effluent concentration is 0.035 μg/L, compared to the water quality standard is 0.012 μg/L. The 95th percentile ambient concentration is 0.010 μg/L. A dilution factor of 13.29 is required and a mixing zone of 1,022 m^2 is requested.

Selenium

For Units 1, 2 and 3, the assumed effluent concentration is 8.75 μg/L and the water quality standard is 5.0 μg/L. The 95th percentile ambient concentration is 2.5 μg/L, therefore, a dilution factor of 1.5 is required and the requested mixing zone is 12.80 m^2.

Silver

Historical data indicate numerous exceedances of the water quality standard for silver in this segment of the St. Johns River. For that reason, EPA has listed this segment as impaired for silver and prepared a Total Maximum Daily Load (TMDL) for silver under Section 303(d) of the Clean Water Act. However, Seminole has conducted water quality sampling for silver using ultra-clean techniques (EPA Method No. E308) from July 2004 to December 2005. These data, as set forth in Table 10.1.2-3, demonstrate that this segment of the St. Johns River is in compliance with the water quality standard for silver. Therefore, neither a mixing zone nor any other manner of regulatory relief are proposed for silver because the best available data indicate that there is not a compliance problem.

10.1.2.4 Analysis of Antidegradation Considerations

In an ambitious initiative to eliminate additional and pre-existing process wastewater discharges to the maximum extent feasible, the Seminole Generating Station (SGS) Unit 3 Project has been designed with reuse features and a Zero Liquid Discharge (ZLD) system that will eliminate discharges of industrial wastewater to surface water from Units 1, 2, and 3, with the exception of cooling tower blowdown from all three units. Moreover, discharges to groundwater via percolation ponds will be eliminated in conjunction with the SGS Unit 3 project. Pollutant concentrations in the discharge of cooling tower blowdown primarily will be attributable to increased concentrations of intake pollutants, with a substantial decrease in mass loading. As set forth in the SGS Unit 3 Site Certification Application and NPDES application, several of the existing Units 1 and 2 mixing zones will be eliminated or substantially smaller.

Antidegradation Provisions

Section 403.088(2)(b), Fla. Stat. provides that if a proposed discharge does not reduce the quality of the receiving water below the classification established for it, the Department "may issue an operation permit if it finds that such degradation is necessary or desirable under federal standards and under circumstances which are clearly in the public interest."

Rule 62-4.242, F.A.C. provides:

(b) In determining whether a proposed discharge which results in water quality degradation is necessary or desirable under federal standards and under circumstances which are clearly in the public interest, the department shall consider and balance the following factors:

1. Whether the proposed project is important to and is beneficial to the public health, safety, or welfare (taking into account the policies set forth in Rules 62-302.100, 62-302.300, and, if applicable, 62-302.700); and

2. Whether the proposed discharge will adversely affect conservation of fish and wildlife, including endangered or threatened species, or their habitats; and

3. Whether the proposed discharge will adversely affect the fishing or water-based recreational values or marine productivity in the vicinity of the proposed discharge; and

4. Whether the proposed discharge is consistent with any applicable Surface Water Improvement and Management Plan that has been adopted by a Water Management District and approved by the Department.

(d) For industrial wastewater facilities, proposing new or expanded surface water discharges, in addition to subsection (b) above, in order for the new or expanded industrial wastewater discharge to be necessary or desirable under federal standards and under circumstances which are clearly in the public interest, the permit applicant:

1. Must demonstrate that use of other discharge locations, land application, or recycling at offsite locations that would avoid the degradation of water quality is not economically and technologically reasonable; and

2. Shall submit a signed statement under penalty of law that a waste minimization and source reduction analysis was completed consistent with best management practices appropriate for the type of facility or discharge proposed as identified in paragraph 62-620.100(3)(m), F.A.C., 40 CFR 122.44(k), and Guidance Manual for Developing Best Management Practices (BMP), U.S. Environmental Protection Agency, Office of Water, Washington, DC, EPA 833-B-93-004, October, 1993.

Rule 62-302.300(6) confirms that "private activities conducted for private purposes may...be in the public interest."

Antidegradation Analysis

The SGS Unit 3 Project will result in substantial net benefits to the receiving body of water, the St. Johns River. Surface water discharges of traditional steam electric power plant waste streams, such as low volume wastes, ash handling water, cleaning wastes, and gypsum purge water, will be eliminated. Existing Units 1 and 2 net surface water discharges of nutrients (nitrogen), estimated to be 20 lbs/day, will be eliminated. In fact, there will be potential reductions in the mass loadings of several additional water pollutants (See Table 10.1.2-6). The current utilization of percolation ponds for groundwater discharges will be eliminated. Moreover, the SGS Unit 3 Project, coupled with significant air pollution control upgrades on Units 1 and 2, will result in significantly lower net air emissions for several air pollutants, thereby reducing potential water quality impacts associated with deposition of those air pollutants.

1. The proposed project is important to and is beneficial to the public health, safety and welfare.

Seminole reliably, cost-effectively, and in an environmentally responsible manner provides electricity, which is an essential public amenity, to ten Member Electric Cooperatives that provide electricity in 46 of Florida's 67 counties. In conjunction with constructing and operating SGS Unit 3, Seminole will continue to meet the needs of its Members and the Florida public with enhanced reliability and efficiency, and with significant reductions in pollutant loading to the environment.

2. No Adverse Effects on Designated Uses

Regarding the second and third prongs of the antidegradation test, Seminole is aware of no grounds for expecting adverse environmental consequences associated with the Unit 3 Project. The discharge of several waste streams will be eliminated. There will be significant decreases in the mass loading of pollutants to the St. Johns River. An existing mixing zone will be eliminated; existing mixing zones for copper, mercury, and other parameters will be much smaller. The increased mixing zone sizes for oil and grease, selenium, and temperature are modest. The proposed new mixing zones for cadmium and lead will be very small. There is no reasonable expectation of any discernable adverse impacts on the aquatic environment.

SWIM Plan Consistency

To Seminole's knowledge, the proposed discharge is not inconsistent with any SWIM Plan provisions.

4. Reuse or other discharge locations

The SGS Unit 3 Project amply fulfills the objective of providing for beneficial reuse of industrial wastewater. No off-site additional reuse alternatives or land application options appear to be feasible. Similarly, no alternative discharge locations appear to be preferable to the currently utilized, previously approved, outfall.

5. Waste Minimization/Source Reduction

SGS Unit 3 inherently features waste minimization and source reduction concepts. BMP3 requirements have been and will continue to be met. Solid Waste disposal will be minimized through substantial existing and new reuse initiatives. The Professional Engineer signature affixed to the NPDES application confirms that the cited rule requirement has been met.

10.1.2.5 Conclusion

In general, SGS Unit 3 entails an additional discharge of cooling tower blowdown. Significantly, the SGS Unit 3 Project includes the installation and operation of a ZLD process wastewater elimination system. With the ZLD, the operation of Unit 3 will not result in discharges of low volume waste, cleaning wastestreams, ash handling water or other traditional pollutant waste streams to the St. Johns River. Moreover, the ZLD will also eliminate all of these wastestreams from Units 1 and 2, resulting in a substantial, net environmental improvement. The only remaining surface water discharges will be cooling tower blowdown from Units 1, 2 and 3. The pollutants in the cooling tower blowdown predominantly are "pass-through" pollutants from the intake river water.

The SGS Unit 3 Project meets all requirements of Florida's water quality standards, including the antidegradation test.

TABLE 10.1.2-1
Estimated SGS Unit 3 Cooling Tower Monthly Evaporation and Blowdown Rates in GPM

Month	Peak Evaporation	Peak Blowdown	Average Evaporation	Average Blowdown
January	5,202	2,079	4,501	1,799
February	5,350	2,139	4,579	1,830
March	5,350	2,139	4,723	1,888
April	5,507	2,201	4,898	1,958
May	5,673	2,268	5,079	2,030
June	5,601	2,239	5,157	2,061
July	5,601	2,239	5,195	2,076
August	5,576	2,229	5,175	2,068
September	5,601	2,239	5,120	2,046
October	5,437	2,173	4,911	1,963
November	5,350	2,139	4,710	1,882
December	5,068	2,026	4,534	1,812

Source: Golder, 2005

TABLE 10.1.2.2

Estimated SGS Unit 3 Cooling Tower Monthly Blowdown Temperatures in ° F.

Month	Peak Blowdown Temperature	Average Blowdown Temperature
January	85.7	76.4
February	87.2	77.0
March	87.2	78.7
April	88.1	80.0
May	89.2	81.4
June	90.8	83.9
July	90.8	84.4
August	91.3	84.8
September	90.8	83.4
October	89.7	81.6
November	87.2	78.5
December	88.5	77.2

Source: Golder, 2005

TABLE 10.1.2-3
ST. JOHNS RIVER SURFACE WATER QUALITY NEAR SGS OUTFALL

Parameter	Average	Maximum	95^{th} Precentile	Number of Samples	Class III Water Quality Standard[1]
Temperature (°F)*	77.10	92.28	57.26	947	92 or +5
Turbidity (NTU)	5.44	117.00	9.03	750	
pH	7.71	9.01	8.56	918	6.0 to 8.5
Oil and Greese (mg/L)	1.42	6.40	3.08	253	5
Ammonia, as NH4 (mg/L)	0.027	0.531	0.089	734	
Unionized Ammonia, as NH4 (mg/L)	0.00099	0.0284	0.0039	644	0.02
TKN, as N (mg/L)	1.30	2.40	1.78	717	
Nitrate+Nitrite, as N (mg/L)	0.052	0.410	0.190	344	
Nitraogen, total (mg/L)	1.304	2.237	1.831	317	
Phosphorus, total (mg/L)	0.074	0.682	0.119	708	
Ortho-phasphate (mg/L)	0.022	0.073	0.052	205	
Total Hardness, as CaCO3 (mg/L)	176	480	255	419	
Specific Conductivity (µmhos/cm)	940.3	1,516	1,327	978	1,991
Beryllium, annual average (µg/L)	0.022	0.050	0.038	22	0.13
Arsenic (µg/L)	2.23	8.85	8.85	214	50
Cadmium (µg/L)	0.57	2.20	1.00	415	1.77
Chromium (µg/L)	2.05	22.80	9.63	397	
Copper (µg/L)	1.76	17.00	5.00	424	15.1
Cyanide (µg/L)	1.70	4.00	2.60	33	5.2
Iron (mg/L)	0.20	1.52	0.43	433	1.0
Lead (µg/L)	1.77	10.00	3.26	375	6.5
Mercury (µg/L)	0.004	0.017	0.010	61	0.012
Nickel (µg/L)	3.56	53.00	9.45	376	84
Selenium (µg/L)	1.16	4.90	2.50	75	5
Silver (µg/L)	0.010	16.0	0.020	49	0.07
Zinc (µg/L)	9.00	196.0	25.0	443	193
Total Alpha (picocuries/L)	0.80	2.1	1.9	24	

Source: ECT, 2005.

* 95% Temperature is 5% low temperature

[1]Florida Administrative Code Chapter 62-302 Surface Water Quality Standards.

Table 10.1.2-4
SEMINOLE GENERATING STATION COOLING TOWER BLOWDOWN CHARACTERISTICS

Parameter	Average	Maximum	95th Percentile	Class III Water Quality Standard	Number of Samples	Assumed Blowdown Quality	Exceeds Standard	Dilutions (D) Required
Temperature (°F)*	77.10	92.28	57.26	92.0000	947	89.2000	no	
Temperature Rise (°F)*	0.00	0.00	0.00	5.0000		31.9406	yes	5.39
Oil and Grease (mg/L)	1.42	6.40	3.08	5.0000	253	10.7800	yes	3.01
Specific Conductivity (µmhos/cm)	940.3	1,516	1,327	1,990.7250	978	4,645.0250	yes	4.00
Cadmium (ug/L)	0.57	2.20	1.00	1.7650	415	3.5000	yes	2.27
Copper (ug/L)	1.76	17.00	5.00	15.0944	424	17.5000	yes	0.24
Cyanide (ug/L)	1.70	4.00	2.60	5.2000	33	9.1000	yes	1.50
Iron (ug/L)	0.20	1.52	0.43	1.0000	433	1.4969	yes	0.87
Lead (ug/L)	1.77	10.00	3.26	6.5160	375	11.4030	yes	1.50
Mercury (ug/L)	0.004	0.017	0.01	0.0120	61	0.0354	yes	12.29
Selenium (ug/L)	1.16	4.90	2.50	5.0000	75	8.7500	yes	1.50
Silver (ug/L)***	0.01	0.05	0.02	0.0700	49	0.0700	no	1.00

Source of Sampling Data: ECT, 2004.
* 95% Temperature is 5% low temperature
**pH controlled between 7.0 and 7.5 by addition of sulfuric acid
*** Data based on Method E200.8
Blowdown temperature is highest value for months October thru May (October Value Combined 3 units)

Discharge Flow = 5970 gpm = 13.3 cfs

TABLE 10.1.2-5
EXISTING AND PROPOSED MIXING ZONES

Constituent	Existing Units 1 and 2 Mixing Zone (square meters)	Proposed Units 1-3 Mixing Zones (square meters)	Parallel to Shore (meters)	Perpendicular to Shore (meters)
Copper	253.00	1.30	1.38	1.87
Mercury	67,323.00	1,022.84	51.04	40.08
Cyanide	108.00	12.80	4.18	6.12
Iron	15.00	5.90	2.86	4.12
Oil and Grease	23.00	42.00	7.44	11.29
Selemium	7.00	12.80	4.18	6.12
Specific Conductivity	170.00	73.00	9.84	14.83
Temperature	39.00	120.20	13.10	18.35
Zinc	29.00	NR	NR	NR
Cadmium	NR	27.00	5.90	9.04
Lead	NR	12.79	4.18	6.12

NR - Not Required

TABLE 10.1.2-6

Constituent++	Units	Existing Average D-001*	Ambient River Average Concentration**	Existing Net Mass Loading in lbs per day +	Proposed cooling tower blowdown concentration +++	Proposed Net Mass Loading in lbs per day #	Decrease in Net Mass Loading with Proposed Unit 3
Oil & Grease	mg/L	0.9	0.77	-114.4	2.695	-20.20	-94.24
Nitrogen, Total	mg/L	6.96	1.5	20.4	5.25	-39.36	59.73
Phosphorus, Total	mg/L	0.24	0.076	-4.2	0.266	-1.99	-2.24
Beryllium, annual average	ug/L	0	0.05	-10.2	0.175	-1.31	-8.85
Cadmium	ug/L	0.85	0.6	-82.2	2.1	-15.74	-66.49
Copper	ug/L	33.37	1.106	1,334.6	3.871	-29.02	1,363.65
Cyanide	ug/L	13.02	2.3	141.0	8.05	-60.35	201.31
Iron	mg/L	0.63	0.226	-16.5	0.791	-5.93	-10.56
Mercury***	ug/L	0.0212	0.0038	0.2	0.0133	-0.10	0.32
Nickel	ug/L	13.12	1.192	370.8	4.172	-31.28	402.12
Selenium	ug/L	4.47	1.134	-21.6	3.969	-29.76	8.16
Zinc	ug/L	10.4	2.805	-84.1	9.8175	-73.60	-10.51

* from 2004 Mixing Zone Assessment Report Table 3-1
** from 2004 Mixing Zone Asessment Report Table 3-3 or 4-1 (preferentially 4-1)
*** from Nov 2005 ECT Report

+ Existing station intake flow = 24.4 MGD per Table 1 of Nov 2005 ECT Report
and Existing Station D-001 discharge flow = 5.61 MGD per Table 9 of Nov 2005 ECT Report
'++: Constituents never detected assumed absent

+++ based on 3.5 cycles of concentration

Based on average intake flow rate of 33.25 MGD and average discharge flow rate of 8.60 MGD from Figure 3.5-1 of Unit 3 SCA

10.1.2

ATTACHMENT A

NPDES APPLICATION FORM

DEPARTMENT OF ENVIRONMENTAL PROTECTION FLORIDA

WASTEWATER FACILITY OR ACTIVITY PERMIT APPLICATION FORM 1 GENERAL INFORMATION

This form must be completed by all persons applying for a permit for a wastewater facility or activity under Chapter 62-620, F.A.C..
See Form 1 to determine which other application forms you will need.

WASTEWATER FACILITY OR ACTIVITY PERMIT
APPLICATION FORM 1
GENERAL INFORMATION

I IDENTIFICATION NUMBER:

Facility ID FL006498

II CHARACTERISTICS:

INSTRUCTIONS: Complete the questions below to determine whether you need to submit any permit application forms to the Department of Environmental Protection. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the blank in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements. See Section B of the instructions. See also, Section C of the instructions for definitions of the terms used here.

SPECIFIC QUESTIONS	YES	NO	FORM ATTACHED
A. Is this facility a domestic wastewater facility which results in a discharge to surface or ground waters?		X	
B. Does or will this facility (either existing or proposed) include a concentrated animal feeding operation or aquatic animal production facility which results in a discharge to waters?		X	
C. Does or will this facility (other than those describe in A. or B.) discharge process wastewater, or non-process wastewater regulated by effluent guidelines or new source performance standards, to surface waters?	X		2-CS
D. Does or will this facility (other than those described in A. or B.) discharge process wastewater to ground waters?		X	
E. Does or will this facility discharge non-process wastewater, not regulated by effluent guidelines or new source performance standards, to surface waters?		X	
F. Does or will this facility discharge non-process wastewater to ground waters?		X	
G. Does or will this facility discharge stormwater associated with industrial activity to surface waters?	X		
H. Is this facility a non-discharging/closed loop recycle system?		X	

III NAME OF FACILITY: (40 characters and spaces)

Seminole Generating Station

Facility ID FL0036498

IV FACILITY CONTACT: (A. 30 characters and spaces)

A. Name and Title (Last, first, & title)	B. Phone (area code & no.)
Yarborough, Robert Sr. Env. Engineer	813-963-0994

V FACILITY MAILING ADDRESS: (A. 30 characters and spaces; B. 25 characters and spaces)

A. Street or P.O. Box: P.O. Box 272000		
B. City or Town: Tampa	State: FL	Zip Code: 33688

VI FACILITY LOCATION: (A. 30 characters and spaces; B. 24 characters and spaces; C. 3 spaces (if known); D. 25 characters and spaces; E. 2 spaces; F. 9 spaces)

A. Street, Route or Other Specific Identifier: 890 North U.S. Highway 17		
B. County Name: Putnam	C. County Code (if known):	
D. City or Town: Palatka	E. State: FL	F. Zip Code: 32177

VII SIC CODES: (4-digit, in order of priority)

1. Code #:	(Specify) 049	2. Code #:	(Specify)
3. Code #:	(Specify)	4. Code #:	(Specify)

VIII OPERATOR INFORMATION: (A. 40 characters and spaces; B. 1 character; C. 1 character (if other, specify); D. 12 characters; E. 30 characters and spaces; F. 25 characters and spaces; G. 2 characters; H. 9 characters)

A. Name: Seminole Electric Cooperative		B. Is the name in VIII A. the owner? ☒ Yes ☐ No	
C. Status of Operator: F = Federal; S = State; P = Private; O = Other; M = Public (other than F or S)	(code) O	(specify) Cooperative	D. Phone No.: 813-963-0994
E. Street or P. O. Box: P.O. Box 272000			
F. City or Town: Tampa		G. State: FL	H. Zip Code: 33688

IX INDIAN LAND: Is the facility located on Indian lands? ☐ Yes ☒ No

Facility ID ____________

X EXISTING ENVIRONMENTAL PERMITS:

A. NPDES Permit No.	B. UIC Permit No.	C. Other (specify)	D. Other (specify)
FL0036498		PA 78-10	FLR05B869

XI MAP: Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

XII NATURE OF BUSINESS (provide a brief description)

Steam Electric Generation

XIII CERTIFICATION (see instructions)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

James R. Frauen
A. Name (type or print)

[signature]
B. Signature

Manager, Environmental Affairs
Official Title (type or print)

3-3-06
C. Date Signed

DEP Form 62-620.910(1)
(Effective October 23, 2000)

WASTEWATER APPLICATION
FORM 2CS

PERMIT TO DISCHARGE PROCESS WASTEWATER
FROM NEW OR EXISTING
INDUSTRIAL WASTEWATER FACILITIES
TO SURFACE WATER

FORM

2CS

WASTEWATER APPLICATION FOR PERMIT TO DISCHARGE PROCESS WASTEWATER FROM NEW OR EXISTING INDUSTRIAL WASTEWATER FACILITIES TO SURFACE WATERS

Facility I.D. Number: FL0036498

Please print or type information in the appropriate areas.

I OUTFALL LOCATION For each outfall, list the X,Y coordinates and the name of the receiving water.
(latitude/longitude to the nearest 15 seconds)

A. Outfall	B. Latitude			C. Longitude			D. Name of Receiving Water
No. (List)	Deg.	Min.	Sec.	Deg.	Min.	Sec.	
D-001	29	42	41	81	38	14	St Johns River

II OUTFALL DESIGN

A. Outfall No. (List)	B. Design Configuration and Construction Materials	C. Distance from shore	D. Diameter	E. Elevation of Discharge Invert (MSL)	F. Receiving Water Depth at POD (MSL)
D-001	16 inch pipe	900 ft	16 inches	0 MSL (estimated)	7 ft (approximately

Facility I.D. Number: FL0036498

III RECEIVING WATER INFORMATION

For each surface water that will receive effluent, supply the following information:

A. Name of Receiving Water	B. Check One		C. Classification (See Ch. 62-302, F.A.C.)	D. Type of Receiving Water (canal, river, lake, etc.)
	Fresh	Salt or Brackish		
St Johns River	☒	☐	III	River
	☐	☐		
	☐	☐		
	☐	☐		
	☐	☐		
	☐	☐		

E. Minimum 7-day 10-year low flow of the receiving water at each outfall (if appropriate).

F. Identify and describe the flow of effluent from each outfall to a major body of water. A suitably marked map or aerial photograph may be used.

G. Do you request a mixing zone under Rule 62-4.244, F.A.C.? If yes, for what parameters or pollutants?

IV FLOWS, SOURCES OF POLLUTION, AND TREATMENT TECHNOLOGIES

A. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item B. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

B. For each outfall, provide a description of:

1. All operations contributing wastewater to the effluent; including process wastewater, sanitary wastewater, cooling water, and stormwater runoff;

2. The average flow contributed by each operation; and

3. The treatment received by the wastewater.

Use the space on the next page. Continue on additional sheets, if necessary.

Facility I.D. Number: FL0036498

(1) Outfall No. (List)	(2) Operation(s) Contributing Flow		(3) Treatment		
	(a) Operation (list)	(b) Avg. Flow & Units	(a) Description	(b) List Code from Table 2CS-1	
D-001	Cooling Tower Blowdown from	8.6 MGD	Discharge to surface water	4A	
	Units 1, 2 and 3				
I-04A	Unit 1 Cooling Tower Blowdown	2.9 MGD	Disinfection	2-F	
			Neutralization	2-K	
			Dechlorination	2-E	
I-04B	Unit 2 Cooling Tower Blowdown	2.9 MGD	Disinfection	2-F	
			Neutralization	2-K	
			Dechlorination	2-E	
	Unit 3 Cooling Tower Blowdown	2.8 MGD	Disinfection	2-F	
			Neutralization	2-K	
			Dechlorination	2-E	
D-005	Surface Water Intake	33.2 MGD	Disinfection	2-F	

 Facility I.D. Number: FL0036498

C. Except for storm runoff, leaks, or spills, are any of the discharges described in Items II-A or B intermittent or seasonal?
☐ Yes (complete the following table) ☒ No (go to D. below)

(1) Outfall No. (List)	(2)Operation(s) Contributing Flow(List)	(3) Frequency		(4) Flow				
		(a) Days per Week (specify avg.)	(b) Months per Yr. (specify avg.)	(a) Flow Rate (in mgd)		(b) Total Volume (specify with units)		(c) Duration (in days)
				Long Term Avg.	Max. Daily	Long Term Avg.	Max. Daily	

D. Describe practices to be followed to ensure adequate wastewater treatment during emergencies such as power loss and equipment failures causing shutdown of pollution abatement equipment of the proposed/permitted facilities.

E. List the method(s) and location(s) of flow measurement.

V PRODUCTION

A. Does an effluent guideline limitation promulgated by EPA under Section 304 of the Clean Water Act apply to your facility?

☒ Yes (complete Item V-B) ☐ No (go to Section VI)

B. Are the limitations in the applicable guideline expressed in terms of production (or other measure of operation)?

☐ Yes (complete Item V-C) ☒ No (go to Section VI)

C. If you answered "yes" to Item V-B, list the quantity which represents an actual measurement of your level of production, expressed in the terms and units used in the applicable effluent guideline, and indicate the affected outfalls.

1. AVERAGE DAILY PRODUCTION			2. Affected Outfalls
a. Quantity per Day	b. Units of Measure	c. Operation, Product, Materials, Etc. (specify)	(list outfall nos.)

Facility I.D. Number: FL0036498

VI IMPROVEMENTS

A. Are you now required by any Federal, State or local authority to meet any implementation schedule for the construction, upgrading or operation of wastewater treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includes, but is not limited to, permit conditions, administrative or enforcement order, enforcement compliance schedule letter, stipulations, court orders, and grant or loan conditions.

☐ Yes (complete the following table) ☒ No (go to Item VI-B)

1. Identification of Condition, Agreement, Etc.	2. Affected Outfalls		3. Brief Description of Project	4. Final Compliance Date	
	a. No.	b. Source of Discharge		a. Required	B. Projected

B. OPTIONAL: You may attach additional sheets describing any additional water pollution control programs (or other environmental projects which may affect your discharges) you now have underway or which you plan. Indicate whether each program is now underway or planned, and indicate your actual or planned schedules for construction.

☐ Mark "X" if description of additional control programs is attached.

VII INTAKE AND EFFLUENT CHARACTERISTICS

A, B, & C: See instructions before proceeding--Complete one set of tables for each outfall -- Annotate the outfall number in the space provided. NOTE: Tables VII-A, VII-B, and VII-C are included on separate sheets number VII-1 through VII-9.

D. Use the space below to list any of the pollutants listed in Table 2CS-3 of the instructions, which you know or have reason to believe is discharged or may be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it to be present and report any analytical data in your possession.

1. Pollutant	2. Source	1. Pollutant	2. Source
Refer to 2CS data			

Facility I.D. Number: FL0036498

VIII POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS

Is any pollutant listed in Item VII-C a substance or a component of a substance which you currently use or manufacture as an intermediate or final product or by-product?

☐ YES (list all such pollutants below) ☒ NO (go to IX)

IX BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

☒ YES (identify the test(s) and describe their purposes below) ☐ NO (go to Section X)

Whole Effluent Acute Effulent Toxicity Testing is currently required in the current NPDES permit. Toxicity data is not available that is representative of the proposed discharge.

X CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item VII performed by a contract laboratory or consulting firm?

☒ YES (list the name, address, telephone number, and certification number of, and pollutants analyzed by each such laboratory or firm below) ☐ NO (go to Section XI)

A. Name	B. Address	C. Telephone (area code & no.)	D. Pollutants Analyzed (list)
STL Laboratories	6712 Benjamin Road, Tampa, FL	(813) 885-7427	All parameters except cyanide and TRO
PPB Laboratories	6821 SW Archer Road, Gainesville	(352) 377-2349	Cyanide
ELAB	8 East Tower, Ormond Beach, FL	(386) 672-5668	

Facility I.D. Number: FL0036498

XI CONNECTION TO REGIONAL POTW

A. Indicate the relationship between this project and area regional planning for wastewater treatment. List steps to be taken for this industrial wastewater facility to become part of an area-wide wastewater treatment system.

No Relationship Exists

XII-A CERTIFICATIONS FOR NEW OR MODIFIED FACILITIES

This is to certify the engineering features of this pollution control project have been designed by me and found to be in conformity with sound engineering principles, applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules of the Department. It is also agreed that the undersigned, if authorized by the owner, will furnish the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Harold A. Frediani, Jr
Signature

Harold A. Frediani, Jr
Name (please type)

(Affix Seal)

Golder Associates Inc., Certificate of Authorization No: 1670
Company Name

Address 3730 Chamblee Tucker Road
Atlanta, Georgia 30341

Florida Registration No.: 36394
Telephone No:: 770-496-1893
Date February 28, 2006

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

James R. Frauen, Manager Environmental Affairs
Name & Official Title (Please type or print)

(813) 963-0994
Telephone No. (area code & No.)

James R. Frauen
Signature

3-3-06
Date Signed

Facility ID. Number: FL0036498 Outfall No. D-001

PLEASE PRINT OR TYPE ONLY: You may report some or all of this information on separate sheets instead of completing these pages. Use the same format. SEE INSTRUCTIONS.

VII. INTAKE AND EFFLUENT CHARACTERISTICS

PART A - You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

1. Pollutant	2. Effluent							3.. Units		4. Intake (optional)		
	a. Max. Daily Value		b. Max. 30-day Value		c. Annual Avg. Value		d. No. of Analyses	a. Concentration	b. Mass	a. Long Term Avg. Value		b. No. of Analyses
	(1) Conc.	(2) Mass	(1) Conc.	(2) Mass	(1) Conc.	(2) Mass				(1) Conc.	(2) Mass	
a Carbonaceous Biochemical Oxygen Demand (CBOD)							1	mg/L				
b. Chemical Oxygen Demand (COD)							1	mg/L				
c. Total Organic Carbon (TOC)							1	mg/L				
d. Total Suspended Solids (TSS)							1	mg/L				
e. Total Nitrogen (as N)	6.40						1	mg/L				
f. Total Phosphorus (as P)	0.415						1	mg/L				
g. Ammonia (as N)	0.31						1	mg/L				
h. Flow - actual or projected	Value 17.7		Value		Value 8.6			MGD		Value		
i. Flow - design	Value		Value		Value			MGD		Value		
j. Specific Conductivity	Value 4645.03		Value		Value			UMHOS/CM		Value		
k. Temperature (winter)	Value73.4		Value		Value			°C		Value		
l. Temperature (summer)	Value92.4		Value		Value			°C		Value		
m. . pH	Min. 6.5	Max 8.5	Min.	Max.				STANDARD UNITS				

PART B - Mark "X" in column 2a for each pollutant you know or have reason to believe is present. Mark "X" in column 2b for each pollutant you believe to be absent. If you mark column 2a for any pollutant which is limited either directly, or indirectly but expressly, in an effluent limitations guideline, you must provide the results of at least one analysis for that pollutant. For other pollutants for which you mark column 2a, you must provide quantitative data or an explanation of their presence in your discharge. Complete one table for each outfall. See the instructions for additonal details and requirements.

1. Pollutant and CAS No. (if available)	2. Mark "X"		3. Effluent							4. Units		5. Intake (optional)		
	a. be-lieved present	b. be lieved absent	a. Maximum Daily Value		b. Max. 30-day Value (if available)		c. Long Term Avg. Value (if available)		d. No. of Analyses	a. Conc.	b. Mass	a. Long Term Avg. Value		b. No. of Analyses
			(1) Conc...	(2) Mass	(1) Conc.	(2) Mass	(1) Conc.	(2) Mass				(1) Conc.	(2) Mass	
a. Bromide (24949-67-9)	☐	☒							1	mg/L				
b. Chlorine, Total Residual	☐	☒							1	mg/L				
c. Color	☐	☒							1	PUC				
d. Fecal Coliform	☐	☒							1	/100mL				
e. Fluoride (16984-48-8)	☐	☒							1	mg/L				
f. Nitrate-Nitrite (as N)	☒	☐	0.66						1	mg/L				

: Item VII-B Contd.

Facility ID. Number FL0036498 Outfall No. D-001

1. Pollutant and CAS No. (if available)	2. Mark "X"		3. Effluent							4. Units		5. Intake (optional)		
	a .be-lieved present	b. be-lieved absent	a. Maximum Daily Value		b. Max. 30-day Value (if available)		c. Long Term Avg. Value (if available)		d. No. of Analyses	a. Conc.	b. Mass	a. Long Term Avg. Value		b. No. of Analyses
			(1) Conc.	(2) Mass	(1) Conc.	(2) Mass	(1) Conc.	(2) Mass				(1) Conc.	(2) Mass	
g. Nitrogen, Total Organic (as N)	☒	☐	6.41						1	mg/L				
h. Oil and grease	☒	☐	10.78						1	mg/L				
i. Phosphorus, Total (as P) (7723-14-0)	☒	☐	0.42						1	mg/L				
j. Radioactivity														
(1) Alpha, Total	☒	☐	6.65						1	pCi/L				
(2) Beta, Total	☐	☒							1	pCi/L				
(3) Radium, Total	☐	☒							1	pCi/L				
(4) Radium 226, Total	☐	☒							1	pCi/L				
k. Sulfate (as SO_4) (14808-79-8)	☐	☒							1	mg/L				
l. Sulfide (as S)	☐	☒							1	mg/L				
m. Sulfite (as SO_3) (14265-45-3)	☐	☒							1	mg/L				
n. Surfactants	☐	☒							1	mg/L				
o. Aluminum, Total (7429-90-5)	☐	☒							1	mg/L				
p. Barium, Total (7440-39-3)	☐	☒							1	mg/L				
q. Boron, Total (7440-42-8)	☐	☒							1	mg/L				
r. Cobalt, Total (7440-48-4)	☐	☐							1	mg/L				
s. Iron, Total (7439-89-6)	☒	☐	1.50						1	mg/L				
t. Maagnesium, Total (7439-95-4)	☐	☒							1	mg/L				
u. Molybdenum, Total (7439-98-7)	☐	☒							1	mg/L				
v. Manganese, Total (7439-96-5)	☐	☒							1	mg/L				
w. Tin, Total (7440-31-5)	☐	☒							1	mg/L				
x. Titanium, Total (7440-32-6)	☐	☒							1	mg/L				

Facility ID. Number: FL0036498 Outfall No. D-001

PART C - If you are a primary industry and this outfall contains process wastewater, refer to Table 2c-2 in the instructions to determine which of the GC/MS fractions you must test for. Mark "X" in column 2a for all GC/MS fractions that apply to your industry and for ALL toxic metals, cyanides, and total phenols. If you are not required to mark column 2a (secondary industries, non-process wastewater outfalls, and non-required GC/MS fractions), mark "X" in column 2b for each pollutant you know or have reason to believe is present. Mark "X" in column 2c for each pollutant you believe is absent. If you mark column 2a for any pollutant, you must provide the results of at least one analysis for that pollutant. If you mark column 2b for any pollutant, you must provide the results of at least one anlysis for that pollutnat if you know or have reason to believe it will be discharged in concentrations of 10 ppb or greater. If you mark column 2b for acrolein, acrylonitrile, 2,4,dinitrophenol, or 2-methyl-4,6 dinitrophenol, you must provide the results of at least one analysis for each of these pollutants which you know or have reason to believe that you discharge in concentrations of 100 ppb or greater. Otherwise, for pollutants for which you mark column2b, you must either submit at least one analysis or briefly describe the reasons the pollutant is expected to be discharged. Note that there are 7 pages to this part; please review each carefully. Complete one table (all 7 pages) for each outfall. See instructions for additional details and requirements.

1. Pollutant and CAS No. (if available)	2. Mark "X"			3. Effluent							4. Units		5. Intake (optional)		
	a. testing required	b. believed present	c. believed absent	a. Maximum Daily Value		b. Max. 30-day Value (if available)		c. Long Term Avg. Value (if available)		d. No. of Analyses	a. Conc.	b. Mass	a. Long Term Avg. Value		b. No. of Analyses
				(1) Conc.	(2) Mass	(1) Conc.	(2) Mass	(1) Conc.	(2) Mass				(1) Conc.	(2) Mass	
METALS, CYANIDE, AND TOTAL PHENOLS															
1M. Antimony, Total (7440-36-0)	☐	☐	☒							1	mg/L				
2M. Arsenic, Total (7723-14-0)	☐	☒	☐	30.98						1	mg/L				
3M. Beryllium, Total (7440-41-7)	☐	☒	☐	0.13						1	mg/L				
4M. Cadmium, Total (7440-43-9)	☐	☒	☐	3.50						1	mg/L				
5M. Chromium, Total (7440-47-3)	☐	☒	☐	33.70						1	mg/L				
6M. Copper, Total (7440-50-8)	☐	☒	☐	17.50						1	mg/L				
7M. Lead, Total (7439-92-1)	☐	☒	☐	11.40						1	mg/L				
8M. Mercury, Total (7439-97-6)	☐	☒	☐	0.04						1	mg/L				
9M. Nickel, Total (7440-02-0)	☐	☒	☐	33.06						1	mg/L				
10M. Selenium, Total (7782-49-2)	☐	☒	☐	8.75						1	mg/L				
11M. Silver, Total (7440-22-4)	☐	☒	☐	0.07						1	mg/L				
12M. Thallium, Total (7440-28-0)	☐	☐	☒							1	mg/L				
13M. Zinc, Total (7440-66-6)	☐	☐	☐	87.50						1	mg/L				
14M. Cyanide, Total (57-12-5)	☐	☐	☐	9.10						1	mg/L				
15M. Phenols, Total	☐	☐	☒							1	mg/L				
DIOXIN															
2,3,7,8-Tetra-chlorodibenzo-P-Dioxin (1764-01-6)	☐	☐	☒							1	pg/L				
GC/MS FRACTION - VOLATILE COMPOUNDS															
1V. Acrolein (107-02-8)	☐	☐	☒							1	mg/L				
2V. Acrylonitrile (107-13-1)	☐	☐	☒							1	mg/L				

Facility ID. Number: FL0036498 Outfall No. D-001

1. Pollutant and CAS No. (if available)	2. Mark "X"			3. Effuent							4. Units		5. Intake (optional)		
	a. testing required	b. be-lieved present	c. be-lieved absent	a. Maximum Daily Value		b. Max. 30-day Value (if available)		c. Long Term Avg. Value (if available)		d. No. of Analyses	a. Conc.	b. Mass	a. Long Term Avg. Value		b. No. of Analyses
				(1) Conc.	(2) Mass	(1) Conc.	(2) Mass	(1) Conc.	(2) Mass				(1) Conc.	(2) Mass	
GC/MS FRACTION - VOLATILE COMPOUNDS (continued)															
3V. Benzene (71-43-2)	☐	☐	☒							1	mg/L				
4V. Bis (Chloromethyl) Ether (542-88-1)	☐	☐	☒												
5V. Bromoform (75-25-2)	☐	☐	☒							1	mg/L				
6V. Carbon Tetrachloride (56-23-5)	☐	☐	☒							1	mg/L				
7V Chlorobenzene (108-90-7)	☐	☐	☒							1	mg/L				
8V. Chlorodi-bromomethane (124-8-1)	☐	☐	☒							1	mg/L				
9V. Chloroethane (74-00-3)	☐	☐	☒							1	mg/L				
10V. 2-Chloro-ethylvinyl Ether (110-75-8)	☐	☐	☒							1	mg/L				
11V. Chloroform (67-86-3)	☐	☐	☒							1	mg/L				
12V. Dichloro-bromomethane (75-24-4)	☐	☐	☒							1	mg/L				
13V. Dichloro-difluoromethane (75-71-8)	☐	☐	☒							1	mg/L				
14V. 1,1-Dichloroethane (75-34-3)	☐	☐	☒							1	mg/L				
15V. 1,2-Dichloroethane (107-06-2)	☐	☐	☒							1	mg/L				
16V. 1,1-Dichloroethylene (75-35-4)	☐	☐	☒							1	mg/L				
17V. 1,2,-Dichloropropane (78-87-5)	☐	☐	☒							1	mg/L				
18V. 1,3-Dichloropropylene (542-75-6)	☐	☐	☒							1	mg/L				
19V. Ethylbenzene (100-41-4)	☐	☐	☒							1	mg/L				
20V. Methyl Bromide (74-83-9)	☐	☐	☒							1	mg/L				
21V. Methyl Chloride (74-87-3)	☐	☐	☒							1	mg/L				
22V. Methylene Chloride (74-98-2)	☐	☐	☒							1	mg/L				
23V. 1,1,2,2-Tetra-chloroethane (79-34-5)	☐	☐	☒							1	mg/L				
24V. Tetrachloroethylene (127-18-4)	☐	☐	☒							1	mg/L				

Facility ID. Number: FL0036498 Outfall No. D-001

1. Pollutant and CAS No. (if available)	2. Mark "X"			3. Effluent							4. Units		5. Intake (optional)		
	a. testing required	b. believed present	c. believed absent	a. Maximum Daily Value		b. Max. 30-day Value (if available)		c. Long Term Avg. Value (if available)		d. No. of Analyses	a. Conc.	b. Mass	a. Long Term Avg. Value		b. No. of Analyses
				(1) Conc.	(2) Mass	(1) Conc.	(2) Mass	(1) Conc.	(2) Mass				(1) Conc.	(2) Mass	
GC/MS FRACTION - VOLATILE COMPOUNDS (continued)															
25V. Toluene (108-88-3)	☐	☐	☒							1	mg/L				
26V. 1,2-Trans-Dichloroethylene (156-60-5)	☐	☐	☒							1	mg/L				
27V. 1,1,2-Trichloroethane (71-55-6)	☐	☐	☒							1	mg/L				
28V. 1,1,2-Trichloroethane (79-00-5)	☐	☐	☒							1	mg/L				
29V. Trichloroethylene (79-01-6)	☐	☐	☒							1	mg/L				
30V. Trichloro-fluoromethane (75-69-4)	☐	☐	☒							1	mg/L				
31V. Vinyl Chloride (75-01-4)	☐	☐	☒							1	mg/L				
GC/MS FRACTION - ACID COMPOUNDS															
1A. 2-Chlorophenol (95-57-8)	☐	☐	☒							1	mg/L				
2A. 2,4-Dichlorophenol (120-83-2)	☐	☐	☒							1	mg/L				
3A. 2,4-Dimethylphenol (105-67-9)	☐	☐	☒							1	mg/L				
4A. 4,6-Dinitro-O-Cresol (534-53-1)	☐	☐	☒							1	mg/L				
5A. 2,4-Dinitrophenol (51-28-5)	☐	☐	☒							1	mg/L				
6A. 2-Nitrophenol (88-75-5)	☐	☐	☒							1	mg/L				
7A. 4-Nitrophenol (100-02-7)	☐	☐	☒							1	mg/L				
8A P-Chloro-M-Cresol (59-50-7)	☐	☐	☒							1	mg/L				
9A Pentachlorophenol (87-86-5)	☐	☐	☒							1	mg/L				
10A Phenol (108-95-2)	☐	☐	☒							1	mg/L				
11A 2,4,5-Trichloro-phenol (88-06-2)	☐	☐	☒							1	mg/L				
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS															
1B. Acenaphthene (63-32-9)	☐	☐	☒							1	mg/L				
2B. Acenaphtylene (208-96-8)	☐	☐	☒							1	mg/L				
3B. Anthracene (120-12-7)	☐	☐	☒							1	mg/L				
4B. Benzidine (92-87-5)	☐	☐	☒							1	mg/L				

Facility ID. Number: FL0036498 Outfall No. D-001

1. Pollutant and CAS No. (if available)	2. Mark "X"			3. Effluent							4. Units		5. Intake (optional)		
	a. testing required	b. believed present	c. believed absent	a. Maximum Daily Value		b. Max. 30-day Value (if available)		c. Long Term Avg. Value (if available)		d. No. of Analyses	a. Conc.	b. Mass	a. Long Term Avg. Value		b. No. of Analyses
				(1) Conc.	(2) Mass	(1) Conc.	(2) Mass	(1) Conc.	(2) Mass				(1) Conc.	(2) Mass	
5B. Benzo *(a)* Anthracene (56-55-3)	☐	☐	☒							1	mg/L				
6B. Benzo *(a)* Pyrene (50-32-8)	☐	☐	☒							1	mg/L				
7B. 3,4-Benzo-fluoranthene (205-99-2)	☐	☐	☒							1	mg/L				
8B. Benzo *(ghi)* Perylene (191-24-2)	☐	☐	☒							1	mg/L				
9B. Benzo *(k)* Fluoranthene (207-08-9)	☐	☐	☒							1	mg/L				
10B. Bis *(2-Chloroethoxy)* Methane (111-91-1)	☐	☐	☒							1	mg/L				
11B. Bis *(2-chloroethyl)* Ether (111-44-4)	☐	☐	☒							1	mg/L				
12B. Bis *(2-Chloroisopropyl)* Ether (102-60-1)	☐	☐	☒							1	mg/L				
13B. Bis *(2-Ethylhexyl)* Phthalate (117-81-7)	☐	☐	☒							1	mg/L				
14B. 4-Bromophenyl Phenyl Ether (101-55-3)	☐	☐	☒							1	mg/L				
15B Butyl Benzyl Phthalate (84-68-7)	☐	☐	☒							1	mg/L				
16B. 2-Chloronaphthalene (91-58-7)	☐	☐	☒							1	mg/L				
17B. 4-Chlorophenyl Phenyl Ether (7005-72-3)	☐	☐	☒							1	mg/L				
18B. Chrysene (218-01-9)	☐	☐	☒							1	mg/L				
19B. Dibenzo *(a,h)* Anthracene (53-70-3)	☐	☐	☒							1	mg/L				
20B. 1,2-Dichlorobenzene (95-50-1)	☐	☐	☒							1	mg/L				
21B. 1,3-Dichlorobenzene (541-73-1)	☐	☐	☒							1	mg/L				
22B. 1,4-Dichlorobenzene (106-46-7)	☐	☐	☒							1	mg/L				
23B. 3,3'-Dichlorobenzidine (92-94-1)	☐	☐	☒							1	mg/L				
24B. Diethyl Phthalate (84-66-2)	☐	☐	☒							1	mg/L				
25B. Dimethyl Phthalate (131-11-3)	☐	☐	☒							1	mg/L				
26B. Di-N-Butyl Phthalate (84-74-2)	☐	☐	☒							1	mg/L				
27B. 2,4-Dinitrotoluene (121-14-2)	☐	☐	☒							1	mg/L				
28B. 2,6-Dinitrotoluene (606-20-2)	☐	☐	☒							1	mg/L				

Facility ID. Number: FL0036498 Outfall No. D-001

1. Pollutant and CAS No. (if available)	2. Mark "X"			3. Effluent							4. Units		5. Intake (optional)		
	a. testing required	b. believed present	c. believed absent	a. Maximum Daily Value		b. Max. 30-day Value (if available)		c. Long Term Avg. Value (if available)		d. No. of Analyses	a. Conc.	b. Mass	a. Long Term Avg. Value		b. No. of Analyses
				(1) Conc.	(2) Mass	(1) Conc.	(2) Mass	(1) Conc.	(2) Mass				(1) Conc.	(2) Mass	
29B. Di-N-Octyl Phthalate (117-84-0)	☐	☐	☒							1	mg/L				
30B. 1,2-Diphenylhydrazine *(as Azobenzene)* (122-66-7)	☐	☐	☒							1	mg/L				
31B. Fluoranthene (206-44-0)	☐	☐	☒							1	mg/L				
32B. Fluorene (86-73-7)	☐	☐	☒							1	mg/L				
33B. Hexachlorobenzene (118-74-1)	☐	☐	☒							1	mg/L				
34B. Hexachlorobutadiene (87-68-3)	☐	☐	☒							1	mg/L				
35B. Hexachlorocyclopentadiene (77-47-4)	☐	☐	☒							1	mg/L				
36B. Hexachloroethane (67-72-1)	☐	☐	☒							1	mg/L				
37B. Indeno *(1,2,3-cd)* Pyrene (193-39-5)	☐	☐	☒							1	mg/L				
38B. Isophorone (78-59-1)	☐	☐	☒							1	mg/L				
39B. Naphthalene (91-20-3)	☐	☐	☒							1	mg/L				
40B. Nitrobenzene (98-95-9)	☐	☐	☒							1	mg/L				
41B N-Nitrosodimethylamine (62-75-9)	☐	☐	☒							1	mg/L				
42B. N-Nitrosodi-N-Propylamine (621-64-7)	☐	☐	☒							1	mg/L				
43B. N-Nitro-sodiphenylamine (86-30-6)	☐	☐	☒							1	mg/L				
44B Phenanthrene (85-01-8)	☐	☐	☒							1	mg/L				
45B. Pyrene (129-00-0)	☐	☐	☒							1	mg/L				
46B. 1,2,4-Trichlorobenzene (120-82-1)	☐	☐	☒							1	mg/L				
GC/MS FRACTION - PESTICIDES															
1P. Aldrin (309-00-2)	☐	☐	☒												
2P. -BHC (319-84-6)	☐	☐	☒												
3P -BHC (319-85-7)	☐	☐	☒												
4P. -BHC (58-89-9)	☐	☐	☒												
5P. -BHC (319-86-8)	☐	☐	☒												

Facility ID. Number: FL0036498 Outfall No. D-001

1. Pollutant and CAS No. (if available)	2. Mark "X"			3. Effluent							4. Units		5. Intake (optional)		
	a. testing required	b. believed present	c. believed absent	a. Maximum Daily Value		b. Max. 30-day Value (if available)		c. Long Term Avg. Value (if available)		d. No. of Analyses	a. Conc.	b. Mass	a. Long Term Avg. Value		b. No. of Analyses
				(1) Conc.	(2) Mass	(1) Conc.	(2) Mass	(1) Conc.	(2) Mass				(1) Conc.	(2) Mass	
6P. Chlordane (57-74-9)	☐	☐	☒												
7P. 4,4'-DDT (50-29-3)	☐	☐	☒												
8P. 4,4'-DDE (72-55-9)	☐	☐	☒												
9P. 4,4'-DDD (72-54-8)	☐	☐	☒												
10P. Dieldrin (60-57-1)	☐	☐	☒												
11P. -Endosulfan (115-29-7)	☐	☐	☒												
12P. -Endosulfan (115-29-7)	☐	☐	☒												
13P. Endosulfan Sulfate (1031-07-8)	☐	☐	☒												
14P. Endrin (72-20-8)	☐	☐	☒												
15P. Endrin Aldehyde (7421-92-4)	☐	☐	☒												
16P. Heptachlor (76-44-8)	☐	☐	☒												
17P. Heptachlor Epoxide (1024-57-3)	☐	☐	☒												
18P. PCB-1242 (53469-21-9)	☐	☐	☒												
19P. PCB-1254 (11097-69-1)	☐	☐	☒												
20P. PCB-1221 (11104-28-2)	☐	☐	☒												
21P. PCB-1232 (11141-16-5)	☐	☐	☒												
22P. PCB-1248 (12672-29-6)	☐	☐	☒												
23P. PCB-1260 (11096-82-5)	☐	☐	☒												
24P. PCB-1016 (12674-11-2)	☐	☐	☒												
25P. Toxaphene (8001-35-2)	☐	☐	☒												

10.1.2

ATTACHMENT B

WATER QUALITY DATA

Ambient Total Cadmium Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1.77 µg/L

Average MDL = 2.7 µg/L

Average =	0.57 µg/L
Maximum =	2.20 µg/L
Standard Dev =	0.46 µg/L
95 Percentile =	1.00 µg/L

Count 415.00

Station	Date	Time		Cadmium (µg/L)	Remark Code	Value used (µg/L)
SECI D-005	6/93		<	2	K	0.88
SECI D-005	9/93		<	2	K	0.88
SECI D-005	12/93		<	2	K	0.88
SECI D-005	3/94		<	2	K	0.88
SECI D-005	6/94		<	2	K	0.88
SECI D-005	9/94					0.88
SECI D-005	12/94		<	2	K	0.88
SECI D-005	3/95		<	2	K	0.88
SECI D-005	6/95		<	2	K	0.88
SECI D-005	9/95		<	2	K	0.88
SECI D-005	12/95		<	1	K	0.50
SECI D-005	3/96		<	1	K	0.50
SECI D-005	6/96		<	1	K	0.50
SECI D-005	9/96		<	2	K	0.88
SECI D-005	12/96			1.5		1.50
SECI D-005	3/97		<	1	K	0.50
SECI D-005	6/97		<	1	K	0.50
SECI D-005	9/97		<	1	K	0.50
SECI D-005	12/97		<	1	K	0.50
FP41	9/22/1993	14:50		0	T	0.88
FP42	9/22/1993	15:00		0	T	0.88
FP42	11/27/2001	10:00		0.019	T	0.02
FP43	9/22/1993	15:15		0	T	0.88
SJ6	5/16/2002	10:45		-0.014	T	0.88
SJRCC	5/12/1993	13:40		0	T	0.88
SJRCC	6/8/1993	8:25		-0.1	T	0.88
SJRCC	7/7/1993	11:20		-0.1	T	0.88
SJRCC	9/22/1993	8:50		0	T	0.88
SJRCC	12/15/1993	11:30		-0.1	T	0.88
SJRCC	1/20/1994	12:05		-0.1	T	0.88
SJRCC	2/15/1994	10:15		0	T	0.88
SJRCC	3/14/1994	12:10		0.2		0.20
SJRCC	4/12/1994	11:30		2		2.00
SJRCC	5/16/1994	12:05		0	T	0.88
SJRCC	6/14/1994	12:25		-0.1	T	0.88
SJRCC	7/12/1994	11:40		-1.6	T	0.88
SJRCC	8/16/1994	11:45		0	T	0.88
SJRCC	9/13/1994	11:55		0	T	0.88
SJRCC	10/17/1994	11:25		0.01	W	0.01
SJRCC	11/18/1994	10:40		0	T	0.88
SJRCC	12/13/1994	12:10		0	T	0.88
SJRCC	1/19/1995	11:40		0	T	0.88
SJRCC	3/15/1995	10:40		0.6	T	0.60
SJRCC	4/11/1995	9:30		0	T	0.88
SJRCC	5/16/1995	11:25		0.1	T	0.10
SJRCC	6/13/1995	10:00		0.3	T	0.30
SJRCC	7/11/1995	11:15		0.2	T	0.20
SJRCC	8/15/1995	12:15		-0.1	T	0.88
SJRCC	9/13/1995	12:10		0	T	0.88
SJRCC	10/17/1995	11:00		1.4	T	1.40
SJRCC	11/16/1995	11:20		-0.2	T	0.88
SJRCC	12/13/1995	10:40		-0.8	T	0.88
SJRCC	1/16/1996	10:50		1	T	1.00
SJRCC	2/13/1996	11:25		-0.05	T	0.88

SJRCC	3/13/1996	11:15	0.2	T	0.20
SJRCC	4/16/1996	10:40	1.3	T	1.30
SJRCC	5/14/1996	11:00	0.6	T	0.60
SJRCC	6/12/1996	11:15	1.4	T	1.40
SJRCC	7/16/1996	10:55	0.5	T	0.50
SJRCC	8/21/1996	11:20	0.5	T	0.50
SJRCC	9/17/1996	10:15	2.1		2.10
SJRCC	10/15/1996	10:15	1.4	T	1.40
SJRCC	11/13/1996	10:40	0	T	0.88
SJRCC	12/3/1996	10:40	-0.2	T	0.88
SJRCC	1/14/1997	10:25	0	T	0.88
SJRCC	2/11/1997	10:25	0	T	0.88
SJRCC	3/11/1997	10:25	0	T	0.88
SJRCC	4/15/1997	10:25	0	T	0.88
SJRCC	4/15/1997	10:25	0	T	0.88
SJRCC	5/13/1997	10:20	0	T	0.88
SJRCC	5/13/1997	10:20	0	T	0.88
SJRCC	6/10/1997	10:40	0	T	0.88
SJRCC	6/10/1997	10:40	0	T	0.88
SJRCC	7/8/1997	10:40	0	T	0.88
SJRCC	7/8/1997	10:40	0	T	0.88
SJRCC	8/5/1997	10:30	0	T	0.88
SJRCC	8/5/1997	10:30	0	T	0.88
SJRCC	9/16/1997	9:40	-0.008	T	0.88
SJRCC	9/16/1997	9:40	-0.008	T	0.88
SJRCC	10/9/1997	14:20	0	T	0.88
SJRCC	11/11/1997	9:50	-0.008	T	0.88
SJRCC	12/9/1997	9:45	0.009	T	0.01
SJRCC	1/13/1998	10:10	-0.011	T	0.88
SJRCC	2/10/1998	9:45	-0.002	T	0.88
SJRCC	3/17/1998	10:20	0.004	T	0.00
SJRCC	4/14/1998	9:45	0.001	T	0.00
SJRCC	5/12/1998	13:40	0.006	T	0.01
SJRCC	6/9/1998	13:25	0.015	T	0.02
SJRCC	7/14/1998	14:00	0.011	T	0.01
SJRCC	8/18/1998	9:15	-0.033	T	0.88
SJRCC	9/8/1998	13:30	-0.026	T	0.88
SJRCC	10/15/1998	14:00	-0.001	T	0.88
SJRCC	12/15/1998	13:30	0.005	T	0.01
SJRCC	1/12/1999	9:50	-0.007	T	0.88
SJRCC	2/9/1999	10:30	-0.009	T	0.88
SJRCC	3/10/1999	13:35	-0.022	T	0.88
SJRCC	4/27/1999	10:45	0.013	T	0.01
SJRCC	5/10/1999	10:30	0.007	T	0.01
SJRCC	6/7/1999	10:15	0.007	T	0.01
SJRCC	7/12/1999	13:10	-0.008	T	0.88
SJRCC	8/10/1999	13:20	-0.007	T	0.88
SJRCC	9/28/1999	14:30	0.05	T	0.05
SJRCC	10/12/1999	14:30	0.1	T	0.10
SJRCC	11/9/1999	11:40	0.04	T	0.04
SJRCC	12/6/1999	14:10	0.03	T	0.03
SJRCC	1/10/2000	14:20	0.29	T	0.29
SJRCC	2/7/2000	15:40	0.163	W	0.16
SJRCC	3/6/2000	15:10	0.352	W	0.35
SJRCC	4/10/2000	10:50	0.19	T	0.19
SJRCC	5/8/2000	11:15	0.244	W	0.24
SJRCC	6/12/2000	15:00	0.145	W	0.15
SJRCC	7/10/2000	10:30	0.04	T	0.04
SJRCC	8/7/2000	10:45	0.47	T	0.47
SJRCC	9/11/2000	9:55	0.144	T	0.14
SJRCC	10/11/2000	15:25	0.555	W	0.56
SJRCC	11/13/2000	9:40	0.217	W	0.22
SJRCC	12/14/2000	9:55	-0.007	T	0.88

SJRCC	1/9/2001	11:40	0.002	T	0.00
SJRCC	2/15/2001	10:00	-0.092	T	0.88
SJRCC	3/15/2001	9:00	0.023	T	0.02
SJRCC	4/10/2001	8:50	-0.08	T	0.88
SJRCC	5/14/2001	13:55	-0.088	T	0.88
SJRCC	6/11/2001	13:50	-0.126	T	0.88
SJRCC	7/11/2001	12:34	0.028	T	0.03
SJRCC	8/9/2001	11:50	0.031	T	0.03
SJRCC	9/11/2001	14:40	-0.055	T	0.88
SJRCC	10/9/2001	12:20	-0.014	T	0.88
SJRCC	11/20/2001	13:10	0.011	T	0.01
SJRCC	12/5/2001	12:50	-0.027	T	0.88
SJRCC	1/8/2002	12:15	-0.039	T	0.88
SJRCC	2/11/2002	11:40	-0.048	T	0.88
SJRCC	3/11/2002	9:20	0.037	T	0.04
SJRCC	4/8/2002	13:05	0.5	U	0.25
SJRCC	5/13/2002	12:10	-0.024	T	0.88
SJRCC	6/10/2002	12:15	0.32	T	0.32
SJRCC	7/15/2002	12:50	-0.04	T	0.88
SJRCC	8/12/2002	11:45	0.117	T	0.12
SJRCC	9/12/2002	11:30	-0.079	T	0.88
SJRCC	10/7/2002	12:20	-0.011	T	0.88
SJRCC	11/11/2002	11:50	-0.136	T	0.88
SJRCC	12/9/2002	11:30	0.111	T	0.11
SJRCC	1/6/2003	11:20	-0.032	T	0.88
SJRCC	2/11/2003	10:00	0.072	T	0.07
SJRCC	3/11/2003	13:10	0.004	T	0.00
SJRCC	3/11/2003	13:15	0.032	T	0.03
SJRCC	4/14/2003	12:15	0.016	T	0.02
SJRCC	4/14/2003	12:20	0.012	T	0.01
SJRCC	5/12/2003	12:50	0.056	T	0.06
SJRCC	5/12/2003	13:00	0.008	T	0.01
SJRCC	6/9/2003	12:20	0.062	T	0.06
SJRCC	6/9/2003	12:25	0.023	T	0.02
SJRCC	8/12/2003	12:50	0.105	T	0.11
SJRCC	8/12/2003	12:55	0.098	T	0.10
SJRCC	9/8/2003	12:10	0.101	T	0.10
SJRCC	10/7/2003	11:45	-0.044	T	0.88
SJRCC	11/12/2003	12:25	0.245	T	0.25
SJRCC	12/10/2003	13:30	0.079	T	0.08
SJRCC	1/12/2004	13:30	0.004	T	0.00
SJRCC	2/9/2004	12:55	0.028	T	0.03
SJRCE	5/12/1993	13:50	0	T	0.88
SJRCE	6/8/1993	8:15	-0.1	T	0.88
SJRCE	7/7/1993	11:10	0	T	0.88
SJRCE	9/22/1993	8:40	0	T	0.88
SJRCE	12/15/1993	11:20	-0.1	T	0.88
SJRCE	1/20/1994	11:50	0.4	T	0.40
SJRCE	2/15/1994	10:30	0	T	0.88
SJRCE	3/14/1994	11:55	0	T	0.88
SJRCE	4/12/1994	11:20	2		2.00
SJRCE	5/16/1994	11:50	0.1	T	0.10
SJRCE	6/14/1994	12:05	-0.1	T	0.88
SJRCE	7/12/1994	11:20	-3.1	T	0.88
SJRCE	8/16/1994	11:35	-0.1	T	0.88
SJRCE	9/13/1994	11:40	0	T	0.88
SJRCE	10/17/1994	11:10	0.1	T	0.10
SJRCE	11/18/1994	10:30	0	T	0.88
SJRCE	12/13/1994	12:00	0	T	0.88
SJRCE	1/19/1995	11:30	0	T	0.88
SJRCE	3/15/1995	10:30	0.6	T	0.60
SJRCE	4/11/1995	9:25	0	T	0.88
SJRCE	5/16/1995	11:15	0.2	T	0.20

SJRCE	6/13/1995	9:50	0.3	T	0.30
SJRCE	7/11/1995	10:55	0.1	T	0.10
SJRCE	8/15/1995	12:00	-0.1	T	0.88
SJRCE	9/13/1995	11:55	0	T	0.88
SJRCE	10/17/1995	10:45	1.1	T	1.10
SJRCE	11/16/1995	11:05	-0.3	T	0.88
SJRCE	12/13/1995	10:25	-1.5	T	0.88
SJRCE	1/16/1996	10:45	0.8	T	0.80
SJRCE	2/13/1996	11:15	-0.4	T	0.88
SJRCE	3/13/1996	11:05	0	T	0.88
SJRCE	4/16/1996	10:30	1.2	T	1.20
SJRCE	5/14/1996	10:50	0.5	T	0.50
SJRCE	6/12/1996	11:05	1.6	T	1.60
SJRCE	7/16/1996	10:45	0.7	T	0.70
SJRCE	8/21/1996	11:05	0.5	T	0.50
SJRCE	9/17/1996	9:55	2.2		2.20
SJRCE	10/15/1996	10:30	1.2	T	1.20
SJRCE	11/13/1996	10:15	0	T	0.88
SJRCE	12/3/1996	10:25	-0.2	T	0.88
SJRCE	1/14/1997	10:15	0	T	0.88
SJRCE	2/11/1997	10:15	0	T	0.88
SJRCE	3/11/1997	10:20	0	T	0.88
SJRCE	4/15/1997	10:15	0	T	0.88
SJRCE	4/15/1997	10:15	0	T	0.88
SJRCE	5/13/1997	10:10	0	T	0.88
SJRCE	5/13/1997	10:10	0	T	0.88
SJRCE	6/10/1997	10:25	0	T	0.88
SJRCE	6/10/1997	10:25	0	T	0.88
SJRCE	7/8/1997	10:30	0	T	0.88
SJRCE	7/8/1997	10:30	0	T	0.88
SJRCE	8/5/1997	10:20	0	T	0.88
SJRCE	8/5/1997	10:20	0	T	0.88
SJRCE	9/16/1997	9:35	0.002	T	0.00
SJRCE	9/16/1997	9:35	0.002	T	0.00
SJRCE	10/9/1997	14:00	0	T	0.88
SJRCE	11/11/1997	9:45	0	T	0.88
SJRCE	12/9/1997	9:30	0.01	T	0.01
SJRCE	1/13/1998	9:55	0	T	0.88
SJRCE	2/10/1998	9:40	0.007	T	0.01
SJRCE	3/17/1998	10:15	0	T	0.88
SJRCE	4/14/1998	9:30	-0.002	T	0.88
SJRCE	5/12/1998	13:45	0.004	T	0.00
SJRCE	6/9/1998	13:45	-0.029	T	0.88
SJRCE	7/14/1998	13:45	0.003	T	0.00
SJRCE	8/18/1998	9:00	-0.037	T	0.88
SJRCE	9/8/1998	13:20	-0.018	T	0.88
SJRCE	10/15/1998	13:40	-0.01	T	0.88
SJRCE	12/15/1998	13:40	0	T	0.88
SJRCE	1/12/1999	9:45	0.008	T	0.01
SJRCE	2/9/1999	10:15	-0.007	T	0.88
SJRCE	3/10/1999	13:45	-0.004	T	0.88
SJRCE	4/27/1999	10:20	0.022	T	0.02
SJRCE	5/10/1999	10:10	-0.003	T	0.88
SJRCE	6/7/1999	10:00	0.007	T	0.01
SJRCE	7/12/1999	13:20	-0.009	T	0.88
SJRCE	8/10/1999	13:35	-0.006	T	0.88
SJRCE	9/28/1999	14:40	0.006	T	0.01
SJRCE	10/12/1999	14:40	0.12	T	0.12
SJRCE	11/9/1999	11:20	0.06	T	0.06
SJRCE	12/6/1999	14:20	0.016	W	0.02
SJRCE	1/10/2000	14:30	0.14	T	0.14
SJRCE	2/7/2000	15:50	0.268	W	0.27
SJRCE	3/6/2000	15:20	0.083	W	0.08

SJRCE	4/10/2000	10:40	0.08	T	0.08
SJRCE	5/8/2000	10:55	0.196	W	0.20
SJRCE	6/12/2000	15:15	0.507	W	0.51
SJRCE	7/10/2000	10:15	0.03	T	0.03
SJRCE	8/7/2000	10:35	0.41	T	0.41
SJRCE	9/11/2000	9:45	0.227	T	0.23
SJRCE	10/11/2000	15:35	0.223	W	0.22
SJRCE	11/13/2000	9:30	0.379	W	0.38
SJRCE	12/14/2000	9:45	-0.004	T	0.88
SJRCE	1/9/2001	11:50	0.048	T	0.05
SJRCE	2/15/2001	9:50	0.006	T	0.01
SJRCE	3/15/2001	8:45	0.009	T	0.01
SJRCE	4/10/2001	8:45	-0.136	T	0.88
SJRCE	5/14/2001	13:40	-0.071	T	0.88
SJRCE	6/11/2001	13:40	-0.127	T	0.88
SJRCE	7/11/2001	12:45	0.032	T	0.03
SJRCE	8/9/2001	12:00	0.099	T	0.10
SJRCE	9/11/2001	14:50	-0.103	T	0.88
SJRCE	10/9/2001	12:30	-0.004	T	0.88
SJRCW	5/12/1993	13:30	-0.1	T	0.88
SJRCW	6/8/1993	8:30	-0.1	T	0.88
SJRCW	7/7/1993	11:30	0	T	0.88
SJRCW	9/22/1993	9:00	0	T	0.88
SJRCW	12/15/1993	11:45	-0.1	T	0.88
SJRCW	1/20/1994	12:15	0	T	0.88
SJRCW	2/15/1994	9:50	0	T	0.88
SJRCW	3/14/1994	12:25	0	T	0.88
SJRCW	4/12/1994	11:40	2		2.00
SJRCW	5/16/1994	12:20	0	T	0.88
SJRCW	6/14/1994	12:35	-0.1	T	0.88
SJRCW	7/12/1994	11:55	-1.6	T	0.88
SJRCW	8/16/1994	12:00	0	T	0.88
SJRCW	9/13/1994	11:55	0	T	0.88
SJRCW	10/17/1994	11:45	0.01	W	0.01
SJRCW	11/18/1994	10:50	0	T	0.88
SJRCW	12/13/1994	12:20	0	T	0.88
SJRCW	1/19/1995	11:50	0	T	0.88
SJRCW	3/15/1995	10:55	0.6	T	0.60
SJRCW	4/11/1995	9:40	0	T	0.88
SJRCW	5/16/1995	11:35	0.1	T	0.10
SJRCW	6/13/1995	10:15	-1	T	0.88
SJRCW	7/11/1995	11:30	0	T	0.88
SJRCW	8/15/1995	12:30	0	T	0.88
SJRCW	9/13/1995	12:25	0	T	0.88
SJRCW	10/17/1995	11:20	2.1		2.10
SJRCW	11/16/1995	11:35	0.2	T	0.20
SJRCW	12/13/1995	10:50	-1	T	0.88
SJRCW	1/16/1996	11:00	0.9	T	0.90
SJRCW	2/13/1996	11:35	1.4	T	1.40
SJRCW	3/13/1996	11:25	0	T	0.88
SJRCW	4/16/1996	10:50	1	T	1.00
SJRCW	5/14/1996	11:15	0.3	T	0.30
SJRCW	6/12/1996	11:30	1.6	T	1.60
SJRCW	7/16/1996	11:10	1.8	T	1.80
SJRCW	8/21/1996	11:35	0.5	T	0.50
SJRCW	9/17/1996	10:30	2		2.00
SJRCW	10/15/1996	10:00	1.1	T	1.10
SJRCW	11/13/1996	11:00	0	T	0.88
SJRCW	12/3/1996	10:55	-0.2	T	0.88
SJRCW	1/14/1997	10:40	0	T	0.88
SJRCW	2/11/1997	10:40	0	T	0.88
SJRCW	3/11/1997	10:45	0	T	0.88
SJRCW	4/15/1997	10:35	0	T	0.88

SJRCW	4/15/1997	10:35	0	T	0.88
SJRCW	5/13/1997	10:25	0	T	0.88
SJRCW	5/13/1997	10:25	0	T	0.88
SJRCW	6/10/1997	10:50	0	T	0.88
SJRCW	6/10/1997	10:50	0	T	0.88
SJRCW	7/8/1997	10:45	0	T	0.88
SJRCW	7/8/1997	10:45	0	T	0.88
SJRCW	8/5/1997	10:40	0	T	0.88
SJRCW	8/5/1997	10:40	0	T	0.88
SJRCW	9/16/1997	9:50	0.003	T	0.00
SJRCW	9/16/1997	9:50	0.003	T	0.00
SJRCW	10/9/1997	14:50	0	T	0.88
SJRCW	11/11/1997	10:00	0.013	T	0.01
SJRCW	12/9/1997	10:00	0.021	T	0.02
SJRCW	1/13/1998	10:20	-0.011	T	0.88
SJRCW	2/10/1998	10:00	0.014	T	0.01
SJRCW	3/17/1998	10:35	0.008	T	0.01
SJRCW	4/14/1998	10:10	0.008	T	0.01
SJRCW	5/12/1998	13:20	0.002	T	0.00
SJRCW	6/9/1998	13:20	-0.007	T	0.88
SJRCW	7/14/1998	14:15	-0.001	T	0.88
SJRCW	8/18/1998	9:30	0.13	T	0.13
SJRCW	9/8/1998	10:45	-0.025	T	0.88
SJRCW	9/8/1998	13:45	-0.018	T	0.88
SJRCW	10/15/1998	14:15	-0.006	T	0.88
SJRCW	11/10/1998	13:30	-0.01	T	0.88
SJRCW	12/15/1998	13:15	-0.002	T	0.88
SJRCW	1/12/1999	10:15	0.003	T	0.00
SJRCW	2/9/1999	10:40	0.01	T	0.01
SJRCW	3/10/1999	13:20	-0.019	T	0.88
SJRCW	4/27/1999	11:00	0.021	T	0.02
SJRCW	5/10/1999	11:00	0.004	T	0.00
SJRCW	6/7/1999	10:30	0.012	T	0.01
SJRCW	7/12/1999	13:00	-0.007	T	0.88
SJRCW	8/10/1999	13:15	0.004	T	0.00
SJRCW	9/28/1999	14:20	0.12	T	0.12
SJRCW	10/12/1999	14:20	0.13	T	0.13
SJRCW	11/9/1999	12:00	0.06	T	0.06
SJRCW	12/6/1999	14:00	0.07	T	0.07
SJRCW	1/10/2000	14:10	0.21	T	0.21
SJRCW	2/7/2000	15:30	0.07	T	0.07
SJRCW	3/6/2000	15:00	0.348	W	0.35
SJRCW	4/10/2000	11:00	0.08	T	0.08
SJRCW	5/8/2000	11:25	0.075	W	0.08
SJRCW	6/12/2000	14:55	0.045	W	0.05
SJRCW	7/10/2000	10:50	0.16	T	0.16
SJRCW	8/7/2000	11:00	0.25	T	0.25
SJRCW	9/11/2000	10:05	0.153	T	0.15
SJRCW	10/11/2000	15:15	0.603	W	0.60
SJRCW	11/13/2000	9:50	0.242	W	0.24
SJRCW	12/14/2000	10:05	0.018	T	0.02
SJRCW	1/9/2001	11:30	0.053		0.05
SJRCW	2/15/2001	10:10	-0.109	T	0.88
SJRCW	3/15/2001	9:15	-0.033	T	0.88
SJRCW	4/10/2001	8:55	-0.071	T	0.88
SJRCW	5/14/2001	14:10	-0.138	T	0.88
SJRCW	6/11/2001	13:55	-0.076	T	0.88
SJRCW	7/11/2001	12:25	0.037	T	0.04
SJRCW	8/9/2001	11:40	0.016	T	0.02
SJRCW	9/11/2001	14:30	-0.11	T	0.88
SJRCW	10/9/2001	12:05	0.024	T	0.02
SJRCW	11/20/2001	12:55	0.119	T	0.12
SJRCW	12/5/2001	12:40	0.024	T	0.02

SJRCW	1/8/2002	12:00	0.054	T	0.05
SJRCW	2/11/2002	11:25	-0.068	T	0.88
SJRCW	3/11/2002	9:35	0.053	T	0.05
SJRCW	4/8/2002	12:55	0.5	U	0.25
SJRCW	5/13/2002	12:00	0.016	T	0.02
SJRCW	6/10/2002	12:10	0.33	T	0.33
SJRCW	7/15/2002	12:30	-0.04	T	0.88
SJRCW	8/12/2002	11:35	0.098	T	0.10
SJRCW	9/12/2002	11:20	0.021	T	0.02
SJRCW	10/7/2002	12:10	-0.018	T	0.88
SJRCW	11/11/2002	11:40	-0.087	T	0.88
SJRCW	12/9/2002	11:15	0.091		0.09
SJRCW	1/6/2003	11:10	-0.074	T	0.88
SJRCW	2/11/2003	9:50	0.006	T	0.01
SJRCW	3/11/2003	13:05	0.004	T	0.00
SJRCW	4/14/2003	12:00	0.018	T	0.02
SJRCW	5/12/2003	12:40	0.041	T	0.04
SJRCW	6/9/2003	12:15	0.034	T	0.03
SJRCW	8/12/2003	12:45	0.079	T	0.08
SJRCW	9/8/2003	12:00	0.141	T	0.14
SJRCW	10/7/2003	11:35	0.047	T	0.05
SJRCW	11/12/2003	12:20	0.134	T	0.13
SJRCW	12/10/2003	13:40	0.193	T	0.19
SJRCW	1/12/2004	13:25	-0.006	T	0.88
SJRCW	2/9/2004	12:45	0.019	T	0.02
sjrcc	3/24/2005	10:16	0.027	I	0.0270
SJRM 74C	3/24/2005	2:15	0.033	I	0.0330
SJ6	3/24/2005	3:00	0.051	I	0.0510
SJRCC	4/26/2005	1:00	0.026	U	0.0130
SJ6	4/26/2005	4:45	0.026	U	0.0130
SJRM 74C	4/26/2005	5:15	0.026	U	0.0130
SJRCC	5/17/2005	9:00	0.026	U	0.0130
SJ6	5/17/2005	10:45	0.026	U	0.0130
SJRM 74C	5/17/2005	11:15	0.026	U	0.0130
SJRCC	6/20/2005	10:00	0.035	I	0.0350
SJRM 74C	6/20/2005	3:15	0.026	U	0.0130
SJ6	6/20/2005	2:45	0.026	U	0.0130
SJRCC	7/25/2005	7:30	0.026	U	0.0130
SJ6	7/25/2005	2:00	0.026	U	0.0130
SJRM 74C	7/25/2005	2:15	0.026	U	0.0130
SJRCC	8/31/2005	9:30	0.026	U	0.0130
SJ6	8/31/2005	1:30	0.026	U	0.0130
SJRM 74C	8/31/2005	2:00	0.048	I	0.0480
SJ6	9/27/2005	12:45	0.026	U	0.0130
SJRM 74C	9/27/2005	1:30	0.026	U	0.0130
SJRCC	9/27/2005	2:00	0.026	U	0.0130

Note: If non-detect was reported, half of the detection limit or half of the water quality standard was used, whichever was less. If all samples are non-detect then the constitutent is assumed absent.

Source: SJRWMD, 2004.
ECT, 2004.

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SECI D-005	10/1/1995		365	
SECI D-005	10/1/1995		380	
SECI D-005	10/1/1995		410	
SECI D-005	2/1/1996		500	
SECI D-005	2/1/1996		450	
SECI D-005	2/1/1996		410	
SECI D-005	2/1/1996		390	
SECI D-005	8/1/1996		847	
SECI D-005	8/1/1996		829	
SECI D-005	8/1/1996		901	
SECI D-005	8/1/1996		828	
SECI D-005	8/6/1997		870	
SECI D-005	8/6/1997		655	
SECI D-005	8/6/1997		736	
SECI D-005	8/6/1997		882	
SECI D-005	7/13/1998		834	
SECI D-005	7/13/1998		786	
SECI D-005	7/13/1998		791	
SECI D-005	7/13/1998		853	
SECI D-005	6/18/98		713	
SECI D-005	8/19/98		850	
SECI D-005	3/1/2000		846	
SECI D-005	6/1/2000		921	
SECI D-005	9/1/2000		1,042	
SECI D-005	12/11/2000		1,384	
SECI D-005	3/1/2001		1,282	
SECI D-005	6/1/2001		1,500	
SECI D-005	12/1/2001		661	
SECI D-005	3/1/2002		950	
SECI D-005	6/1/2002		1,269	
SECI D-005	7/29/2002		999	
SECI D-005	1/28/2003		740	
SECI D-005	5/13/2003		727	
SECI D-005	8/26/2003		712	
FP41	9/22/1993	14:50	1,024	
FP41	10/20/1993	13:20	1,037	
FP41	11/30/1993	13:40	959	
FP41	12/28/1993	13:05	1,132	
FP41	1/26/1994	12:35	1,020	
FP41	2/23/1994	11:40	936	
FP41	3/30/1994	13:01	1,101	
FP41	4/20/1994	12:09	1,267	
FP41	5/25/1994	12:02	1,216	
FP41	6/29/1994	12:15	1,304	
FP41	7/27/1994	12:15	1,260	
FP41	7/27/1994	12:16	1,260	
FP41	8/23/1994	11:34	1,103	
FP41	9/29/1994	11:45	699	
FP41	10/24/1994	9:45	700	
FP41	12/28/1994	10:00	500	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
FP41	2/15/1995	10:00	362	
FP41	3/1/1995	11:10	665	
FP41	3/29/1995	12:15	751	
FP41	5/2/1995	12:05	805	
FP41	5/31/1995	12:15	819	
FP41	6/29/1995	12:45	868	
FP41	7/27/1995	11:45	933	
FP41	8/31/1995	15:30	821	
FP41	9/26/1995	14:55	727	
FP41	10/24/1995	14:25	522	
FP41	11/21/1995	13:00	547	
FP41	1/3/1996	14:00	679	
FP41	1/30/1996	14:10	558	
FP41	2/27/1996	14:00	749	
FP41	3/26/1996	14:05	649	
FP41	4/30/1996	14:45	702	
FP41	5/28/1996	14:50	648	
FP41	7/2/1996	15:40	733	
FP41	8/6/1996	13:50	745	
FP41	9/12/1996	13:35	773	
FP41	10/1/1996	13:30	909	
FP41	10/24/1996	13:30	766	
FP42	9/22/1993	15:00	1,066	
FP42	10/20/1993	13:35	1,020	
FP42	11/30/1993	13:55	993	
FP42	12/28/1993	13:20	1,127	
FP42	1/26/1994	12:45	1,065	
FP42	2/23/1994	11:49	970	
FP42	3/30/1994	13:14	1,124	
FP42	3/30/1994	13:15	1,124	
FP42	4/20/1994	12:00	1,256	
FP42	5/25/1994	12:20	1,261	
FP42	6/29/1994	12:20	1,286	
FP42	7/27/1994	12:10	1,258	
FP42	8/23/1994	11:40	1,070	
FP42	9/29/1994	11:55	700	
FP42	10/24/1994	10:00	600	
FP42	12/28/1994	10:20	478	
FP42	2/15/1995	10:10	630	
FP42	3/1/1995	11:20	638	
FP42	3/29/1995	12:30	725	
FP42	5/2/1995	12:15	812	
FP42	5/31/1995	12:26	830	
FP42	6/29/1995	13:00	867	
FP42	7/27/1995	11:55	979	
FP42	8/31/1995	15:45	835	
FP42	9/26/1995	14:50	732	
FP42	10/24/1995	14:35	508	
FP42	11/21/1995	13:10	554	
FP42	1/3/1996	14:10	682	
FP42	1/30/1996	14:25	558	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
FP42	2/27/1996	14:10	756	
FP42	3/26/1996	14:10	667	
FP42	4/30/1996	15:00	715	
FP42	5/28/1996	15:00	631	
FP42	7/2/1996	15:55	704	
FP42	8/6/1996	14:00	745	
FP42	9/12/1996	13:20	728	
FP42	10/1/1996	13:55	955	
FP42	10/24/1996	13:20	768	
FP42	2/26/1997	13:30	874	
FP42	3/26/1997	13:10	1,044	
FP42	6/25/1997	13:40	969	
FP42	6/25/1997	13:40	969	
FP42	7/23/1997	13:35	932	
FP42	7/23/1997	13:35	932	
FP42	8/20/1997	13:40	1,170	
FP42	8/20/1997	13:40	1,170	
FP42	9/25/1997	13:20	1,260	
FP42	9/25/1997	13:20	1,260	
FP42	11/24/1997	13:10	759	
FP42	12/22/1997	12:15	621	
FP42	2/23/1998	14:40	398	
FP42	4/2/1998	12:40	455	
FP42	4/27/1998	12:20	501	
FP42	5/26/1998	13:10	666	
FP42	6/30/1998	13:50	783	
FP42	8/3/1998	12:15	870	
FP42	8/24/1998	12:00	759	
FP42	9/22/1998	13:40	906	
FP42	9/22/1998	13:40	904	
FP42	9/22/1998	13:40	905	
FP42	10/28/1998	13:35	964	
FP42	10/28/1998	13:35	946	
FP42	10/28/1998	13:35	955	
FP42	11/24/1998	13:25	969	
FP42	11/24/1998	13:25	971	
FP42	11/24/1998	13:25	970	
FP42	12/28/1998	14:55	897	
FP42	12/28/1998	14:55	897	
FP42	12/28/1998	14:55	897	
FP42	1/27/1999	10:10	997	
FP42	1/27/1999	10:10	998	
FP42	1/27/1999	10:10	998	
FP42	1/27/1999	10:20	998	
FP42	2/24/1999	14:55	752	
FP42	2/24/1999	14:55	756	
FP42	2/24/1999	14:55	754	
FP42	3/30/1999	10:30	1,055	
FP42	3/30/1999	10:30	1,063	
FP42	3/30/1999	10:30	1,059	
FP42	4/29/1999	10:00	1,227	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
FP42	4/29/1999	10:00	1,226	
FP42	4/29/1999	10:00	1,226	
FP42	5/27/1999	14:50	1,126	
FP42	5/27/1999	14:50	1,124	
FP42	5/27/1999	14:50	1,125	
FP42	6/29/1999	16:30	902	
FP42	6/29/1999	16:30	900	
FP42	6/29/1999	16:30	901	
FP42	8/12/1999	9:35	1,327	
FP42	8/12/1999	9:35	1,328	
FP42	8/12/1999	9:35	1,328	
FP42	8/26/1999	14:45	1,271	
FP42	8/26/1999	14:45	1,296	
FP42	8/26/1999	14:45	1,284	
FP42	9/23/1999	15:40	1,196	
FP42	9/23/1999	15:40	1,159	
FP42	9/23/1999	15:40	1,178	
FP42	10/26/1999	16:30	1,246	
FP42	10/26/1999	16:30	1,314	
FP42	10/26/1999	16:30	1,280	
FP42	11/23/1999	14:10	856	
FP42	11/23/1999	14:10	850	
FP42	11/23/1999	14:10	853	
FP42	12/21/1999	10:15	673	
FP42	12/21/1999	10:15	666	
FP42	12/21/1999	10:15	670	
FP42	1/27/2000	14:50	729	
FP42	1/27/2000	14:50	733	
FP42	1/27/2000	14:50	731	
FP42	2/21/2000	13:50	881	
FP42	2/21/2000	13:50	881	
FP42	2/21/2000	13:50	881	
FP42	3/29/2000	10:10	868	
FP42	3/29/2000	10:10	867	
FP42	3/29/2000	10:10	868	
FP42	4/26/2000	9:30	872	
FP42	4/26/2000	9:30	884	
FP42	4/26/2000	9:30	878	
FP42	5/24/2000	14:45	905	
FP42	5/24/2000	14:45	898	
FP42	5/24/2000	14:45	902	
FP42	6/29/2000	9:10	981	
FP42	6/29/2000	9:10	981	
FP42	6/29/2000	9:10	981	
FP42	7/27/2000	14:55	1,039	
FP42	7/27/2000	14:55	1,037	
FP42	7/27/2000	14:55	1,038	
FP42	8/24/2000	14:00	1,137	
FP42	8/24/2000	14:00	1,147	
FP42	8/24/2000	14:00	1,142	
FP42	9/28/2000	13:45	949	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
FP42	9/28/2000	13:45	951	
FP42	9/28/2000	13:45	950	
FP42	10/26/2000	13:15	864	
FP42	10/26/2000	13:15	864	
FP42	10/26/2000	13:15	864	
FP42	11/27/2000	15:15	1,275	
FP42	11/27/2000	15:15	1,275	
FP42	11/27/2000	15:15	1,275	
FP42	12/21/2000	12:55	1,203	
FP42	12/21/2000	12:55	1,196	
FP42	12/21/2000	12:55	1,200	
FP42	2/27/2001	15:20	1,349	
FP42	2/27/2001	15:20	1,357	
FP42	2/27/2001	15:20	1,353	
FP42	3/29/2001	15:00	1,232	
FP42	3/29/2001	15:00	1,230	
FP42	3/29/2001	15:00	1,231	
FP42	5/1/2001	10:20	1,409	
FP42	5/1/2001	10:20	1,410	
FP42	5/1/2001	10:20	1,410	
FP42	5/30/2001	13:50	1,475	
FP42	5/30/2001	13:50	1,508	
FP42	5/30/2001	13:50	1,492	
FP42	6/28/2001	14:45	1,419	
FP42	6/28/2001	14:45	1,423	
FP42	6/28/2001	14:45	1,421	
FP42	7/23/2001	14:55	1,323	
FP42	7/23/2001	14:55	1,324	
FP42	7/23/2001	14:55	1,324	
FP42	8/20/2001	10:00	1,350	
FP42	8/20/2001	10:00	1,353	
FP42	8/20/2001	10:00	1,352	
FP42	9/25/2001	10:25	913	
FP42	9/25/2001	10:25	919	
FP42	9/25/2001	10:25	916	
FP42	10/24/2001	14:55	786	
FP42	10/24/2001	14:55	780	
FP42	10/24/2001	14:55	783	
FP42	11/27/2001	10:00	618	
FP42	11/27/2001	10:00	601	
FP42	11/27/2001	10:00	610	
FP42	2/26/2002	10:50	887	
FP42	2/26/2002	10:50	884	
FP42	2/26/2002	10:50	886	
FP42	3/25/2002	15:30	994	
FP42	3/25/2002	15:30	992	
FP42	3/25/2002	15:30	993	
FP42	4/29/2002	14:55	1,060	
FP42	4/29/2002	14:55	1,059	
FP42	4/29/2002	14:55	1,059	
FP42	5/29/2002	13:45	1,149	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
FP42	5/29/2002	13:45	1,150	
FP42	5/29/2002	13:45	1,150	
FP42	6/26/2002	15:10	1,038	
FP42	6/26/2002	15:10	1,054	
FP42	6/26/2002	15:10	1,046	
FP42	7/30/2002	14:00	1,024	
FP42	7/30/2002	14:00	1,028	
FP42	7/30/2002	14:00	1,026	
FP42	8/26/2002	10:00	793	
FP42	8/26/2002	10:00	793	
FP42	8/26/2002	10:00	793	
FP42	9/25/2002	14:30	524	
FP42	9/25/2002	14:30	519	
FP42	9/25/2002	14:30	522	
FP42	10/24/2002	14:35	587	
FP42	10/24/2002	14:35	580	
FP42	10/24/2002	14:35	584	
FP42	11/25/2002	15:05	662	
FP42	11/25/2002	15:05	656	
FP42	11/25/2002	15:05	659	
FP42	1/28/2003	9:45	748	
FP42	1/28/2003	9:45	749	
FP42	1/28/2003	9:45	748	
FP43	9/22/1993	15:15	1,056	
FP43	10/20/1993	13:50	1,020	
FP43	11/30/1993	14:05	974	
FP43	12/28/1993	13:32	1,129	
FP43	1/26/1994	12:53	1,014	
FP43	2/23/1994	12:00	970	
FP43	3/30/1994	13:45	1,116	
FP43	4/20/1994	11:55	1,257	
FP43	5/25/1994	12:30	1,258	
FP43	6/29/1994	12:30	1,249	
FP43	7/27/1994	12:00	1,241	
FP43	8/23/1994	11:45	1,020	
FP43	9/29/1994	12:10	673	
FP43	10/24/1994	10:05	600	
FP43	12/28/1994	10:30	483	
FP43	2/15/1995	10:15	634	
FP43	3/1/1995	11:30	647	
FP43	3/29/1995	12:40	732	
FP43	5/2/1995	12:25	811	
FP43	5/31/1995	12:40	831	
FP43	6/29/1995	13:08	880	
FP43	7/27/1995	12:05	969	
FP43	8/31/1995	15:55	823	
FP43	9/26/1995	14:40	733	
FP43	10/24/1995	14:40	514	
FP43	11/21/1995	13:20	545	
FP43	1/3/1996	14:20	659	
FP43	1/30/1996	14:30	588	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
FP43	2/27/1996	14:20	746	
FP43	3/26/1996	14:20	656	
FP43	4/30/1996	15:10	708	
FP43	7/2/1996	16:00	710	
FP43	8/6/1996	14:10	755	
FP43	9/12/1996	13:10	728	
FP43	10/1/1996	14:05	964	
FP43	10/24/1996	13:10	757	
PA34	2/23/1994	11:22	920	
PA34	3/30/1994	12:35	1,186	
PA34	4/20/1994	11:43	1,277	
PA34	5/25/1994	11:45	1,302	
PA34	6/29/1994	11:55	1,234	
PA34	7/27/1994	11:47	1,208	
PA34	8/23/1994	11:20	1,046	
PA34	9/29/1994	11:20	708	
PA34	10/24/1994	9:30	500	
PA34	12/28/1994	9:40	475	
PA34	2/15/1995	9:50	668	
PA34	3/1/1995	11:00	639	
PA34	3/29/1995	11:55	736	
PA34	5/2/1995	11:50	821	
PA34	5/31/1995	12:00	851	
PA34	6/29/1995	12:28	816	
PA34	7/27/1995	11:28	842	
PA34	8/31/1995	16:10	631	
PA34	9/26/1995	15:10	747	
PA34	10/24/1995	15:00	531	
PA34	11/21/1995	13:30	546	
PA34	1/3/1996	14:40	692	
PA34	1/30/1996	14:55	559	
PA34	2/27/1996	14:30	787	
PA34	3/26/1996	14:35	686	
PA34	4/30/1996	15:45	699	
PA34	5/28/1996	15:40	662	
PA34	7/9/1996	10:20	755	
PA34	8/6/1996	14:20	760	
PA34	9/12/1996	12:55	769	
PA34	10/1/1996	13:10	965	
PA34	10/24/1996	12:50	745	
SJ6	5/16/2002	10:45	1,183	
SJ6	5/16/2002	10:45	1,184	
SJ6	5/16/2002	10:45	1,183	
SJRCC	3/9/1993	15:00	800	
SJRCC	4/13/1993	15:10	695	
SJRCC	5/12/1993	13:40	910	
SJRCC	7/7/1993	11:20	1,080	
SJRCC	9/22/1993	8:50	1,060	
SJRCC	10/20/1993	10:30	1,050	
SJRCC	11/15/1993	11:40	1,053	
SJRCC	12/15/1993	11:30	1,140	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRCC	1/20/1994	12:05	1,104	
SJRCC	2/15/1994	10:15	984	
SJRCC	3/14/1994	12:10	1,095	
SJRCC	4/12/1994	11:30	1,219	
SJRCC	5/16/1994	12:05	1,279	
SJRCC	6/14/1994	12:25	1,178	
SJRCC	7/12/1994	11:40	1,278	
SJRCC	8/16/1994	11:45	1,216	
SJRCC	9/13/1994	11:55	959	
SJRCC	10/17/1994	11:25	675	
SJRCC	11/18/1994	10:40	572	
SJRCC	12/13/1994	12:10	499	
SJRCC	1/19/1995	11:40	489	
SJRCC	2/15/1995	9:45	609	
SJRCC	3/15/1995	10:40	704	
SJRCC	4/11/1995	9:30	746	
SJRCC	5/16/1995	11:25	813	
SJRCC	6/13/1995	10:00	842	
SJRCC	7/11/1995	11:15	776	
SJRCC	8/15/1995	12:15	954	
SJRCC	9/13/1995	12:10	773	
SJRCC	10/17/1995	11:00	502	
SJRCC	11/16/1995	11:20	563	
SJRCC	12/13/1995	10:40	610	
SJRCC	1/16/1996	10:50	521	
SJRCC	2/13/1996	11:25	671	
SJRCC	3/13/1996	11:15	736	
SJRCC	4/16/1996	10:40	721	
SJRCC	5/14/1996	11:00	733	
SJRCC	6/12/1996	11:15	739	
SJRCC	7/16/1996	10:55	578	
SJRCC	8/21/1996	11:20	784	
SJRCC	9/17/1996	10:15	973	
SJRCC	10/15/1996	10:15	730	
SJRCC	11/13/1996	10:40	906	
SJRCC	12/3/1996	10:40	856	
SJRCC	1/14/1997	10:25	855	
SJRCC	2/11/1997	10:25	962	
SJRCC	3/11/1997	10:25	1,023	
SJRCC	4/15/1997	10:25	985	
SJRCC	4/15/1997	10:25	985	
SJRCC	5/13/1997	10:20	776	
SJRCC	5/13/1997	10:20	776	
SJRCC	6/10/1997	10:40	927	
SJRCC	6/10/1997	10:40	927	
SJRCC	7/8/1997	10:40	1,039	
SJRCC	7/8/1997	10:40	1,039	
SJRCC	8/5/1997	10:30	1,160	
SJRCC	8/5/1997	10:30	1,160	
SJRCC	9/16/1997	9:40	1,251	
SJRCC	9/16/1997	9:40	1,251	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRCC	10/9/1997	14:20	1,050	
SJRCC	11/11/1997	9:50	878	
SJRCC	12/9/1997	9:45	807	
SJRCC	1/13/1998	10:10	599	
SJRCC	2/10/1998	9:45	557	
SJRCC	3/17/1998	10:20	481	
SJRCC	4/14/1998	9:45	480	
SJRCC	5/12/1998	13:40	598	
SJRCC	6/9/1998	13:25	720	
SJRCC	7/14/1998	14:00	790	
SJRCC	8/18/1998	9:15	737	
SJRCC	9/8/1998	13:30	851	
SJRCC	10/15/1998	14:00	866	
SJRCC	12/15/1998	13:30	900	
SJRCC	1/12/1999	9:50	844	
SJRCC	2/9/1999	10:30	664	
SJRCC	3/10/1999	13:35	911	
SJRCC	4/27/1999	10:45	1,175	
SJRCC	5/10/1999	10:30	1,119	
	6/7/1999	10:15	1,125	
SJRCC	7/12/1999	13:10	1,140	
SJRCC	8/10/1999	13:20	1,371	
SJRCC	9/28/1999	14:30	1,188	
SJRCC	10/12/1999	14:30	1,323	
SJRCC	11/9/1999	11:40	1,095	
SJRCC	12/6/1999	14:10	666	
SJRCC	1/10/2000	14:20	717	
SJRCC	3/6/2000	15:10	818	
SJRCC	5/8/2000	11:15	984	
SJRCC	6/12/2000	15:00	1,047	
SJRCC	7/10/2000	10:30	1,017	
SJRCC	7/10/2000	10:30	1,017	
SJRCC	8/7/2000	10:45	1,060	
SJRCC	9/11/2000	9:55	987	
SJRCC	10/11/2000	15:25	754	
SJRCC	11/13/2000	9:40	1,253	
SJRCC	12/14/2000	9:55	1,229	
SJRCC	1/9/2001	11:40	1,226	
SJRCC	2/15/2001	10:00	1,273	
SJRCC	3/15/2001	9:00	1,335	
SJRCC	4/10/2001	8:50	1,386	
SJRCC	5/14/2001	13:55	1,491	
SJRCC	6/11/2001	13:50	1,316	
SJRCC	7/11/2001	12:34	1,210	
SJRCC	8/9/2001	11:50	1,026	
SJRCC	9/11/2001	14:40	1,422	
SJRCC	10/9/2001	12:20	869	
SJRCC	11/20/2001	13:10	600	
SJRCC	12/5/2001	12:50	609	
SJRCC	1/8/2002	12:15	787	
SJRCC	2/11/2002	11:40	848	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRCC	3/11/2002	9:20	925	
SJRCC	4/8/2002	13:05	1,045	
SJRCC	5/13/2002	12:10	1,190	
SJRCC	6/10/2002	12:15	1,186	
SJRCC	7/15/2002	12:50	1,237	
SJRCC	8/12/2002	11:45	1,001	
SJRCC	9/12/2002	11:30	637	
SJRCC	10/7/2002	12:20	511	
SJRCC	11/11/2002	11:50	620	
SJRCC	12/9/2002	11:30	715	
SJRCC	1/6/2003	11:20	615	
SJRCC	2/11/2003	10:00	696	
SJRCC	3/11/2003	13:10	484	
SJRCC	3/11/2003	13:10	527	
SJRCC	3/11/2003	13:15	570	
SJRCC	4/14/2003	12:15	610	
SJRCC	4/14/2003	12:15	614	
SJRCC	4/14/2003	12:20	617	
SJRCC	8/12/2003	12:50	693	
SJRCC	8/12/2003	12:50	693	
SJRCC	8/12/2003	12:55	692	
SJRCC	9/8/2003	12:10	873	
SJRCC	9/8/2003	12:10	870	
SJRCC	10/7/2003	11:45	792	
SJRCC	11/12/2003	12:25	736	
SJRCC	11/12/2003	12:25	734	
SJRCC	11/12/2003	12:25	735	
SJRCC	12/10/2003	13:30	796	
SJRCC	12/10/2003	13:30	794	
SJRCC	12/10/2003	13:30	795	
SJRCC	1/12/2004	13:30	853	
SJRCC	2/9/2004	12:55	850	
SJRCC	2/9/2004	12:55	837	
SJRCC	2/9/2004	12:55	844	
SJRCE	3/9/1993	15:05	837	
SJRCE	4/13/1993	15:15	691	
SJRCE	5/12/1993	13:50	910	
SJRCE	7/7/1993	11:10	1,080	
SJRCE	9/22/1993	8:40	1,055	
SJRCE	10/20/1993	10:10	1,053	
SJRCE	11/15/1993	11:30	1,065	
SJRCE	12/15/1993	11:20	1,159	
SJRCE	1/20/1994	11:50	1,114	
SJRCE	2/15/1994	10:30	967	
SJRCE	3/14/1994	11:55	1,114	
SJRCE	4/12/1994	11:20	1,206	
SJRCE	5/16/1994	11:50	1,276	
SJRCE	6/14/1994	12:05	1,218	
SJRCE	7/12/1994	11:20	1,336	
SJRCE	8/16/1994	11:35	1,177	
SJRCE	9/13/1994	11:40	1,040	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRCE	10/17/1994	11:10	666	
SJRCE	11/18/1994	10:30	568	
SJRCE	12/13/1994	12:00	492	
SJRCE	1/19/1995	11:30	477	
SJRCE	2/15/1995	9:40	619	
SJRCE	3/15/1995	10:30	703	
SJRCE	4/11/1995	9:25	747	
SJRCE	5/16/1995	11:15	797	
SJRCE	6/13/1995	9:50	863	
SJRCE	7/11/1995	10:55	777	
SJRCE	8/15/1995	12:00	982	
SJRCE	9/13/1995	11:55	764	
SJRCE	10/17/1995	10:45	543	
SJRCE	11/16/1995	11:05	563	
SJRCE	12/13/1995	10:25	607	
SJRCE	1/16/1996	10:45	528	
SJRCE	2/13/1996	11:15	665	
SJRCE	3/13/1996	11:05	736	
SJRCE	4/16/1996	10:30	722	
SJRCE	5/14/1996	10:50	731	
SJRCE	6/12/1996	11:05	741	
SJRCE	7/16/1996	10:45	585	
SJRCE	8/21/1996	11:05	775	
SJRCE	9/17/1996	9:55	981	
SJRCE	10/15/1996	10:30	732	
SJRCE	11/13/1996	10:15	902	
SJRCE	12/3/1996	10:25	857	
SJRCE	1/14/1997	10:15	869	
SJRCE	2/11/1997	10:15	932	
SJRCE	3/11/1997	10:20	1,032	
SJRCE	4/15/1997	10:15	1,026	
SJRCE	4/15/1997	10:15	1,026	
SJRCE	5/13/1997	10:10	816	
SJRCE	5/13/1997	10:10	816	
SJRCE	6/10/1997	10:25	881	
SJRCE	6/10/1997	10:25	881	
SJRCE	7/8/1997	10:30	1,020	
SJRCE	7/8/1997	10:30	1,020	
SJRCE	8/5/1997	10:20	1,157	
SJRCE	8/5/1997	10:20	1,157	
SJRCE	9/16/1997	9:35	1,253	
SJRCE	9/16/1997	9:35	1,253	
SJRCE	10/9/1997	14:00	1,073	
SJRCE	11/11/1997	9:45	872	
SJRCE	12/9/1997	9:30	809	
SJRCE	1/13/1998	9:55	598	
SJRCE	2/10/1998	9:40	558	
SJRCE	3/17/1998	10:15	493	
SJRCE	4/14/1998	9:30	483	
SJRCE	5/12/1998	13:45	594	
SJRCE	6/9/1998	13:45	703	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRCE	7/14/1998	13:45	778	
SJRCE	8/18/1998	9:00	742	
SJRCE	9/8/1998	13:20	845	
SJRCE	10/15/1998	13:40	833	
SJRCE	12/15/1998	13:40	883	
SJRCE	1/12/1999	9:45	850	
SJRCE	2/9/1999	10:15	665	
SJRCE	3/10/1999	13:45	935	
SJRCE	4/27/1999	10:20	1,172	
SJRCE	5/10/1999	10:10	1,107	
SJRCE	6/7/1999	10:00	1,129	
SJRCE	7/12/1999	13:20	1,165	
SJRCE	8/10/1999	13:35	1,380	
SJRCE	9/28/1999	14:40	1,183	
SJRCE	10/12/1999	14:40	1,318	
SJRCE	11/9/1999	11:20	1,102	
SJRCE	12/6/1999	14:20	647	
SJRCE	1/10/2000	14:30	718	
SJRCE	3/6/2000	15:20	794	
SJRCE	5/8/2000	10:55	949	
SJRCE	6/12/2000	15:15	1,019	
SJRCE	7/10/2000	10:15	1,029	
SJRCE	8/7/2000	10:35	1,046	
SJRCE	9/11/2000	9:45	988	
SJRCE	10/11/2000	15:35	735	
SJRCE	11/13/2000	9:30	1,264	
SJRCE	12/14/2000	9:45	1,219	
SJRCE	1/9/2001	11:50	1,261	
SJRCE	2/15/2001	9:50	1,262	
SJRCE	3/15/2001	8:45	1,339	
SJRCE	4/10/2001	8:45	1,388	
SJRCE	5/14/2001	13:40	1,487	
SJRCE	6/11/2001	13:40	1,321	
SJRCE	7/11/2001	12:45	1,205	
SJRCE	8/9/2001	12:00	1,227	
SJRCE	9/11/2001	14:50	1,368	
SJRCE	10/9/2001	12:30	848	
SJRCW	3/9/1993	14:50	718	
SJRCW	4/13/1993	15:05	798	
SJRCW	5/12/1993	13:30	940	
SJRCW	7/7/1993	11:30	1,090	
SJRCW	9/22/1993	9:00	1,090	
SJRCW	10/20/1993	10:40	803	
SJRCW	11/15/1993	11:50	882	
SJRCW	12/15/1993	11:45	1,092	
SJRCW	1/20/1994	12:15	967	
SJRCW	2/15/1994	9:50	827	
SJRCW	3/14/1994	12:25	995	
SJRCW	4/12/1994	11:40	1,240	
SJRCW	5/16/1994	12:20	1,305	
SJRCW	6/14/1994	12:35	1,101	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRCW	7/12/1994	11:55	1,030	
SJRCW	8/16/1994	12:00	1,170	
SJRCW	8/16/1994	12:01	89	
SJRCW	9/13/1994	11:55	937	
SJRCW	10/17/1994	11:45	399	
SJRCW	11/18/1994	10:50	587	
SJRCW	12/13/1994	12:20	471	
SJRCW	1/19/1995	11:50	397	
SJRCW	3/15/1995	10:55	737	
SJRCW	4/11/1995	9:40	644	
SJRCW	5/16/1995	11:35	843	
SJRCW	6/13/1995	10:15	774	
SJRCW	7/11/1995	11:30	798	
SJRCW	8/15/1995	12:30	869	
SJRCW	9/13/1995	12:25	700	
SJRCW	10/17/1995	11:20	529	
SJRCW	11/16/1995	11:35	552	
SJRCW	12/13/1995	10:50	643	
SJRCW	1/16/1996	11:00	548	
SJRCW	2/13/1996	11:35	649	
SJRCW	3/13/1996	11:25	737	
SJRCW	4/16/1996	10:50	708	
SJRCW	5/14/1996	11:15	735	
SJRCW	6/12/1996	11:30	717	
SJRCW	7/16/1996	11:10	681	
SJRCW	8/21/1996	11:35	757	
SJRCW	9/17/1996	10:30	889	
SJRCW	10/15/1996	10:00	706	
SJRCW	11/13/1996	11:00	953	
SJRCW	12/3/1996	10:55	877	
SJRCW	1/14/1997	10:40	834	
SJRCW	2/11/1997	10:40	1,025	
SJRCW	3/11/1997	10:45	1,058	
SJRCW	4/15/1997	10:35	1,001	
SJRCW	4/15/1997	10:35	1,001	
SJRCW	5/13/1997	10:25	782	
SJRCW	5/13/1997	10:25	782	
SJRCW	6/10/1997	10:50	904	
SJRCW	6/10/1997	10:50	904	
SJRCW	7/8/1997	10:45	1,047	
SJRCW	7/8/1997	10:45	1,047	
SJRCW	8/5/1997	10:40	927	
SJRCW	8/5/1997	10:40	927	
SJRCW	9/16/1997	9:50	1,249	
SJRCW	9/16/1997	9:50	1,249	
SJRCW	10/9/1997	14:50	1,057	
SJRCW	11/11/1997	10:00	760	
SJRCW	12/9/1997	10:00	828	
SJRCW	1/13/1998	10:20	562	
SJRCW	2/10/1998	10:00	412	
SJRCW	3/17/1998	10:35	473	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRCW	4/14/1998	10:10	503	
SJRCW	5/12/1998	13:20	641	
SJRCW	6/9/1998	13:20	792	
SJRCW	7/14/1998	14:15	811	
SJRCW	8/18/1998	9:30	744	
SJRCW	9/8/1998	10:45	799	
SJRCW	9/8/1998	13:45	984	
SJRCW	10/15/1998	14:15	782	
SJRCW	11/10/1998	13:30	1,028	
SJRCW	12/15/1998	13:15	899	
SJRCW	1/12/1999	10:15	880	
SJRCW	2/9/1999	10:40	754	
SJRCW	3/10/1999	13:20	910	
SJRCW	4/27/1999	11:00	1,183	
SJRCW	5/10/1999	11:00	1,127	
SJRCW	6/7/1999	10:30	1,164	
SJRCW	7/12/1999	13:00	1,172	
SJRCW	8/10/1999	13:15	1,328	
SJRCW	9/28/1999	14:20	1,183	
SJRCW	10/12/1999	14:20	1,347	
SJRCW	11/9/1999	12:00	1,069	
SJRCW	12/6/1999	14:00	638	
SJRCW	1/10/2000	14:10	813	
SJRCW	3/6/2000	15:00	852	
SJRCW	5/8/2000	11:25	1,006	
SJRCW	6/12/2000	14:55	1,084	
SJRCW	7/10/2000	10:50	1,020	
SJRCW	8/7/2000	11:00	1,063	
SJRCW	9/11/2000	10:05	790	
SJRCW	10/11/2000	15:15	767	
SJRCW	11/13/2000	9:50	1,248	
SJRCW	12/14/2000	10:05	1,279	
SJRCW	1/9/2001	11:30	1,188	
SJRCW	2/15/2001	10:10	1,284	
SJRCW	3/15/2001	9:15	1,377	
SJRCW	4/10/2001	8:55	1,372	
SJRCW	5/14/2001	14:10	1,516	
SJRCW	6/11/2001	13:55	1,312	
SJRCW	7/11/2001	12:25	1,346	
SJRCW	8/9/2001	11:40	1,101	
SJRCW	9/11/2001	14:30	1,408	
SJRCW	10/9/2001	12:05	863	
SJRCW	11/20/2001	12:55	642	
SJRCW	12/5/2001	12:40	627	
SJRCW	1/8/2002	12:00	824	
SJRCW	2/11/2002	11:25	834	
SJRCW	3/11/2002	9:35	919	
SJRCW	4/8/2002	12:55	1,056	
SJRCW	5/13/2002	12:00	1,238	
SJRCW	6/10/2002	12:10	1,226	
SJRCW	7/15/2002	12:30	1,197	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRCW	8/12/2002	11:35	921	
SJRCW	9/12/2002	11:20	649	
SJRCW	10/7/2002	12:10	504	
SJRCW	11/11/2002	11:40	625	
SJRCW	12/9/2002	11:15	744	
SJRCW	1/6/2003	11:10	491	
SJRCW	2/11/2003	9:50	710	
SJRCW	3/11/2003	13:05	572	
SJRCW	3/11/2003	13:05	460	
SJRCW	4/14/2003	12:00	613	
SJRCW	8/12/2003	12:45	685	
SJRCW	9/8/2003	12:00	985	
SJRCW	10/7/2003	11:35	822	
SJRCW	11/12/2003	12:20	740	X
SJRCW	11/12/2003	12:20	744	
SJRCW	11/12/2003	12:20	742	
SJRCW	12/10/2003	13:40	798	
SJRCW	1/12/2004	13:25	890	
SJRCW	1/12/2004	13:25	854	
SJRCW	1/12/2004	13:25	851	
SJRCW	2/9/2004	12:45	790	
SJRM70B	6/7/2000	10:10	983	
SJRM70B	6/7/2000	10:10	986	
SJRM70B	6/7/2000	10:10	984	
SJRM70B	6/14/2000	9:55	1,047	
SJRM70B	6/14/2000	9:55	1,048	
SJRM70B	6/14/2000	9:55	1,048	
SJRM70B	6/21/2000	9:10	1,024	
SJRM70B	6/21/2000	9:10	1,018	
SJRM70B	6/21/2000	9:10	1,021	
SJRM70B	6/28/2000	8:50	964	
SJRM70B	6/28/2000	8:50	956	
SJRM70B	6/28/2000	8:50	960	
SJRM70B	7/5/2000	10:25	1,074	
SJRM70B	7/5/2000	10:25	1,064	
SJRM70B	7/5/2000	10:25	1,069	
SJRM70B	7/12/2000	9:50	1,044	
SJRM70B	7/12/2000	9:50	1,038	
SJRM70B	7/12/2000	9:50	1,041	
SJRM70B	7/19/2000	10:30	1,050	
SJRM70B	7/19/2000	10:30	1,048	
SJRM70B	7/19/2000	10:30	1,049	
SJRM70B	7/26/2000	9:10	1,056	
SJRM70B	7/26/2000	9:10	1,056	
SJRM70B	7/26/2000	9:10	1,056	
SJRM70B	8/2/2000	7:55	1,028	
SJRM70B	8/2/2000	7:55	1,052	
SJRM70B	8/2/2000	7:55	1,040	
SJRM70B	8/23/2000	7:55	1,061	
SJRM70B	8/23/2000	7:55	1,062	
SJRM70B	8/23/2000	7:55	1,062	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRM70B	6/6/2001	8:30	1,279	
SJRM70B	6/6/2001	8:30	1,279	
SJRM70B	6/6/2001	8:30	1,279	
SJRM70B	6/27/2001	12:40	1,396	
SJRM70B	6/27/2001	12:40	1,397	
SJRM70B	6/27/2001	12:40	1,396	
SJRM70C	6/7/2000	10:20	996	
SJRM70C	6/7/2000	10:20	996	
SJRM70C	6/7/2000	10:20	996	
SJRM70C	6/14/2000	10:05	1,027	
SJRM70C	6/14/2000	10:05	1,024	
SJRM70C	6/14/2000	10:05	1,026	
SJRM70C	6/21/2000	9:15	1,029	
SJRM70C	6/21/2000	9:15	1,027	
SJRM70C	6/21/2000	9:15	1,028	
SJRM70C	6/28/2000	9:00	964	
SJRM70C	6/28/2000	9:00	968	
SJRM70C	6/28/2000	9:00	966	
SJRM70C	7/5/2000	10:35	1,062	
SJRM70C	7/5/2000	10:35	1,065	
SJRM70C	7/5/2000	10:35	1,064	
SJRM70C	7/12/2000	10:00	1,034	
SJRM70C	7/12/2000	10:00	1,034	
SJRM70C	7/12/2000	10:00	1,034	
SJRM70C	7/19/2000	10:40	1,046	
SJRM70C	7/19/2000	10:40	1,043	
SJRM70C	7/19/2000	10:40	1,045	
SJRM70C	7/26/2000	9:20	1,042	
SJRM70C	7/26/2000	9:20	1,050	
SJRM70C	7/26/2000	9:20	1,046	
SJRM70C	8/2/2000	8:10	1,047	
SJRM70C	8/2/2000	8:10	1,053	
SJRM70C	8/2/2000	8:10	1,050	
SJRM70C	8/23/2000	8:05	1,061	
SJRM70C	8/23/2000	8:05	1,060	
SJRM70C	8/23/2000	8:05	1,060	
SJRM70C	6/6/2001	8:40	1,270	
SJRM70C	6/6/2001	8:40	1,272	
SJRM70C	6/6/2001	8:40	1,271	
SJRM70C	6/27/2001	12:50	1,401	
SJRM70C	6/27/2001	12:50	1,407	
SJRM70C	6/27/2001	12:50	1,404	
SJRM70D	6/7/2000	10:35	996	
SJRM70D	6/7/2000	10:35	995	
SJRM70D	6/7/2000	10:35	996	
SJRM70D	6/14/2000	10:15	1,026	
SJRM70D	6/14/2000	10:15	1,027	
SJRM70D	6/14/2000	10:15	1,026	
SJRM70D	6/21/2000	9:25	1,030	
SJRM70D	6/21/2000	9:25	1,027	
SJRM70D	6/21/2000	9:25	1,028	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRM70D	6/28/2000	9:10	975	
SJRM70D	6/28/2000	9:10	979	
SJRM70D	6/28/2000	9:10	977	
SJRM70D	7/5/2000	10:45	1,046	
SJRM70D	7/5/2000	10:45	1,050	
SJRM70D	7/5/2000	10:45	1,048	
SJRM70D	7/12/2000	10:15	1,037	
SJRM70D	7/12/2000	10:15	1,032	
SJRM70D	7/12/2000	10:15	1,035	
SJRM70D	7/19/2000	10:50	1,044	
SJRM70D	7/19/2000	10:50	1,041	
SJRM70D	7/19/2000	10:50	1,043	
SJRM70D	7/26/2000	9:30	1,036	
SJRM70D	7/26/2000	9:30	1,036	
SJRM70D	7/26/2000	9:30	1,036	
SJRM70D	7/26/2000	9:30	1,036	
SJRM70D	8/2/2000	8:20	1,034	
SJRM70D	8/2/2000	8:20	1,027	
SJRM70D	8/2/2000	8:20	1,030	
SJRM70D	8/23/2000	8:15	1,069	
SJRM70D	8/23/2000	8:15	1,070	
SJRM70D	8/23/2000	8:15	1,070	
SJRM70D	6/6/2001	8:50	1,291	
SJRM70D	6/6/2001	8:50	1,297	
SJRM70D	6/6/2001	8:50	1,294	
SJRM70D	6/27/2001	12:55	1,384	
SJRM70D	6/27/2001	12:55	1,386	
SJRM70D	6/27/2001	12:55	1,385	
SJRM70E	6/7/2000	10:45	994	
SJRM70E	6/14/2000	10:25	1,025	
SJRM70E	6/14/2000	10:25	1,025	
SJRM70E	6/21/2000	9:40	1,031	
SJRM70E	6/21/2000	9:40	1,031	
SJRM70E	6/28/2000	9:20	983	
SJRM70E	7/5/2000	10:55	1,035	
SJRM70E	7/5/2000	10:55	1,035	
SJRM70E	7/12/2000	10:30	1,038	
SJRM70E	7/19/2000	11:00	1,045	
SJRM70E	7/19/2000	11:00	1,045	
SJRM70E	7/26/2000	9:45	1,034	
SJRM70E	8/2/2000	8:30	1,032	
SJRM70E	8/23/2000	8:25	1,071	
SJRM70E	8/23/2000	8:25	981	
SJRM70E	8/23/2000	8:25	1,026	
SJRM70E	6/6/2001	9:05	1,338	
SJRM70E	6/27/2001	13:05	1,383	
SJRM70W	6/7/2000	10:00	991	
SJRM70W	6/14/2000	9:45	1,061	
SJRM70W	6/21/2000	9:00	1,032	
SJRM70W	6/28/2000	8:40	960	
SJRM70W	7/5/2000	10:10	1,063	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRM70W	7/12/2000	9:45	1,045	
SJRM70W	7/19/2000	10:20	1,050	
SJRM70W	7/26/2000	8:55	1,058	
SJRM70W	8/2/2000	7:35	1,024	
SJRM70W	8/23/2000	7:35	1,067	
SJRM70W	6/6/2001	8:10	1,288	
SJRM70W	6/27/2001	12:30	1,369	
SJRM74B	6/7/2000	9:20	1,004	
SJRM74B	6/7/2000	9:20	1,003	
SJRM74B	6/7/2000	9:20	1,004	
SJRM74B	6/14/2000	9:15	1,008	
SJRM74B	6/14/2000	9:15	1,007	
SJRM74B	6/14/2000	9:15	1,008	
SJRM74B	6/21/2000	8:30	957	
SJRM74B	6/21/2000	8:30	957	
SJRM74B	6/21/2000	8:30	957	
SJRM74B	6/28/2000	8:15	977	
SJRM74B	7/5/2000	9:35	1,010	
SJRM74B	7/5/2000	9:35	1,007	
SJRM74B	7/5/2000	9:35	1,008	
SJRM74B	7/12/2000	9:10	1,040	
SJRM74B	7/12/2000	9:10	1,030	
SJRM74B	7/12/2000	9:10	1,035	
SJRM74B	7/19/2000	9:45	1,079	
SJRM74B	7/19/2000	9:45	1,064	
SJRM74B	7/19/2000	9:45	1,072	
SJRM74B	7/26/2000	8:25	999	
SJRM74B	7/26/2000	8:25	998	
SJRM74B	7/26/2000	8:25	998	
SJRM74C	6/7/2000	9:10	1,004	
SJRM74C	6/7/2000	9:10	1,002	
SJRM74C	6/7/2000	9:10	1,003	
SJRM74C	6/14/2000	9:00	984	
SJRM74C	6/14/2000	9:00	984	
SJRM74C	6/14/2000	9:00	984	
SJRM74C	6/21/2000	8:20	940	
SJRM74C	6/21/2000	8:20	941	
SJRM74C	6/21/2000	8:20	940	
SJRM74C	6/28/2000	8:00	989	
SJRM74C	6/28/2000	8:00	996	
SJRM74C	6/28/2000	8:00	993	
SJRM74C	6/28/2000	8:15	975	
SJRM74C	6/28/2000	8:15	978	
SJRM74C	7/5/2000	9:15	1,014	
SJRM74C	7/5/2000	9:15	1,000	
SJRM74C	7/5/2000	9:25	1,007	
SJRM74C	7/12/2000	9:00	1,033	
SJRM74C	7/12/2000	9:00	1,029	
SJRM74C	7/12/2000	9:00	1,031	
SJRM74C	7/19/2000	9:30	1,068	
SJRM74C	7/19/2000	9:30	1,054	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRM74C	7/19/2000	9:30	1,061	
SJRM74C	7/26/2000	8:10	980	
SJRM74C	7/26/2000	8:10	981	
SJRM74C	7/26/2000	8:10	980	
SJRM74D	6/7/2000	9:00	989	
SJRM74D	6/7/2000	9:00	984	
SJRM74D	6/7/2000	9:00	986	
SJRM74D	6/14/2000	8:50	986	
SJRM74D	6/14/2000	8:50	983	
SJRM74D	6/14/2000	8:50	984	
SJRM74D	6/21/2000	8:05	936	
SJRM74D	6/21/2000	8:05	941	
SJRM74D	6/21/2000	8:05	938	
SJRM74D	6/28/2000	7:55	987	
SJRM74D	6/28/2000	7:55	985	
SJRM74D	6/28/2000	7:55	986	
SJRM74D	7/5/2000	9:15	999	
SJRM74D	7/5/2000	9:15	1,011	
SJRM74D	7/5/2000	9:15	1,005	
SJRM74D	7/12/2000	8:50	1,036	
SJRM74D	7/12/2000	8:50	1,029	
SJRM74D	7/12/2000	8:50	1,033	
SJRM74D	7/19/2000	9:15	1,047	
SJRM74D	7/19/2000	9:15	1,049	
SJRM74D	7/19/2000	9:15	1,048	
SJRM74D	7/26/2000	7:55	974	
SJRM74D	7/26/2000	7:55	973	
SJRM74D	7/26/2000	7:55	974	
SJRM74E	6/7/2000	8:45	988	
SJRM74E	6/14/2000	8:40	988	
SJRM74E	6/14/2000	8:40	990	
SJRM74E	6/14/2000	8:40	989	
SJRM74E	6/21/2000	7:50	929	
SJRM74E	6/21/2000	7:50	930	
SJRM74E	6/21/2000	7:50	930	
SJRM74E	6/28/2000	7:40	986	
SJRM74E	6/28/2000	7:40	978	
SJRM74E	6/28/2000	7:40	982	
SJRM74E	7/5/2000	9:05	988	
SJRM74E	7/5/2000	9:05	981	
SJRM74E	7/5/2000	9:05	984	
SJRM74E	7/12/2000	8:40	1,033	
SJRM74E	7/12/2000	8:40	1,033	
SJRM74E	7/12/2000	8:40	1,033	
SJRM74E	7/19/2000	9:00	1,050	
SJRM74E	7/19/2000	9:00	1,050	
SJRM74E	7/19/2000	9:00	1,049	
SJRM74E	7/19/2000	9:00	1,050	
SJRM74E	7/26/2000	7:30	989	
SJRM74W	6/7/2000	9:30	1,044	
SJRM74W	6/7/2000	9:30	1,044	

Ambient Conductivity Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 1,991 µmhos/cm

Station	Date	Time	Specific Conductivity (µmhos/cm)	Remark Code
SJRM74W	6/14/2000	9:25	1,042	
SJRM74W	6/21/2000	8:35	977	
SJRM74W	6/21/2000	8:35	977	
SJRM74W	6/21/2000	8:35	977	
SJRM74W	6/28/2000	8:20	1,050	
SJRM74W	7/5/2000	9:45	1,018	
SJRM74W	7/5/2000	9:45	1,018	
SJRM74W	7/12/2000	9:20	1,064	
SJRM74W	7/19/2000	9:55	1,087	
SJRM74W	7/26/2000	8:35	1,005	

Average =	940.3	µmhos/cm
Maximum =	1,516.0	µmhos/cm
Standard Dev =	231.0	µmhos/cm
95 Percentile =	1,327.2	µmhos/cm
Count	978.0	

Note: If non-detect was reported, half of the detection limit or half of the water quality standard was used, whichever was less. If all samples are non-detect then the constitutent is assumed absent.

Source: SJRWMD, 2001.
SECI, 2001.
ECT, 2001.

Ambient Copper Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 15.09 µg/L mg/L

Average MDL = 7.3 µg/L

Average =	1.76 µg/L
Maximum =	17.00 µg/L
Standard Dev =	1.99 µg/L
95 Percentile =	5.00 µg/L
Count	424.00

Station	Date	Time		Copper µg/L	Remark Code	Value used µg/L
SECI D-005	8/19/98		<	2.5	K	1.25
SECI D-005	10/20/98		<	2.5	K	1.25
SECI D-005	3/1/2000		<	10	K	5
SECI D-005	6/1/2000		<	10	K	5
SECI D-005	9/1/2000		<	1.4	K	0.7
SECI D-005	12/1/2000		<	6	K	3
SECI D-005	3/1/2001		<	0.9	K	0.45
SECI D-005	6/1/2001		<	0.9	K	0.45
SECI D-005	7/1/2001		<	0.9	K	0.45
SECI D-005	12/1/2001		<	0.9	K	0.45
SECI D-005	3/1/2002			1.8		1.8
SECI D-005	6/1/2002		<	0.9	K	0.45
SECI D-005	7/29/2002			1.9		1.9
SECI D-005	10/22/2002			3		3
SECI D-005	1/28/2003			0.9		0.9
SECI D-005	5/13/2003			2.8		2.8
SECI D-005	8/26/2003			1.7		1.7
FP41	9/22/1993	14:50		1	T	1
FP42	9/22/1993	15:00		1	T	1
FP42	11/27/2001	10:00		1.457	T	1.457
FP42	2/26/2002	10:50		0.737	T	0.737
FP42	3/25/2002	15:30		1.321	T	1.321
FP42	4/29/2002	14:55		1.049	T	1.049
FP42	5/29/2002	13:45		0.629	T	0.629
FP42	6/26/2002	15:10		0.624	T	0.624
FP42	7/30/2002	14:00		0.953	T	0.953
FP42	8/26/2002	10:00		0.633	T	0.633
FP42	9/25/2002	14:30		1.006	T	1.006
FP42	10/24/2002	14:35		0.898	T	0.898
FP42	11/25/2002	15:05		1.091	T	1.091
FP42	1/28/2003	9:45		1.224	T	1.224
FP43	9/22/1993	15:15		1	T	1
SJ6	5/16/2002	10:45		1.7	T	1.7
SJRCC	5/12/1993	13:40		0	T	3.65
SJRCC	6/8/1993	8:25		1	T	1
SJRCC	7/7/1993	11:20		0	T	3.65
SJRCC	9/22/1993	8:50		0	T	3.65
SJRCC	12/15/1993	11:30		1	T	1
SJRCC	1/20/1994	12:05		1	T	1
SJRCC	2/15/1994	10:15		0	T	3.65
SJRCC	3/14/1994	12:10		-1	T	3.65
SJRCC	4/12/1994	11:30		13		13
SJRCC	5/16/1994	12:05		1		1
SJRCC	6/14/1994	12:25		1		1
SJRCC	7/12/1994	11:40		7		7
SJRCC	8/16/1994	11:45		5		5
SJRCC	9/13/1994	11:55		4		4
SJRCC	10/17/1994	11:25		2		2
SJRCC	11/18/1994	10:40		0	T	3.65
SJRCC	12/13/1994	12:10		6		6
SJRCC	1/19/1995	11:40		1	T	1

Ambient Copper Data in St. Johns River near SECI Palatka Plant

Average MDL = 7.3 µg/L

Class III Water Quality Standard = 15.09 µg/L mg/L

Average =	1.76 µg/L
Maximum =	17.00 µg/L
Standard Dev =	1.99 µg/L
95 Percentile =	5.00 µg/L

Station	Date	Time	Copper µg/L	Remark Code	Value used µg/L
SJRCC	3/15/1995	10:40	1	T	1
SJRCC	4/11/1995	9:30	-1	T	3.65
SJRCC	5/16/1995	11:25	2		2
SJRCC	6/13/1995	10:00	1	T	1
SJRCC	7/11/1995	11:15	1	T	1
SJRCC	8/15/1995	12:15	1	T	1
SJRCC	9/13/1995	12:10	4		4
SJRCC	10/17/1995	11:00	2		2
SJRCC	11/16/1995	11:20	0	T	3.65
SJRCC	12/13/1995	10:40	3		3
SJRCC	1/16/1996	10:50	5		5
SJRCC	2/13/1996	11:25	1	T	1
SJRCC	3/13/1996	11:15	4		4
SJRCC	4/16/1996	10:40	2	T	2
SJRCC	5/14/1996	11:00	2		2
SJRCC	6/12/1996	11:15	1	T	1
SJRCC	7/16/1996	10:55	8		8
SJRCC	8/21/1996	11:20	8		8
SJRCC	9/17/1996	10:15	1	T	1
SJRCC	10/15/1996	10:15	1	T	1
SJRCC	11/13/1996	10:40	4		4
SJRCC	12/3/1996	10:40	1	T	1
SJRCC	1/14/1997	10:25	1	T	1
SJRCC	2/11/1997	10:25	1	T	1
SJRCC	3/11/1997	10:25	-1	T	3.65
SJRCC	4/15/1997	10:25	1	T	1
SJRCC	4/15/1997	10:25	1	T	1
SJRCC	5/13/1997	10:20	1	T	1
SJRCC	5/13/1997	10:20	1	T	1
SJRCC	6/10/1997	10:40	1	T	1
SJRCC	6/10/1997	10:40	1	T	1
SJRCC	7/8/1997	10:40	1	T	1
SJRCC	7/8/1997	10:40	1	T	1
SJRCC	8/5/1997	10:30	1	T	1
SJRCC	8/5/1997	10:30	1	T	1
SJRCC	9/16/1997	9:40	1.92	T	1.92
SJRCC	9/16/1997	9:40	1.92	T	1.92
SJRCC	10/9/1997	14:20	2		2
SJRCC	11/11/1997	9:50	0.68	T	0.68
SJRCC	12/9/1997	9:45	0.41	T	0.41
SJRCC	1/13/1998	10:10	0.74	T	0.74
SJRCC	2/10/1998	9:45	0.9	T	0.9
SJRCC	3/17/1998	10:20	1.38	T	1.38
SJRCC	4/14/1998	9:45	0.75	T	0.75
SJRCC	5/12/1998	13:40	1.78	T	1.78
SJRCC	6/9/1998	13:25	0.7	T	0.7
SJRCC	7/14/1998	14:00	0.72	T	0.72
SJRCC	8/18/1998	9:15	0.42	T	0.42
SJRCC	9/8/1998	13:30	0.53	T	0.53
SJRCC	10/15/1998	14:00	0.28	T	0.28
SJRCC	12/15/1998	13:30	0.53	T	0.53
SJRCC	1/12/1999	9:50	0.41	T	0.41
SJRCC	2/9/1999	10:30	0.49	T	0.49

Ambient Copper Data in St. Johns River near SECI Palatka Plant

Average MDL = 7.3 µg/L

Class III Water Quality Standard = 15.09 µg/L mg/L

Average =	1.76 µg/L
Maximum =	17.00 µg/L
Standard Dev =	1.99 µg/L
95 Percentile =	5.00 µg/L

Station	Date	Time	Copper µg/L	Remark Code	Value used µg/L
SJRCC	3/10/1999	13:35	0.79	T	0.79
SJRCC	4/27/1999	10:45	0.64	T	0.64
SJRCC	5/10/1999	10:30	0.45	T	0.45
SJRCC	6/7/1999	10:15	0.84	T	0.84
SJRCC	7/12/1999	13:10	0.44	T	0.44
SJRCC	8/10/1999	13:20	0.6	T	0.6
SJRCC	9/28/1999	14:30	1.99	T	1.99
SJRCC	10/12/1999	14:30	1.47	T	1.47
SJRCC	11/9/1999	11:40	1.31	T	1.31
SJRCC	12/6/1999	14:10	0.37	T	0.37
SJRCC	1/10/2000	14:20	0.86	T	0.86
SJRCC	2/7/2000	15:40	1.29	T	1.29
SJRCC	3/6/2000	15:10	0.41	T	0.41
SJRCC	4/10/2000	10:50	0.74	T	0.74
SJRCC	5/8/2000	11:15	0.97	T	0.97
SJRCC	6/12/2000	15:00	3.34		3.34
SJRCC	7/10/2000	10:30	1.26	T	1.26
SJRCC	8/7/2000	10:45	1.29	T	1.29
SJRCC	9/11/2000	9:55	1.46		1.46
SJRCC	10/11/2000	15:25	0.691	W	0.691
SJRCC	11/13/2000	9:40	0.56	T	0.56
SJRCC	12/14/2000	9:55	0.63	T	0.63
SJRCC	1/9/2001	11:40	-0.231	T	3.65
SJRCC	2/15/2001	10:00	0.444	T	0.444
SJRCC	3/15/2001	9:00	0.889	T	0.889
SJRCC	4/10/2001	8:50	0.069	T	0.069
SJRCC	5/14/2001	13:55	0.459	T	0.459
SJRCC	6/11/2001	13:50	-0.043	T	3.65
SJRCC	7/11/2001	12:34	0.264	T	0.264
SJRCC	8/9/2001	11:50	0.398	T	0.398
SJRCC	9/11/2001	14:40	0.512	T	0.512
SJRCC	10/9/2001	12:20	0.894	T	0.894
SJRCC	11/20/2001	13:10	0.929	T	0.929
SJRCC	12/5/2001	12:50	1.033	T	1.033
SJRCC	1/8/2002	12:15	0.421	T	0.421
SJRCC	2/11/2002	11:40	1.121	T	1.121
SJRCC	3/11/2002	9:20	0.287	T	0.287
SJRCC	4/8/2002	13:05	2	U	1
SJRCC	5/13/2002	12:10	1.3	T	1.3
SJRCC	6/10/2002	12:15	1.8	T	1.8
SJRCC	7/15/2002	12:50	1.19	T	1.19
SJRCC	8/12/2002	11:45	0.227	T	0.227
SJRCC	9/12/2002	11:30	-0.522	T	3.65
SJRCC	10/7/2002	12:20	1.23	T	1.23
SJRCC	11/11/2002	11:50	-0.604	T	3.65
SJRCC	12/9/2002	11:30	0.346	T	0.346
SJRCC	1/6/2003	11:20	-0.183	T	3.65
SJRCC	2/11/2003	10:00	1.456	T	1.456
SJRCC	3/11/2003	13:10	0.77	T	0.77
SJRCC	3/11/2003	13:15	0.758	T	0.758
SJRCC	4/14/2003	12:15	1.242	T	1.242
SJRCC	4/14/2003	12:20	0.981	T	0.981
SJRCC	5/12/2003	12:50	0.865	T	0.865

Ambient Copper Data in St. Johns River near SECI Palatka Plant

Average MDL = 7.3 µg/L

Class III Water Quality Standard = 15.09 µg/L mg/L

Average =	1.76 µg/L
Maximum =	17.00 µg/L
Standard Dev =	1.99 µg/L
95 Percentile =	5.00 µg/L

Station	Date	Time	Copper µg/L	Remark Code	Value used µg/L
SJRCC	5/12/2003	13:00	0.121	T	0.121
SJRCC	6/9/2003	12:20	0.941	T	0.941
SJRCC	6/9/2003	12:25	0.723	T	0.723
SJRCC	8/12/2003	12:50	0.513	T	0.513
SJRCC	8/12/2003	12:55	0.427	T	0.427
SJRCC	9/8/2003	12:10	0.19	T	0.19
SJRCC	10/7/2003	11:45	-1.78	T	3.65
SJRCC	11/12/2003	12:25	0.816	T	0.816
SJRCC	12/10/2003	13:30	-0.983	T	3.65
SJRCC	1/12/2004	13:30	1.37	T	1.37
SJRCC	2/9/2004	12:55	1.25	T	1.25
SJRCE	5/12/1993	13:50	0	T	3.65
SJRCE	6/8/1993	8:15	1	T	1
SJRCE	7/7/1993	11:10	0	T	3.65
SJRCE	9/22/1993	8:40	0	T	3.65
SJRCE	12/15/1993	11:20	0	T	3.65
SJRCE	1/20/1994	11:50	0	T	3.65
SJRCE	2/15/1994	10:30	0	T	3.65
SJRCE	3/14/1994	11:55	0	T	3.65
SJRCE	4/12/1994	11:20	13		13
SJRCE	5/16/1994	11:50	0	T	3.65
SJRCE	6/14/1994	12:05	2		2
SJRCE	7/12/1994	11:20	17		17
SJRCE	8/16/1994	11:35	5		5
SJRCE	9/13/1994	11:40	5		5
SJRCE	10/17/1994	11:10	0.01	W	0.01
SJRCE	11/18/1994	10:30	0	T	3.65
SJRCE	12/13/1994	12:00	1	T	1
SJRCE	1/19/1995	11:30	0	T	3.65
SJRCE	3/15/1995	10:30	2		2
SJRCE	4/11/1995	9:25	0	T	3.65
SJRCE	5/16/1995	11:15	2		2
SJRCE	6/13/1995	9:50	1	T	1
SJRCE	7/11/1995	10:55	2		2
SJRCE	8/15/1995	12:00	1	T	1
SJRCE	9/13/1995	11:55	2		2
SJRCE	10/17/1995	10:45	5		5
SJRCE	11/16/1995	11:05	0	T	3.65
SJRCE	12/13/1995	10:25	3		3
SJRCE	1/16/1996	10:45	5		5
SJRCE	2/13/1996	11:15	0	T	3.65
SJRCE	3/13/1996	11:05	5		5
SJRCE	4/16/1996	10:30	1	T	1
SJRCE	5/14/1996	10:50	2	T	2
SJRCE	6/12/1996	11:05	1	T	1
SJRCE	7/16/1996	10:45	5		5
SJRCE	8/21/1996	11:05	6		6
SJRCE	9/17/1996	9:55	2		2
SJRCE	10/15/1996	10:30	1	T	1
SJRCE	11/13/1996	10:15	4		4
SJRCE	12/3/1996	10:25	1	T	1
SJRCE	1/14/1997	10:15	1	T	1
SJRCE	2/11/1997	10:15	2	T	2

Ambient Copper Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 15.09 µg/L mg/L

Average MDL = 7.3 µg/L

Average =	1.76	µg/L
Maximum =	17.00	µg/L
Standard Dev =	1.99	µg/L
95 Percentile =	5.00	µg/L

Station	Date	Time	Copper µg/L	Remark Code	Value used µg/L
SJRCE	3/11/1997	10:20	-1	T	3.65
SJRCE	4/15/1997	10:15	1	T	1
SJRCE	4/15/1997	10:15	1	T	1
SJRCE	5/13/1997	10:10	1	T	1
SJRCE	5/13/1997	10:10	1	T	1
SJRCE	6/10/1997	10:25	1	T	1
SJRCE	6/10/1997	10:25	1	T	1
SJRCE	7/8/1997	10:30	1	T	1
SJRCE	7/8/1997	10:30	1	T	1
SJRCE	8/5/1997	10:20	2		2
SJRCE	8/5/1997	10:20	2		2
SJRCE	9/16/1997	9:35	0.37	T	0.37
SJRCE	9/16/1997	9:35	0.37	T	0.37
SJRCE	10/9/1997	14:00	1	T	1
SJRCE	11/11/1997	9:45	0.64	T	0.64
SJRCE	12/9/1997	9:30	0.46	T	0.46
SJRCE	1/13/1998	9:55	0.74	T	0.74
SJRCE	2/10/1998	9:40	0.78	T	0.78
SJRCE	3/17/1998	10:15	0.8	T	0.8
SJRCE	4/14/1998	9:30	0.72	T	0.72
SJRCE	5/12/1998	13:45	1.25	T	1.25
SJRCE	6/9/1998	13:45	1.08	T	1.08
SJRCE	7/14/1998	13:45	0.81	T	0.81
SJRCE	8/18/1998	9:00	0.46	T	0.46
SJRCE	9/8/1998	13:20	0.81	T	0.81
SJRCE	10/15/1998	13:40	0.82	T	0.82
SJRCE	12/15/1998	13:40	0.46	T	0.46
SJRCE	1/12/1999	9:45	0.27	T	0.27
SJRCE	2/9/1999	10:15	0.68	T	0.68
SJRCE	3/10/1999	13:45	0.54	T	0.54
SJRCE	4/27/1999	10:20	0.66	T	0.66
SJRCE	5/10/1999	10:10	0.54	T	0.54
SJRCE	6/7/1999	10:00	0.54	T	0.54
SJRCE	7/12/1999	13:20	0.33	T	0.33
SJRCE	8/10/1999	13:35	0.51	T	0.51
SJRCE	9/28/1999	14:40	1.55	T	1.55
SJRCE	10/12/1999	14:40	1.3	T	1.3
SJRCE	11/9/1999	11:20	1.8	T	1.8
SJRCE	12/6/1999	14:20	0.18	T	0.18
SJRCE	1/10/2000	14:30	1.31	T	1.31
SJRCE	2/7/2000	15:50	1.6	T	1.6
SJRCE	3/6/2000	15:20	1.76	T	1.76
SJRCE	4/10/2000	10:40	0.6	T	0.6
SJRCE	5/8/2000	10:55	2.5		2.5
SJRCE	6/12/2000	15:15	2.63		2.63
SJRCE	7/10/2000	10:15	1.56	T	1.56
SJRCE	8/7/2000	10:35	1.22	T	1.22
SJRCE	9/11/2000	9:45	1.76	T	1.76
SJRCE	10/11/2000	15:35	0.534	W	0.534
SJRCE	11/13/2000	9:30	0.71	T	0.71
SJRCE	12/14/2000	9:45	-0.223	T	3.65
SJRCE	1/9/2001	11:50	0.1	T	0.1
SJRCE	2/15/2001	9:50	0.334	T	0.334

Ambient Copper Data in St. Johns River near SECI Palatka Plant

Average MDL = 7.3 µg/L

Class III Water Quality Standard = 15.09 µg/L mg/L

Average =	1.76 µg/L
Maximum =	17.00 µg/L
Standard Dev =	1.99 µg/L
95 Percentile =	5.00 µg/L

Station	Date	Time	Copper µg/L	Remark Code	Value used µg/L
SJRCE	3/15/2001	8:45	0.337	T	0.337
SJRCE	4/10/2001	8:45	0.138	T	0.138
SJRCE	5/14/2001	13:40	0.666	T	0.666
SJRCE	6/11/2001	13:40	-0.367	T	3.65
SJRCE	7/11/2001	12:45	0.614	T	0.614
SJRCE	8/9/2001	12:00	0.292	T	0.292
SJRCE	9/11/2001	14:50	0.237	T	0.237
SJRCE	10/9/2001	12:30	1.202	T	1.202
SJRCW	5/12/1993	13:30	1	T	1
SJRCW	6/8/1993	8:30	1	T	1
SJRCW	7/7/1993	11:30	1	T	1
SJRCW	9/22/1993	9:00	1	T	1
SJRCW	12/15/1993	11:45	0	T	3.65
SJRCW	1/20/1994	12:15	1	T	1
SJRCW	2/15/1994	9:50	8		8
SJRCW	3/14/1994	12:25	-1	T	3.65
SJRCW	4/12/1994	11:40	15		15
SJRCW	5/16/1994	12:20	2		2
SJRCW	6/14/1994	12:35	1		1
SJRCW	7/12/1994	11:55	6		6
SJRCW	8/16/1994	12:00	5		5
SJRCW	9/13/1994	11:55	5		5
SJRCW	10/17/1994	11:45	11		11
SJRCW	11/18/1994	10:50	0	T	3.65
SJRCW	12/13/1994	12:20	2		2
SJRCW	1/19/1995	11:50	1	T	1
SJRCW	3/15/1995	10:55	3		3
SJRCW	4/11/1995	9:40	-1	T	3.65
SJRCW	5/16/1995	11:35	3		3
SJRCW	6/13/1995	10:15	0	T	3.65
SJRCW	7/11/1995	11:30	1	T	1
SJRCW	8/15/1995	12:30	1	T	1
SJRCW	9/13/1995	12:25	2		2
SJRCW	10/17/1995	11:20	6		6
SJRCW	11/16/1995	11:35	1	T	1
SJRCW	12/13/1995	10:50	1	T	1
SJRCW	1/16/1996	11:00	4		4
SJRCW	2/13/1996	11:35	3		3
SJRCW	3/13/1996	11:25	4		4
SJRCW	4/16/1996	10:50	2	T	2
SJRCW	5/14/1996	11:15	2	T	2
SJRCW	6/12/1996	11:30	1	T	1
SJRCW	7/16/1996	11:10	6		6
SJRCW	8/21/1996	11:35	4		4
SJRCW	9/17/1996	10:30	3		3
SJRCW	10/15/1996	10:00	1	T	1
SJRCW	11/13/1996	11:00	4		4
SJRCW	12/3/1996	10:55	9		9
SJRCW	1/14/1997	10:40	1	T	1
SJRCW	2/11/1997	10:40	2	T	2
SJRCW	3/11/1997	10:45	-1	T	3.65
SJRCW	4/15/1997	10:35	1	T	1
SJRCW	4/15/1997	10:35	1	T	1

Ambient Copper Data in St. Johns River near SECI Palatka Plant

Average MDL = 7.3 µg/L

Class III Water Quality Standard = 15.09 µg/L mg/L

Average =	1.76 µg/L
Maximum =	17.00 µg/L
Standard Dev =	1.99 µg/L
95 Percentile =	5.00 µg/L

Station	Date	Time	Copper µg/L	Remark Code	Value used µg/L
SJRCW	5/13/1997	10:25	1	T	1
SJRCW	5/13/1997	10:25	1	T	1
SJRCW	6/10/1997	10:50	1	T	1
SJRCW	6/10/1997	10:50	1	T	1
SJRCW	7/8/1997	10:45	1	T	1
SJRCW	7/8/1997	10:45	1	T	1
SJRCW	8/5/1997	10:40	1	T	1
SJRCW	8/5/1997	10:40	1	T	1
SJRCW	9/16/1997	9:50	0.59	T	0.59
SJRCW	9/16/1997	9:50	0.59	T	0.59
SJRCW	10/9/1997	14:50	1	T	1
SJRCW	11/11/1997	10:00	1.54	T	1.54
SJRCW	12/9/1997	10:00	0.5	T	0.5
SJRCW	1/13/1998	10:20	0.77	T	0.77
SJRCW	2/10/1998	10:00	2.06		2.06
SJRCW	3/17/1998	10:35	1.5	T	1.5
SJRCW	4/14/1998	10:10	0.72	T	0.72
SJRCW	5/12/1998	13:20	1.27	T	1.27
SJRCW	6/9/1998	13:20	1.15	T	1.15
SJRCW	7/14/1998	14:15	0.89	T	0.89
SJRCW	8/18/1998	9:30	0.71	T	0.71
SJRCW	9/8/1998	10:45	0.53	T	0.53
SJRCW	9/8/1998	13:45	1.21	T	1.21
SJRCW	10/15/1998	14:15	0.51	T	0.51
SJRCW	11/10/1998	13:30	0.79	T	0.79
SJRCW	12/15/1998	13:15	0.48	T	0.48
SJRCW	1/12/1999	10:15	0.71	T	0.71
SJRCW	2/9/1999	10:40	5.1		5.1
SJRCW	3/10/1999	13:20	1.2	T	1.2
SJRCW	4/27/1999	11:00	0.66	T	0.66
SJRCW	5/10/1999	11:00	0.72	T	0.72
SJRCW	6/7/1999	10:30	1.01	T	1.01
SJRCW	7/12/1999	13:00	0.58	T	0.58
SJRCW	8/10/1999	13:15	1.13	T	1.13
SJRCW	9/28/1999	14:20	2.34		2.34
SJRCW	10/12/1999	14:20	1.37	T	1.37
SJRCW	11/9/1999	12:00	1.34	T	1.34
SJRCW	12/6/1999	14:00	0.9	T	0.9
SJRCW	1/10/2000	14:10	2.02		2.02
SJRCW	2/7/2000	15:30	1.51	T	1.51
SJRCW	3/6/2000	15:00	0.91	T	0.91
SJRCW	4/10/2000	11:00	0.87	T	0.87
SJRCW	5/8/2000	11:25	1.12	T	1.12
SJRCW	6/12/2000	14:55	2.96		2.96
SJRCW	7/10/2000	10:50	1.22	T	1.22
SJRCW	8/7/2000	11:00	1.77	T	1.77
SJRCW	9/11/2000	10:05	1.52	T	1.52
SJRCW	10/11/2000	15:15	0.35	W	0.35
SJRCW	11/13/2000	9:50	0.98	T	0.98
SJRCW	12/14/2000	10:05	0.328	T	0.328
SJRCW	1/9/2001	11:30	0.056	T	0.056
SJRCW	2/15/2001	10:10	0.283	T	0.283
SJRCW	3/15/2001	9:15	0.418	T	0.418

Ambient Copper Data in St. Johns River near SECI Palatka Plant

Average MDL = 7.3 µg/L

Class III Water Quality Standard = 15.09 µg/L mg/L

Average =	1.76 µg/L
Maximum =	17.00 µg/L
Standard Dev =	1.99 µg/L
95 Percentile =	5.00 µg/L

Station	Date	Time	Copper µg/L	Remark Code	Value used µg/L
SJRCW	4/10/2001	8:55	0.086	T	0.086
SJRCW	5/14/2001	14:10	0.605	T	0.605
SJRCW	6/11/2001	13:55	0.857	T	0.857
SJRCW	7/11/2001	12:25	0.119	T	0.119
SJRCW	8/9/2001	11:40	0.742	T	0.742
SJRCW	9/11/2001	14:30	0.647	T	0.647
SJRCW	10/9/2001	12:05	1.017	T	1.017
SJRCW	11/20/2001	12:55	1.262	T	1.262
SJRCW	12/5/2001	12:40	0.883	T	0.883
SJRCW	1/8/2002	12:00	0.837	T	0.837
SJRCW	2/11/2002	11:25	1.265	T	1.265
SJRCW	3/11/2002	9:35	0.785	T	0.785
SJRCW	4/8/2002	12:55	2	U	1
SJRCW	5/13/2002	12:00	1.5	T	1.5
SJRCW	6/10/2002	12:10	3.5	T	3.5
SJRCW	7/15/2002	12:30	1.11	T	1.11
SJRCW	8/12/2002	11:35	0.156	T	0.156
SJRCW	9/12/2002	11:20	0.094	T	0.094
SJRCW	10/7/2002	12:10	1.78	T	1.78
SJRCW	11/11/2002	11:40	-0.169	T	3.65
SJRCW	12/9/2002	11:15	1.017	T	1.017
SJRCW	1/6/2003	11:10	0.279	T	0.279
SJRCW	2/11/2003	9:50	1.351	T	1.351
SJRCW	3/11/2003	13:05	0.682	T	0.682
SJRCW	4/14/2003	12:00	0.949	T	0.949
SJRCW	5/12/2003	12:40	0.962	T	0.962
SJRCW	6/9/2003	12:15	0.744	T	0.744
SJRCW	8/12/2003	12:45	0.503	T	0.503
SJRCW	9/8/2003	12:00	0.461	T	0.461
SJRCW	10/7/2003	11:35	-1.44	T	3.65
SJRCW	11/12/2003	12:20	1.18	T	1.18
SJRCW	12/10/2003	13:40	0.148	T	0.148
SJRCW	1/12/2004	13:25	1.65	T	1.65
SJRCW	2/9/2004	12:45	0.776	T	0.776
sjrcc	3/24/2005	10:16	1.1		1.1000
SJRM 74C	3/24/2005	2:15	1.5		1.5000
SJ6	3/24/2005	3:00	1.1		1.1000
SJRCC	4/26/2005	1:00	1.4	V	1.4000
SJ6	4/26/2005	4:45	1.2	V	1.2000
SJRM 74C	4/26/2005	5:15	1.1	V	1.1000
SJRCC	5/17/2005	9:00	0.58	I	0.5800
SJ6	5/17/2005	10:45	0.53	i	0.5300
SJRM 74C	5/17/2005	11:15	0.49	I	0.4900
SJRCC	6/20/2005	10:00	0.37	U	0.1850
SJRM 74C	6/20/2005	3:15	0.37	U	0.1850
SJ6	6/20/2005	2:45	0.37	U	0.1850
SJRCC	7/25/2005	7:30	0.45	I	0.4500
SJ6	7/25/2005	2:00	0.65	I	0.6500
SJRM 74C	7/25/2005	2:15	0.49	I	0.4900
SJRCC	8/31/2005	9:30	0.37	U	0.1850
SJ6	8/31/2005	1:30	0.37	U	0.1850
SJRM 74C	8/31/2005	2:00	0.37	U	0.1850
SJ6	9/27/2005	12:45	0.37	I	0.3700

Ambient Copper Data in St. Johns River near SECI Palatka Plant

Average MDL = 7.3 µg/L

Class III Water Quality Standard = 15.09 µg/L mg/L

Station	Date	Time	Copper µg/L	Remark Code	Value used µg/L
SJRM 74C	9/27/2005	1:30	0.37	U	0.1850
SJRCC	9/27/2005	2:00	0.37	U	0.1850

Average =	1.76 µg/L
Maximum =	17.00 µg/L
Standard Dev =	1.99 µg/L
95 Percentile =	5.00 µg/L

Note: If non-detect was reported, half of the detection limit or half of the water quality standard was used, whichever was less. If all samples are non-detect then the constitutent is assumed absent.

Source: SJRWMD, 2004.
ECT, 2004.

Ambient Cyanide Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 5.2 µg/L

Average =	1.70 µg/L
Maximum =	4.00 µg/L
Standard Dev =	0.68 µg/L
95 Percentile =	2.60 µg/L
Count	33.00

Station	Date		Cyanide (µg/L)	Value used (µg/L)
SECI D-005	02/01/01	<	5	2.5
SECI D-005	06/19/01	<	10	2.6
SECI D-005	07/17/01	<	10	2.6
SECI D-005	11/19/01	<	10	2.6
SECI D-005	02/20/02	<	5	2.5
SECI D-005	06/12/02	<	4	2
SECI D-005	07/30/02	<	8	2.6
SECI D-005	10/22/02	<	4	2
SECI D-005	01/28/03		4	4
SECI D-005	05/13/03	<	4	2
SECI D-005	08/26/03	<	4	2
SECI D-005	10/28/03	<	0.4	0.2
sjrcc	3/24/2005	<	2.7	1.35
SJRM 74C	3/24/2005	<	2.7	1.35
SJ6	3/24/2005	<	2.7	1.35
SJRCC	4/26/2005	<	2.7	1.35
SJ6	4/26/2005	<	2.7	1.35
SJRM 74C	4/26/2005	<	2.7	1.35
SJRCC	5/17/2005	<	2.7	1.35
SJ6	5/17/2005	<	2.7	1.35
SJRM 74C	5/17/2005	<	2.7	1.35
SJRCC	6/20/2005	<	2.7	1.35
SJRM 74C	6/20/2005	<	2.7	1.35
SJ6	6/20/2005	<	2.7	1.35
SJRCC	7/25/2005	<	2.7	1.35
SJ6	7/25/2005	<	2.7	1.35
SJRM 74C	7/25/2005	<	2.7	1.35
SJRCC	8/31/2005	<	2.7	1.35
SJ6	8/31/2005	<	2.7	1.35
SJRM 74C	8/31/2005	<	2.7	1.35
SJ6	9/27/2005	<	2.7	1.35
SJRM 74C	9/27/2005	<	2.7	1.35
SJRCC	9/27/2005	<	2.7	1.35

Note: If non-detect was reported, half of the detection limit or half of the water quality standard was used, whichever was less. If all samples are non-detect then the constitutent is assumed absent.

Source: SJRWMD, 2004.
ECT, 2004.

Ambient Iron Data in St. Johns River near SECI Palatka Plant

Average MDL = 14 µg/L

Class III Water Quality Standard = 1,000 µg/L

Average =	203.6 µg/L
Maximum =	1,520.0 µg/L
Standard Dev =	136.6 µg/L
95 Percentile =	427.7 µg/L
Count	433.0

Station	Date	Time	Iron (µg/L)	Remark Code	Value Used (µg/L)
SECI D-005	6/18/98		125.0		125.0
SECI D-005	3/1/2000		250.0		250.0
SECI D-005	6/1/2000		100.0		100.0
SECI D-005	9/1/2000		61.0		61.0
SECI D-005	12/11/2000		9.7		9.7
SECI D-005	3/1/2001		170.0		170.0
SECI D-005	6/1/2001		130.0		130.0
SECI D-005	7/1/2001		110.0		110.0
SECI D-005	12/1/2001		49.0		49.0
SECI D-005	3/1/2002		52.0		52.0
SECI D-005	6/1/2002		9.6		9.6
SECI D-005	7/29/2002		21.0		21.0
SECI D-005	10/22/2002		38.0		38.0
SECI D-005	1/28/2003		35.0		35.0
SECI D-005	5/13/2003		37.0		37.0
SECI D-005	8/26/2003		34.0		34.0
FP41	9/22/1993	14:50	60.0		60.0
FP42	9/22/1993	15:00	68.0		68.0
FP42	11/27/2001	10:00	492.4		492.4
FP42	2/26/2002	10:50	209.9		209.9
FP42	3/25/2002	15:30	270.4		270.4
FP42	4/29/2002	14:55	162.2		162.2
FP42	5/29/2002	13:45	85.6		85.6
FP42	6/26/2002	15:10	119.8		119.8
FP42	7/30/2002	14:00	205.9		205.9
FP42	8/26/2002	10:00	337.2		337.2
FP42	9/25/2002	14:30	396.6		396.6
FP42	10/24/2002	14:35	404.0		404.0
FP42	11/25/2002	15:05	293.9		293.9
FP42	1/28/2003	9:45	296.2		296.2
FP43	9/22/1993	15:15	73.0		73.0
SJ6	5/16/2002	10:45	126.8		126.8
SJRCC	4/13/1993	15:10	137.0		137.0
SJRCC	5/12/1993	13:40	191.0		191.0
SJRCC	6/8/1993	8:25	95.0		95.0
SJRCC	7/7/1993	11:20	57.0		57.0
SJRCC	8/12/1993	11:00	71.0		71.0
SJRCC	9/22/1993	8:50	106.0		106.0
SJRCC	11/15/1993	11:40	63.0		63.0
SJRCC	12/15/1993	11:30	107.0		107.0
SJRCC	1/20/1994	12:05	115.0		115.0
SJRCC	2/15/1994	10:15	95.0		95.0
SJRCC	3/14/1994	12:10	154.0		154.0
SJRCC	4/12/1994	11:30	100.0		100.0
SJRCC	5/16/1994	12:05	74.0		74.0
SJRCC	6/14/1994	12:25	52.0		52.0
SJRCC	7/12/1994	11:40	73.0		73.0
SJRCC	8/16/1994	11:45	339.0		339.0
SJRCC	9/13/1994	11:55	247.0		247.0
SJRCC	10/17/1994	11:25	311.0		311.0
SJRCC	11/18/1994	10:40	514.0		514.0

Ambient Iron Data in St. Johns River near SECI Palatka Plant

Average MDL = 14 µg/L

Class III Water Quality Standard = 1,000 µg/L

Average =	203.6 µg/L
Maximum =	1,520.0 µg/L
Standard Dev =	136.6 µg/L
95 Percentile =	427.7 µg/L
Count	433.0

Station	Date	Time	Iron (µg/L)	Remark Code	Value Used (µg/L)
SJRCC	12/13/1994	12:10	436.0		436.0
SJRCC	1/19/1995	11:40	414.0		414.0
SJRCC	3/15/1995	10:40	255.0		255.0
SJRCC	5/16/1995	11:25	50.0		50.0
SJRCC	6/13/1995	10:00	181.0		181.0
SJRCC	7/11/1995	11:15	103.0		103.0
SJRCC	8/15/1995	12:15	73.0		73.0
SJRCC	9/13/1995	12:10	263.0		263.0
SJRCC	10/17/1995	11:00	541.0		541.0
SJRCC	11/16/1995	11:20	285.0		285.0
SJRCC	12/13/1995	10:40	297.0		297.0
SJRCC	1/16/1996	10:50	334.0		334.0
SJRCC	2/13/1996	11:25	348.0		348.0
SJRCC	3/13/1996	11:15	298.0		298.0
SJRCC	4/16/1996	10:40	342.0		342.0
SJRCC	5/14/1996	11:00	186.0		186.0
SJRCC	6/12/1996	11:15	107.0		107.0
SJRCC	7/16/1996	10:55	246.0		246.0
SJRCC	8/21/1996	11:20	112.0		112.0
SJRCC	9/17/1996	10:15	152.0		152.0
SJRCC	10/15/1996	10:15	250.0		250.0
SJRCC	11/13/1996	10:40	213.0		213.0
SJRCC	12/3/1996	10:40	186.0		186.0
SJRCC	1/14/1997	10:25	187.0		187.0
SJRCC	2/11/1997	10:25	158.0		158.0
SJRCC	3/11/1997	10:25	134.0		134.0
SJRCC	4/15/1997	10:25	112.0		112.0
SJRCC	4/15/1997	10:25	112.0		112.0
SJRCC	5/13/1997	10:20	181.6		181.6
SJRCC	5/13/1997	10:20	181.6		181.6
SJRCC	6/10/1997	10:40	99.7		99.7
SJRCC	6/10/1997	10:40	99.7		99.7
SJRCC	7/8/1997	10:40	143.6		143.6
SJRCC	7/8/1997	10:40	143.6		143.6
SJRCC	8/5/1997	10:30	114.0		114.0
SJRCC	8/5/1997	10:30	114.0		114.0
SJRCC	9/16/1997	9:40	127.7		127.7
SJRCC	9/16/1997	9:40	127.7		127.7
SJRCC	10/9/1997	14:20	145.8		145.8
SJRCC	11/11/1997	9:50	153.5		153.5
SJRCC	12/9/1997	9:45	217.2		217.2
SJRCC	1/13/1998	10:10	262.3		262.3
SJRCC	2/10/1998	9:45	269.5		269.5
SJRCC	3/17/1998	10:20	294.9		294.9
SJRCC	4/14/1998	9:45	354.1		354.1
SJRCC	5/12/1998	13:40	215.3		215.3
SJRCC	6/9/1998	13:25	171.7		171.7
SJRCC	7/14/1998	14:00	49.9	T	49.9
SJRCC	8/18/1998	9:15	67.8		67.8
SJRCC	9/8/1998	13:30	73.1		73.1
SJRCC	10/15/1998	14:00	174.6		174.6
SJRCC	12/15/1998	13:30	188.9		188.9

Ambient Iron Data in St. Johns River near SECI Palatka Plant

Average MDL = 14 µg/L

Class III Water Quality Standard = 1,000 µg/L

Average =	203.6 µg/L
Maximum =	1,520.0 µg/L
Standard Dev =	136.6 µg/L
95 Percentile =	427.7 µg/L
Count	433.0

Station	Date	Time	Iron (µg/L)	Remark Code	Value Used (µg/L)
SJRCC	1/12/1999	9:50	121.2		121.2
SJRCC	2/9/1999	10:30	160.2		160.2
SJRCC	3/10/1999	13:35	148.2		148.2
SJRCC	4/27/1999	10:45	86.6		86.6
SJRCC	5/10/1999	10:30	82.6		82.6
SJRCC	6/7/1999	10:15	79.8		79.8
SJRCC	7/12/1999	13:10	88.0		88.0
SJRCC	8/10/1999	13:20	114.5		114.5
SJRCC	9/28/1999	14:30	87.3		87.3
SJRCC	10/12/1999	14:30	84.3		84.3
SJRCC	11/9/1999	11:40	166.5		166.5
SJRCC	12/6/1999	14:10	314.9		314.9
SJRCC	1/10/2000	14:20	335.2		335.2
SJRCC	2/7/2000	15:40	275.7		275.7
SJRCC	3/6/2000	15:10	196.6		196.6
SJRCC	4/10/2000	10:50	172.0		172.0
SJRCC	5/8/2000	11:15	147.0		147.0
SJRCC	6/12/2000	15:00	45.7	T	45.7
SJRCC	7/10/2000	10:30	68.2		68.2
SJRCC	8/7/2000	10:45	42.0	T	42.0
SJRCC	9/11/2000	9:55	156.0		156.0
SJRCC	10/11/2000	15:25	334.0		334.0
SJRCC	11/13/2000	9:40	127.5		127.5
SJRCC	12/14/2000	9:55	98.2		98.2
SJRCC	1/9/2001	11:40	98.8		98.8
SJRCC	2/15/2001	10:00	81.9		81.9
SJRCC	3/15/2001	9:00	92.7		92.7
SJRCC	4/10/2001	8:50	63.1		63.1
SJRCC	5/14/2001	13:55	81.1		81.1
SJRCC	6/11/2001	13:50	57.6		57.6
SJRCC	7/11/2001	12:34	111.3		111.3
SJRCC	8/9/2001	11:50	193.2		193.2
SJRCC	9/11/2001	14:40	150.9		150.9
SJRCC	10/9/2001	12:20	440.1		440.1
SJRCC	11/20/2001	13:10	532.1		532.1
SJRCC	12/5/2001	12:50	421.5		421.5
SJRCC	1/8/2002	12:15	341.4		341.4
SJRCC	2/11/2002	11:40	219.8		219.8
SJRCC	3/11/2002	9:20	255.7		255.7
SJRCC	4/8/2002	13:05	258.3		258.3
SJRCC	5/13/2002	12:10	84.4		84.4
SJRCC	6/10/2002	12:15	96.1		96.1
SJRCC	7/15/2002	12:50	101.6		101.6
SJRCC	8/12/2002	11:45	89.6		89.6
SJRCC	9/12/2002	11:30	366.4		366.4
SJRCC	10/7/2002	12:20	412.2		412.2
SJRCC	11/11/2002	11:50	380.4		380.4
SJRCC	12/9/2002	11:30	296.5		296.5
SJRCC	1/6/2003	11:20	437.0		437.0
SJRCC	2/11/2003	10:00	298.6		298.6
SJRCC	3/11/2003	13:10	496.9		496.9
SJRCC	3/11/2003	13:15	489.4		489.4

Ambient Iron Data in St. Johns River near SECI Palatka Plant

Average MDL = 14 µg/L

Class III Water Quality Standard = 1,000 µg/L

Average =	203.6 µg/L
Maximum =	1,520.0 µg/L
Standard Dev =	136.6 µg/L
95 Percentile =	427.7 µg/L
Count	433.0

Station	Date	Time	Iron (µg/L)	Remark Code	Value Used (µg/L)
SJRCC	4/14/2003	12:15	302.4		302.4
SJRCC	4/14/2003	12:20	302.7		302.7
SJRCC	5/12/2003	12:50	328.8		328.8
SJRCC	5/12/2003	13:00	223.4	I	223.4
SJRCC	6/9/2003	12:20	165.0		165.0
SJRCC	6/9/2003	12:25	147.2		147.2
SJRCC	7/17/2003	12:50	220.1	I	220.1
SJRCC	7/17/2003	12:55	141.3	I	141.3
SJRCC	8/12/2003	12:50	228.8		228.8
SJRCC	8/12/2003	12:55	226.1		226.1
SJRCC	9/8/2003	12:10	279.7		279.7
SJRCC	10/7/2003	11:45	193.0	I	193.0
SJRCC	11/12/2003	12:25	264.0		264.0
SJRCC	12/10/2003	13:30	280.0		280.0
SJRCC	1/12/2004	13:30	393.0		393.0
SJRCC	2/9/2004	12:55	232.0	I	232.0
SJRCE	4/13/1993	15:15	133.0		133.0
SJRCE	5/12/1993	13:50	160.0		160.0
SJRCE	6/8/1993	8:15	87.0		87.0
SJRCE	7/7/1993	11:10	43.0	T	43.0
SJRCE	8/12/1993	10:50	112.0		112.0
SJRCE	9/22/1993	8:40	98.0		98.0
SJRCE	11/15/1993	11:30	61.0		61.0
SJRCE	12/15/1993	11:20	111.0		111.0
SJRCE	1/20/1994	11:50	111.0		111.0
SJRCE	2/15/1994	10:30	181.0		181.0
SJRCE	3/14/1994	11:55	102.0		102.0
SJRCE	4/12/1994	11:20	93.0		93.0
SJRCE	5/16/1994	11:50	99.0		99.0
SJRCE	6/14/1994	12:05	44.0		44.0
SJRCE	8/16/1994	11:35	215.0		215.0
SJRCE	9/13/1994	11:40	233.0		233.0
SJRCE	10/17/1994	11:10	315.0		315.0
SJRCE	11/18/1994	10:30	428.0		428.0
SJRCE	12/13/1994	12:00	381.0		381.0
SJRCE	1/19/1995	11:30	359.0		359.0
SJRCE	3/15/1995	10:30	303.0		303.0
SJRCE	4/11/1995	9:25	160.0		160.0
SJRCE	5/16/1995	11:15	61.0		61.0
SJRCE	6/13/1995	9:50	147.0		147.0
SJRCE	7/11/1995	10:55	127.0		127.0
SJRCE	8/15/1995	12:00	74.0		74.0
SJRCE	9/13/1995	11:55	412.0		412.0
SJRCE	10/17/1995	10:45	448.0		448.0
SJRCE	11/16/1995	11:05	278.0		278.0
SJRCE	12/13/1995	10:25	274.0		274.0
SJRCE	1/16/1996	10:45	1520.0		1520.0
SJRCE	2/13/1996	11:15	321.0		321.0
SJRCE	3/13/1996	11:05	288.0		288.0
SJRCE	4/16/1996	10:30	348.0		348.0
SJRCE	5/14/1996	10:50	420.0		420.0
SJRCE	6/12/1996	11:05	79.0		79.0

Ambient Iron Data in St. Johns River near SECI Palatka Plant

Average MDL = 14 µg/L

Class III Water Quality Standard = 1,000 µg/L

Average =	203.6 µg/L
Maximum =	1,520.0 µg/L
Standard Dev =	136.6 µg/L
95 Percentile =	427.7 µg/L
Count	433.0

Station	Date	Time	Iron (µg/L)	Remark Code	Value Used (µg/L)
SJRCE	7/16/1996	10:45	274.0		274.0
SJRCE	8/21/1996	11:05	114.0		114.0
SJRCE	9/17/1996	9:55	177.0		177.0
SJRCE	10/15/1996	10:30	297.0		297.0
SJRCE	11/13/1996	10:15	176.0		176.0
SJRCE	12/3/1996	10:25	181.0		181.0
SJRCE	1/14/1997	10:15	216.0		216.0
SJRCE	2/11/1997	10:15	154.0		154.0
SJRCE	3/11/1997	10:20	175.0		175.0
SJRCE	4/15/1997	10:15	125.0		125.0
SJRCE	4/15/1997	10:15	125.0		125.0
SJRCE	5/13/1997	10:10	145.5		145.5
SJRCE	5/13/1997	10:10	145.5		145.5
SJRCE	6/10/1997	10:25	135.4		135.4
SJRCE	6/10/1997	10:25	135.4		135.4
SJRCE	7/8/1997	10:30	82.3		82.3
SJRCE	7/8/1997	10:30	82.3		82.3
SJRCE	8/5/1997	10:20	141.0		141.0
SJRCE	8/5/1997	10:20	141.0		141.0
SJRCE	9/16/1997	9:35	169.8		169.8
SJRCE	9/16/1997	9:35	169.8		169.8
SJRCE	10/9/1997	14:00	122.3		122.3
SJRCE	11/11/1997	9:45	163.9		163.9
SJRCE	12/9/1997	9:30	210.9		210.9
SJRCE	1/13/1998	9:55	275.3		275.3
SJRCE	2/10/1998	9:40	267.3		267.3
SJRCE	3/17/1998	10:15	297.6		297.6
SJRCE	4/14/1998	9:30	254.7		254.7
SJRCE	5/12/1998	13:45	197.1		197.1
SJRCE	6/9/1998	13:45	161.4		161.4
SJRCE	7/14/1998	13:45	82.7		82.7
SJRCE	8/18/1998	9:00	100.7		100.7
SJRCE	9/8/1998	13:20	89.6		89.6
SJRCE	10/15/1998	13:40	173.1		173.1
SJRCE	12/15/1998	13:40	165.7		165.7
SJRCE	1/12/1999	9:45	128.0		128.0
SJRCE	2/9/1999	10:15	165.5		165.5
SJRCE	3/10/1999	13:45	147.4		147.4
SJRCE	4/27/1999	10:20	102.4		102.4
SJRCE	5/10/1999	10:10	96.3		96.3
SJRCE	6/7/1999	10:00	108.8		108.8
SJRCE	7/12/1999	13:20	64.3		64.3
SJRCE	8/10/1999	13:35	75.1		75.1
SJRCE	9/28/1999	14:40	108.2		108.2
SJRCE	10/12/1999	14:40	101.0		101.0
SJRCE	11/9/1999	11:20	162.8		162.8
SJRCE	12/6/1999	14:20	321.8		321.8
SJRCE	1/10/2000	14:30	310.3		310.3
SJRCE	2/7/2000	15:50	267.0		267.0
SJRCE	3/6/2000	15:20	190.1		190.1
SJRCE	4/10/2000	10:40	166.0		166.0
SJRCE	5/8/2000	10:55	120.0		120.0

Ambient Iron Data in St. Johns River near SECI Palatka Plant

Average MDL = 14 µg/L

Class III Water Quality Standard = 1,000 µg/L

Average =	203.6 µg/L
Maximum =	1,520.0 µg/L
Standard Dev =	136.6 µg/L
95 Percentile =	427.7 µg/L
Count	433.0

Station	Date	Time	Iron (µg/L)	Remark Code	Value Used (µg/L)
SJRCE	6/12/2000	15:15	46.0	T	46.0
SJRCE	7/10/2000	10:15	85.6		85.6
SJRCE	8/7/2000	10:35	90.0		90.0
SJRCE	9/11/2000	9:45	98.0		98.0
SJRCE	10/11/2000	15:35	327.0		327.0
SJRCE	11/13/2000	9:30	160.6		160.6
SJRCE	12/14/2000	9:45	166.1		166.1
SJRCE	1/9/2001	11:50	107.2		107.2
SJRCE	2/15/2001	9:50	89.7		89.7
SJRCE	3/15/2001	8:45	95.1		95.1
SJRCE	4/10/2001	8:45	60.1		60.1
SJRCE	5/14/2001	13:40	79.4		79.4
SJRCE	6/11/2001	13:40	47.8	T	47.8
SJRCE	7/11/2001	12:45	83.6		83.6
SJRCE	8/9/2001	12:00	70.0		70.0
SJRCE	9/11/2001	14:50	135.8		135.8
SJRCE	10/9/2001	12:30	385.8		385.8
SJRCW	4/13/1993	15:05	155.0		155.0
SJRCW	5/12/1993	13:30	177.0		177.0
SJRCW	6/8/1993	8:30	87.0		87.0
SJRCW	7/7/1993	11:30	109.0		109.0
SJRCW	8/12/1993	11:10	71.0		71.0
SJRCW	9/22/1993	9:00	76.0		76.0
SJRCW	11/15/1993	11:50	292.0		292.0
SJRCW	12/15/1993	11:45	48.0	T	48.0
SJRCW	1/20/1994	12:15	167.0		167.0
SJRCW	2/15/1994	9:50	293.0		293.0
SJRCW	3/14/1994	12:25	169.0		169.0
SJRCW	4/12/1994	11:40	104.0		104.0
SJRCW	5/16/1994	12:20	88.0		88.0
SJRCW	6/14/1994	12:35	164.0		164.0
SJRCW	7/12/1994	11:55	325.0		325.0
SJRCW	8/16/1994	12:00	511.0		511.0
SJRCW	9/13/1994	11:55	282.0		282.0
SJRCW	10/17/1994	11:45	662.0		662.0
SJRCW	11/18/1994	10:50	364.0		364.0
SJRCW	12/13/1994	12:20	490.0		490.0
SJRCW	1/19/1995	11:50	432.0		432.0
SJRCW	3/15/1995	10:55	293.0		293.0
SJRCW	4/11/1995	9:40	266.0		266.0
SJRCW	5/16/1995	11:35	106.0		106.0
SJRCW	6/13/1995	10:15	272.0		272.0
SJRCW	7/11/1995	11:30	212.0		212.0
SJRCW	8/15/1995	12:30	201.0		201.0
SJRCW	9/13/1995	12:25	345.0		345.0
SJRCW	10/17/1995	11:20	685.0		685.0
SJRCW	11/16/1995	11:35	323.0		323.0
SJRCW	12/13/1995	10:50	327.0		327.0
SJRCW	1/16/1996	11:00	330.0		330.0
SJRCW	2/13/1996	11:35	355.0		355.0
SJRCW	3/13/1996	11:25	366.0		366.0
SJRCW	4/16/1996	10:50	379.0		379.0

Ambient Iron Data in St. Johns River near SECI Palatka Plant

Average MDL = 14 µg/L

Class III Water Quality Standard = 1,000 µg/L

Average =	203.6 µg/L
Maximum =	1,520.0 µg/L
Standard Dev =	136.6 µg/L
95 Percentile =	427.7 µg/L
Count	433.0

Station	Date	Time	Iron (µg/L)	Remark Code	Value Used (µg/L)
SJRCW	5/14/1996	11:15	254.0		254.0
SJRCW	6/12/1996	11:30	82.0		82.0
SJRCW	7/16/1996	11:10	219.0		219.0
SJRCW	8/21/1996	11:35	136.0		136.0
SJRCW	9/17/1996	10:30	110.0		110.0
SJRCW	10/15/1996	10:00	268.0		268.0
SJRCW	11/13/1996	11:00	181.0		181.0
SJRCW	12/3/1996	10:55	193.0		193.0
SJRCW	1/14/1997	10:40	364.0		364.0
SJRCW	2/11/1997	10:40	138.0		138.0
SJRCW	3/11/1997	10:45	205.0		205.0
SJRCW	4/15/1997	10:35	111.0		111.0
SJRCW	4/15/1997	10:35	111.0		111.0
SJRCW	5/13/1997	10:25	197.9		197.9
SJRCW	5/13/1997	10:25	197.9		197.9
SJRCW	6/10/1997	10:50	113.7		113.7
SJRCW	6/10/1997	10:50	113.7		113.7
SJRCW	7/8/1997	10:45	125.1		125.1
SJRCW	7/8/1997	10:45	125.1		125.1
SJRCW	8/5/1997	10:40	287.0		287.0
SJRCW	8/5/1997	10:40	287.0		287.0
SJRCW	9/16/1997	9:50	166.7		166.7
SJRCW	9/16/1997	9:50	166.7		166.7
SJRCW	10/9/1997	14:50	261.8		261.8
SJRCW	11/11/1997	10:00	314.7		314.7
SJRCW	12/9/1997	10:00	174.7		174.7
SJRCW	1/13/1998	10:20	299.3		299.3
SJRCW	2/10/1998	10:00	408.6		408.6
SJRCW	3/17/1998	10:35	307.6		307.6
SJRCW	4/14/1998	10:10	294.0		294.0
SJRCW	5/12/1998	13:20	213.3		213.3
SJRCW	6/9/1998	13:20	180.2		180.2
SJRCW	7/14/1998	14:15	54.1		54.1
SJRCW	8/18/1998	9:30	142.9		142.9
SJRCW	9/8/1998	10:45	111.5		111.5
SJRCW	9/8/1998	13:45	166.5		166.5
SJRCW	10/15/1998	14:15	200.7		200.7
SJRCW	11/10/1998	13:30	217.9		217.9
SJRCW	12/15/1998	13:15	190.8		190.8
SJRCW	1/12/1999	10:15	168.4		168.4
SJRCW	2/9/1999	10:40	235.1		235.1
SJRCW	3/10/1999	13:20	184.9		184.9
SJRCW	4/27/1999	11:00	99.2		99.2
SJRCW	5/10/1999	11:00	95.7		95.7
SJRCW	6/7/1999	10:30	76.1		76.1
SJRCW	7/12/1999	13:00	93.5		93.5
SJRCW	8/10/1999	13:15	108.3		108.3
SJRCW	9/28/1999	14:20	83.0		83.0
SJRCW	10/12/1999	14:20	95.8		95.8
SJRCW	11/9/1999	12:00	164.2		164.2
SJRCW	12/6/1999	14:00	303.9		303.9
SJRCW	1/10/2000	14:10	329.7		329.7

Ambient Iron Data in St. Johns River near SECI Palatka Plant

Average MDL = 14 µg/L

Class III Water Quality Standard = 1,000 µg/L

Average =	203.6 µg/L
Maximum =	1,520.0 µg/L
Standard Dev =	136.6 µg/L
95 Percentile =	427.7 µg/L
Count	433.0

Station	Date	Time	Iron (µg/L)	Remark Code	Value Used (µg/L)
SJRCW	2/7/2000	15:30	257.0		257.0
SJRCW	3/6/2000	15:00	188.6		188.6
SJRCW	4/10/2000	11:00	159.0		159.0
SJRCW	5/8/2000	11:25	142.0		142.0
SJRCW	6/12/2000	14:55	44.8	T	44.8
SJRCW	7/10/2000	10:50	60.0		60.0
SJRCW	8/7/2000	11:00	67.0		67.0
SJRCW	9/11/2000	10:05	401.0		401.0
SJRCW	10/11/2000	15:15	264.0		264.0
SJRCW	11/13/2000	9:50	103.4		103.4
SJRCW	12/14/2000	10:05	115.8		115.8
SJRCW	1/9/2001	11:30	152.7		152.7
SJRCW	2/15/2001	10:10	83.5		83.5
SJRCW	3/15/2001	9:15	140.0		140.0
SJRCW	4/10/2001	8:55	87.1		87.1
SJRCW	5/14/2001	14:10	62.7		62.7
SJRCW	6/11/2001	13:55	58.8		58.8
SJRCW	7/11/2001	12:25	64.9		64.9
SJRCW	8/9/2001	11:40	171.5		171.5
SJRCW	9/11/2001	14:30	191.2		191.2
SJRCW	10/9/2001	12:05	437.2		437.2
SJRCW	11/20/2001	12:55	427.5		427.5
SJRCW	12/5/2001	12:40	466.1		466.1
SJRCW	1/8/2002	12:00	309.2		309.2
SJRCW	2/11/2002	11:25	242.7		242.7
SJRCW	3/11/2002	9:35	240.4		240.4
SJRCW	4/8/2002	12:55	356.2		356.2
SJRCW	5/13/2002	12:00	113.7		113.7

Ambient Iron Data in St. Johns River near SECI Palatka Plant

Average MDL = 14 µg/L

Class III Water Quality Standard = 1,000 µg/L

Average =	203.6 µg/L
Maximum =	1,520.0 µg/L
Standard Dev =	136.6 µg/L
95 Percentile =	427.7 µg/L
Count	433.0

Station	Date	Time	Iron (µg/L)	Remark Code	Value Used (µg/L)
SJRCW	6/10/2002	12:10	98.9		98.9
SJRCW	7/15/2002	12:30	189.5		189.5
SJRCW	8/12/2002	11:35	185.3		185.3
SJRCW	9/12/2002	11:20	349.2		349.2
SJRCW	10/7/2002	12:10	439.3		439.3
SJRCW	11/11/2002	11:40	355.5		355.5
SJRCW	12/9/2002	11:15	305.6		305.6
SJRCW	1/6/2003	11:10	479.0		479.0
SJRCW	2/11/2003	9:50	303.9		303.9
SJRCW	3/11/2003	13:05	417.4		417.4
SJRCW	4/14/2003	12:00	329.8		329.8
SJRCW	5/12/2003	12:40	298.9		298.9
SJRCW	6/9/2003	12:15	159.1		159.1
SJRCW	7/17/2003	12:40	192.9	I	192.9
SJRCW	8/12/2003	12:45	282.9		282.9
SJRCW	9/8/2003	12:00	239.1	I	239.1
SJRCW	10/7/2003	11:35	237.0	I	237.0
SJRCW	11/12/2003	12:20	267.0		267.0
SJRCW	12/10/2003	13:40	875.0		875.0
SJRCW	1/12/2004	13:25	243.0		243.0
SJRCW	2/9/2004	12:45	270.0		270.0
sjrcc	3/24/2005	10:16	280		280.0
SJRM 74C	3/24/2005	2:15	270		270.0
SJ6	3/24/2005	3:00	270		270.0
SJRCC	4/26/2005	1:00	270		270.0
SJ6	4/26/2005	4:45	200		200.0
SJRM 74C	4/26/2005	5:15	210		210.0
SJRCC	5/17/2005	9:00	210		210.0
SJ6	5/17/2005	10:45	200		200.0
SJRM 74C	5/17/2005	11:15	190		190.0
SJRCC	6/20/2005	10:00	180		180.0
SJRM 74C	6/20/2005	3:15	280		280.0
SJ6	6/20/2005	2:45	190		190.0
SJRCC	7/25/2005	7:30	290		290.0
SJ6	7/25/2005	2:00	320		320.0
SJRM 74C	7/25/2005	2:15	270		270.0
	8/31/2005	9:30	240	V	240.0
SJ6	8/31/2005	1:30	220	V	220.0
SJRM 74C	8/31/2005	2:00	230	V	230.0
SJ6	9/27/2005	12:45	320		320.0
SJRM 74C	9/27/2005	1:30	270		270.0
SJRCC	9/27/2005	2:00	270		270.0

Note: If non-detect was reported, half of the detection limit or half of the water quality standard was used, whichever was less.

Source: SJRWMD, 2004.
ECT, 2004.

Ambient Lead Data in St. Johns River near SECI Palatka Plant

Average MDL = 40.7 µg/L

Class III Water Quality Standard = 6.52 µg/L

Average =	1.77 µg/L
Maximum =	10.00 µg/L
Standard Dev =	1.40 µg/L
95 Percentile =	3.26 µg/L
Count	375.00

Station	Date	Time	Lead (µg/L)	Remark Code	Value Used (µg/L)
FP41	9/22/1993	14:50	0	T	3.26
FP42	9/22/1993	15:00	0	T	3.26
FP42	11/27/2001	10:00	0.67	T	0.67
FP43	9/22/1993	15:15	0	T	3.26
SJ6	5/16/2002	10:45	0.55	T	0.55
SJRCC	5/12/1993	13:40	2		2.00
SJRCC	6/8/1993	8:25	0	T	3.26
SJRCC	7/7/1993	11:20	0	T	3.26
SJRCC	9/22/1993	8:50	0	T	3.26
SJRCC	12/15/1993	11:30	0	T	3.26
SJRCC	1/20/1994	12:05	0	T	3.26
SJRCC	2/15/1994	10:15	-1	T	3.26
SJRCC	3/14/1994	12:10	-1	T	3.26
SJRCC	4/12/1994	11:30	0	T	3.26
SJRCC	5/16/1994	12:05	-1	T	3.26
SJRCC	6/14/1994	12:25	-1	T	3.26
SJRCC	7/12/1994	11:40	4		4.00
SJRCC	8/16/1994	11:45	4		4.00
SJRCC	9/13/1994	11:55	3		3.00
SJRCC	10/17/1994	11:25	0.1	T	0.10
SJRCC	11/18/1994	10:40	2	T	2.00
SJRCC	12/13/1994	12:10	2		2.00
SJRCC	1/19/1995	11:40	2	T	2.00
SJRCC	3/15/1995	10:40	1	T	1.00
SJRCC	4/11/1995	9:30	0	T	3.26
SJRCC	5/16/1995	11:25	1	T	1.00
SJRCC	6/13/1995	10:00	0	T	3.26
SJRCC	7/11/1995	11:15	-1	T	3.26
SJRCC	8/15/1995	12:15	0	T	3.26
SJRCC	9/13/1995	12:10	1	T	1.00
SJRCC	10/17/1995	11:00	2		2.00
SJRCC	11/16/1995	11:20	1	T	1.00
SJRCC	12/13/1995	10:40	0	T	3.26
SJRCC	1/16/1996	10:50	1	T	1.00
SJRCC	2/13/1996	11:25	0	T	3.26
SJRCC	3/13/1996	11:15	1	T	1.00
SJRCC	4/16/1996	10:40	1	T	1.00
SJRCC	5/14/1996	11:00	0	T	3.26
SJRCC	6/12/1996	11:15	0	T	3.26
SJRCC	7/16/1996	10:55	0	T	3.26
SJRCC	8/21/1996	11:20	0	T	3.26
SJRCC	9/17/1996	10:15	0	T	3.26
SJRCC	10/15/1996	10:15	0	T	3.26
SJRCC	11/13/1996	10:40	0	T	3.26
SJRCC	12/3/1996	10:40	0	T	3.26
SJRCC	1/14/1997	10:25	2	T	2.00
SJRCC	2/11/1997	10:25	0	T	3.26
SJRCC	3/11/1997	10:25	0	T	3.26
SJRCC	4/15/1997	10:25	2		2.00
SJRCC	4/15/1997	10:25	2		2.00
SJRCC	5/13/1997	10:20	0	T	3.26
SJRCC	5/13/1997	10:20	0	T	3.26

Ambient Lead Data in St. Johns River near SECI Palatka Plant

Average MDL = 40.7 µg/L

Class III Water Quality Standard = 6.52 µg/L

Average =	1.77 µg/L
Maximum =	10.00 µg/L
Standard Dev =	1.40 µg/L
95 Percentile =	3.26 µg/L
Count	375.00

Station	Date	Time	Lead (µg/L)	Remark Code	Value Used (µg/L)
SJRCC	6/10/1997	10:40	0	T	3.26
SJRCC	6/10/1997	10:40	0	T	3.26
SJRCC	7/8/1997	10:40	0	T	3.26
SJRCC	7/8/1997	10:40	0	T	3.26
SJRCC	8/5/1997	10:30	0	T	3.26
SJRCC	8/5/1997	10:30	0	T	3.26
SJRCC	9/16/1997	9:40	-0.12	T	3.26
SJRCC	9/16/1997	9:40	-0.12	T	3.26
SJRCC	10/9/1997	14:20	0	T	3.26
SJRCC	11/11/1997	9:50	0.33	T	0.33
SJRCC	12/9/1997	9:45	0.12	T	0.12
SJRCC	1/13/1998	10:10	0.29	T	0.29
SJRCC	2/10/1998	9:45	0.2	T	0.20
SJRCC	3/17/1998	10:20	0.34	T	0.34
SJRCC	4/14/1998	9:45	0.34	T	0.34
SJRCC	5/12/1998	13:40	0.26	T	0.26
SJRCC	6/9/1998	13:25	0.43	T	0.43
SJRCC	7/14/1998	14:00	0.1	T	0.10
SJRCC	8/18/1998	9:15	-0.03	T	3.26
SJRCC	9/8/1998	13:30	0.46	T	0.46
SJRCC	10/15/1998	14:00	-0.15	T	3.26
SJRCC	12/15/1998	13:30	0.35	T	0.35
SJRCC	1/12/1999	9:50	0.15	T	0.15
SJRCC	2/9/1999	10:30	0.15	T	0.15
SJRCC	3/10/1999	13:35	-0.03	T	3.26
SJRCC	4/27/1999	10:45	-0.06	T	3.26
SJRCC	5/10/1999	10:30	0.11	T	0.11
SJRCC	6/7/1999	10:15	-0.06	T	3.26
SJRCC	7/12/1999	13:10	0.09	T	0.09
SJRCC	8/10/1999	13:20	0.06	T	0.06
SJRCC	9/28/1999	14:30	0.24	T	0.24
SJRCC	10/12/1999	14:30	0.44	T	0.44
SJRCC	11/9/1999	11:40	0.5	T	0.50
SJRCC	12/6/1999	14:10	0.45	T	0.45
SJRCC	1/10/2000	14:20	0.36	T	0.36
SJRCC	2/7/2000	15:40	0.8	T	0.80
SJRCC	3/6/2000	15:10	0.49	T	0.49
SJRCC	4/10/2000	10:50	0.63	T	0.63
SJRCC	5/8/2000	11:15	0.56	T	0.56
SJRCC	6/12/2000	15:00	0.27	T	0.27
SJRCC	7/10/2000	10:30	4.11		4.11
SJRCC	8/7/2000	10:45	1.14	T	1.14
SJRCC	9/11/2000	9:55	0.48	T	0.48
SJRCC	10/11/2000	15:25	1.14	T	1.14
SJRCC	11/13/2000	9:40	1.45	T	1.45
SJRCC	12/14/2000	9:55	0.504	T	0.50
SJRCC	1/9/2001	11:40	-0.115	T	3.26
SJRCC	2/15/2001	10:00	0.439	T	0.44
SJRCC	3/15/2001	9:00	0.143	T	0.14
SJRCC	4/10/2001	8:50	0.769		0.77
SJRCC	5/14/2001	13:55	0.385	T	0.39
SJRCC	6/11/2001	13:50	0.486	T	0.49

Ambient Lead Data in St. Johns River near SECI Palatka Plant

Average MDL = 40.7 µg/L

Class III Water Quality Standard = 6.52 µg/L

Average =	1.77 µg/L
Maximum =	10.00 µg/L
Standard Dev =	1.40 µg/L
95 Percentile =	3.26 µg/L
Count	375.00

Station	Date	Time	Lead (µg/L)	Remark Code	Value Used (µg/L)
SJRCC	7/11/2001	12:34	-0.066	T	3.26
SJRCC	8/9/2001	11:50	0.723	T	0.72
SJRCC	9/11/2001	14:40	0.907	T	0.91
SJRCC	10/9/2001	12:20	0.442	T	0.44
SJRCC	11/20/2001	13:10	0.502	T	0.50
SJRCC	12/5/2001	12:50	0.396	T	0.40
SJRCC	1/8/2002	12:15	0.596	T	0.60
SJRCC	2/11/2002	11:40	0.096	T	0.10
SJRCC	3/11/2002	9:20	1.033	T	1.03
SJRCC	4/8/2002	13:05	1	U	0.50
SJRCC	5/13/2002	12:10	0.18	T	0.18
SJRCC	6/10/2002	12:15	0.55	T	0.55
SJRCC	7/15/2002	12:50	0.28	T	0.28
SJRCC	8/12/2002	11:45	-0.022	T	3.26
SJRCC	9/12/2002	11:30	-0.13	T	3.26
SJRCC	10/7/2002	12:20	0.485	T	0.49
SJRCC	11/11/2002	11:50	0.37	T	0.37
SJRCC	12/9/2002	11:30	1.475	T	1.48
SJRCC	1/6/2003	11:20	1.878	T	1.88
SJRCC	2/11/2003	10:00	1.187		1.19
SJRCC	3/11/2003	13:10	0.068	T	0.07
SJRCC	3/11/2003	13:15	0.483	T	0.48
SJRCC	4/14/2003	12:15	0.558	T	0.56
SJRCC	4/14/2003	12:20	0.566	T	0.57
SJRCC	5/12/2003	12:50	1.205	T	1.21
SJRCC	5/12/2003	13:00	1.514	T	1.51
SJRCC	6/9/2003	12:20	1.192	T	1.19
SJRCC	6/9/2003	12:25	4.421		4.42
SJRCC	8/12/2003	12:50	1.28		1.28
SJRCC	8/12/2003	12:55	1.156		1.16
SJRCC	9/8/2003	12:10	1.6	T	1.60
SJRCC	10/7/2003	11:45	0.788	T	0.79
SJRCC	11/12/2003	12:25	0.432	T	0.43
SJRCC	12/10/2003	13:30	0.457	T	0.46
SJRCC	1/12/2004	13:30	0.52	T	0.52
SJRCC	2/9/2004	12:55	0.693	T	0.69
SJRCE	5/12/1993	13:50	3		3.00
SJRCE	6/8/1993	8:15	1	T	1.00
SJRCE	7/7/1993	11:10	1	T	1.00
SJRCE	9/22/1993	8:40	0	T	3.26
SJRCE	12/15/1993	11:20	0	T	3.26
SJRCE	1/20/1994	11:50	0	T	3.26
SJRCE	2/15/1994	10:30	-1	T	3.26
SJRCE	3/14/1994	11:55	-1	T	3.26
SJRCE	4/12/1994	11:20	0	T	3.26
SJRCE	5/16/1994	11:50	-2	T	3.26
SJRCE	6/14/1994	12:05	-1	T	3.26
SJRCE	7/12/1994	11:20	4		4.00
SJRCE	8/16/1994	11:35	3		3.00
SJRCE	9/13/1994	11:40	10		10.00
SJRCE	10/17/1994	11:10	0.3	T	0.30
SJRCE	11/18/1994	10:30	2	T	2.00

Ambient Lead Data in St. Johns River near SECI Palatka Plant

Average MDL = 40.7 µg/L

Class III Water Quality Standard = 6.52 µg/L

Average =	1.77 µg/L
Maximum =	10.00 µg/L
Standard Dev =	1.40 µg/L
95 Percentile =	3.26 µg/L
Count	375.00

Station	Date	Time	Lead (µg/L)	Remark Code	Value Used (µg/L)
SJRCE	12/13/1994	12:00	0	T	3.26
SJRCE	1/19/1995	11:30	1	T	1.00
SJRCE	3/15/1995	10:30	1	T	1.00
SJRCE	4/11/1995	9:25	0	T	3.26
SJRCE	5/16/1995	11:15	0	T	3.26
SJRCE	6/13/1995	9:50	0	T	3.26
SJRCE	7/11/1995	10:55	-2	T	3.26
SJRCE	8/15/1995	12:00	0	T	3.26
SJRCE	9/13/1995	11:55	1	T	1.00
SJRCE	10/17/1995	10:45	3		3.00
SJRCE	11/16/1995	11:05	0	T	3.26
SJRCE	12/13/1995	10:25	0	T	3.26
SJRCE	1/16/1996	10:45	0	T	3.26
SJRCE	2/13/1996	11:15	0	T	3.26
SJRCE	3/13/1996	11:05	0	T	3.26
SJRCE	4/16/1996	10:30	1	T	1.00
SJRCE	5/14/1996	10:50	0	T	3.26
SJRCE	6/12/1996	11:05	0	T	3.26
SJRCE	7/16/1996	10:45	1	T	1.00
SJRCE	8/21/1996	11:05	0	T	3.26
SJRCE	9/17/1996	9:55	0	T	3.26
SJRCE	10/15/1996	10:30	0	T	3.26
SJRCE	11/13/1996	10:15	0	T	3.26
SJRCE	12/3/1996	10:25	0	T	3.26
SJRCE	1/14/1997	10:15	0	T	3.26
SJRCE	2/11/1997	10:15	0	T	3.26
SJRCE	3/11/1997	10:20	0	T	3.26
SJRCE	4/15/1997	10:15	1	T	1.00
SJRCE	4/15/1997	10:15	1	T	1.00
SJRCE	5/13/1997	10:10	0	T	3.26
SJRCE	5/13/1997	10:10	0	T	3.26
SJRCE	6/10/1997	10:25	0	T	3.26
SJRCE	6/10/1997	10:25	0	T	3.26
SJRCE	7/8/1997	10:30	0	T	3.26
SJRCE	7/8/1997	10:30	0	T	3.26
SJRCE	8/5/1997	10:20	1	T	1.00
SJRCE	8/5/1997	10:20	1	T	1.00
SJRCE	9/16/1997	9:35	0.12	T	0.12
SJRCE	9/16/1997	9:35	0.12	T	0.12
SJRCE	10/9/1997	14:00	0	T	3.26
SJRCE	11/11/1997	9:45	0.32	T	0.32
SJRCE	12/9/1997	9:30	0.21	T	0.21
SJRCE	1/13/1998	9:55	0.53	T	0.53
SJRCE	2/10/1998	9:40	0.06	T	0.06
SJRCE	3/17/1998	10:15	0.26	T	0.26
SJRCE	4/14/1998	9:30	0.16	T	0.16
SJRCE	5/12/1998	13:45	0.31	T	0.31
SJRCE	6/9/1998	13:45	0.29	T	0.29
SJRCE	7/14/1998	13:45	0.14	T	0.14
SJRCE	8/18/1998	9:00	0.14	T	0.14
SJRCE	9/8/1998	13:20	0.06	T	0.06
SJRCE	10/15/1998	13:40	-0.21	T	3.26

Ambient Lead Data in St. Johns River near SECI Palatka Plant

Average MDL = 40.7 µg/L

Class III Water Quality Standard = 6.52 µg/L

Average =	1.77 µg/L
Maximum =	10.00 µg/L
Standard Dev =	1.40 µg/L
95 Percentile =	3.26 µg/L
Count	375.00

Station	Date	Time	Lead (µg/L)	Remark Code	Value Used (µg/L)
SJRCE	12/15/1998	13:40	0.05	T	0.05
SJRCE	1/12/1999	9:45	0.19	T	0.19
SJRCE	2/9/1999	10:15	0.15	T	0.15
SJRCE	3/10/1999	13:45	0.01	T	0.01
SJRCE	4/27/1999	10:20	0.05	T	0.05
SJRCE	5/10/1999	10:10	0.05	T	0.05
SJRCE	6/7/1999	10:00	0.07	T	0.07
SJRCE	7/12/1999	13:20	-0.03	T	3.26
SJRCE	8/10/1999	13:35	0.09	T	0.09
SJRCE	9/28/1999	14:40	0.42	T	0.42
SJRCE	10/12/1999	14:40	0.41	T	0.41
SJRCE	11/9/1999	11:20	0.69	T	0.69
SJRCE	12/6/1999	14:20	0.56	T	0.56
SJRCE	1/10/2000	14:30	0.91	T	0.91
SJRCE	2/7/2000	15:50	0.82	T	0.82
SJRCE	3/6/2000	15:20	0.66	T	0.66
SJRCE	4/10/2000	10:40	0.7	T	0.70
SJRCE	5/8/2000	10:55	0.53	T	0.53
SJRCE	6/12/2000	15:15	1.017	W	1.02
SJRCE	7/10/2000	10:15	0.25	T	0.25
SJRCE	8/7/2000	10:35	1.03	T	1.03
SJRCE	9/11/2000	9:45	0.784	T	0.78
SJRCE	10/11/2000	15:35	1.27	T	1.27
SJRCE	11/13/2000	9:30	1.58	T	1.58
SJRCE	12/14/2000	9:45	0.745	T	0.75
SJRCE	1/9/2001	11:50	0.08	T	0.08
SJRCE	2/15/2001	9:50	0.678	T	0.68
SJRCE	3/15/2001	8:45	-0.883	T	3.26
SJRCE	4/10/2001	8:45	-0.329	T	3.26
SJRCE	5/14/2001	13:40	0.742	T	0.74
SJRCE	6/11/2001	13:40	1.112	T	1.11
SJRCE	7/11/2001	12:45	0.35	T	0.35
SJRCE	8/9/2001	12:00	-0.894	T	3.26
SJRCE	9/11/2001	14:50	1.088	T	1.09
SJRCE	10/9/2001	12:30	0.779	T	0.78
SJRCW	5/12/1993	13:30	2		2.00
SJRCW	6/8/1993	8:30	0	T	3.26
SJRCW	7/7/1993	11:30	0	T	3.26
SJRCW	9/22/1993	9:00	0	T	3.26
SJRCW	12/15/1993	11:45	0	T	3.26
SJRCW	1/20/1994	12:15	0	T	3.26
SJRCW	2/15/1994	9:50	-1	T	3.26
SJRCW	3/14/1994	12:25	-2	T	3.26
SJRCW	4/12/1994	11:40	0	T	3.26
SJRCW	5/16/1994	12:20	-2	T	3.26
SJRCW	6/14/1994	12:35	0	T	3.26
SJRCW	7/12/1994	11:55	2		2.00
SJRCW	8/16/1994	12:00	2		2.00
SJRCW	9/13/1994	11:55	3		3.00
SJRCW	10/17/1994	11:45	0.7		0.70
SJRCW	11/18/1994	10:50	3		3.00
SJRCW	12/13/1994	12:20	3		3.00

Ambient Lead Data in St. Johns River near SECI Palatka Plant

Average MDL = 40.7 µg/L

Class III Water Quality Standard = 6.52 µg/L

Average =	1.77 µg/L
Maximum =	10.00 µg/L
Standard Dev =	1.40 µg/L
95 Percentile =	3.26 µg/L
Count	375.00

Station	Date	Time	Lead (µg/L)	Remark Code	Value Used (µg/L)
SJRCW	1/19/1995	11:50	1	T	1.00
SJRCW	3/15/1995	10:55	1	T	1.00
SJRCW	4/11/1995	9:40	0	T	3.26
SJRCW	5/16/1995	11:35	0	T	3.26
SJRCW	6/13/1995	10:15	0	T	3.26
SJRCW	7/11/1995	11:30	-2	T	3.26
SJRCW	8/15/1995	12:30	0	T	3.26
SJRCW	9/13/1995	12:25	1	T	1.00
SJRCW	10/17/1995	11:20	1	T	1.00
SJRCW	11/16/1995	11:35	0	T	3.26
SJRCW	12/13/1995	10:50	0	T	3.26
SJRCW	1/16/1996	11:00	1	T	1.00
SJRCW	2/13/1996	11:35	1	T	1.00
SJRCW	3/13/1996	11:25	0	T	3.26
SJRCW	4/16/1996	10:50	1	T	1.00
SJRCW	5/14/1996	11:15	0	T	3.26
SJRCW	6/12/1996	11:30	0	T	3.26
SJRCW	7/16/1996	11:10	0	T	3.26
SJRCW	8/21/1996	11:35	0	T	3.26
SJRCW	9/17/1996	10:30	0	T	3.26
SJRCW	10/15/1996	10:00	0	T	3.26
SJRCW	11/13/1996	11:00	0	T	3.26
SJRCW	12/3/1996	10:55	2	T	2.00
SJRCW	1/14/1997	10:40	0	T	3.26
SJRCW	2/11/1997	10:40	0	T	3.26
SJRCW	3/11/1997	10:45	0	T	3.26
SJRCW	4/15/1997	10:35	1	T	1.00
SJRCW	4/15/1997	10:35	1	T	1.00
SJRCW	5/13/1997	10:25	0	T	3.26
SJRCW	5/13/1997	10:25	0	T	3.26
SJRCW	6/10/1997	10:50	0	T	3.26
SJRCW	6/10/1997	10:50	0	T	3.26
SJRCW	7/8/1997	10:45	0	T	3.26
SJRCW	7/8/1997	10:45	0	T	3.26
SJRCW	8/5/1997	10:40	0	T	3.26
SJRCW	8/5/1997	10:40	0	T	3.26
SJRCW	9/16/1997	9:50	-0.04	T	3.26
SJRCW	9/16/1997	9:50	-0.04	T	3.26
SJRCW	10/9/1997	14:50	0	T	3.26
SJRCW	11/11/1997	10:00	0.3	T	0.30
SJRCW	12/9/1997	10:00	0.63	T	0.63
SJRCW	1/13/1998	10:20	0.43	T	0.43
SJRCW	2/10/1998	10:00	0.12	T	0.12
SJRCW	3/17/1998	10:35	0.17	T	0.17
SJRCW	4/14/1998	10:10	0.13	T	0.13
SJRCW	5/12/1998	13:20	-0.05	T	3.26
SJRCW	6/9/1998	13:20	0.18	T	0.18
SJRCW	7/14/1998	14:15	0.22	T	0.22
SJRCW	8/18/1998	9:30	-0.07	T	3.26
SJRCW	9/8/1998	10:45	0.15	T	0.15
SJRCW	9/8/1998	13:45	0.29	T	0.29
SJRCW	10/15/1998	14:15	0.34	T	0.34

Ambient Lead Data in St. Johns River near SECI Palatka Plant

Average MDL = 40.7 µg/L

Class III Water Quality Standard = 6.52 µg/L

Average =	1.77 µg/L
Maximum =	10.00 µg/L
Standard Dev =	1.40 µg/L
95 Percentile =	3.26 µg/L
Count	375.00

Station	Date	Time	Lead (µg/L)	Remark Code	Value Used (µg/L)
SJRCW	11/10/1998	13:30	0.19	T	0.19
SJRCW	12/15/1998	13:15	0.42	T	0.42
SJRCW	1/12/1999	10:15	0.18	T	0.18
SJRCW	2/9/1999	10:40	0.59	T	0.59
SJRCW	3/10/1999	13:20	0.16	T	0.16
SJRCW	4/27/1999	11:00	-0.01	T	3.26
SJRCW	5/10/1999	11:00	0.24	T	0.24
SJRCW	6/7/1999	10:30	0	T	3.26
SJRCW	7/12/1999	13:00	-0.21	T	3.26
SJRCW	8/10/1999	13:15	0.18	T	0.18
SJRCW	9/28/1999	14:20	1.25	T	1.25
SJRCW	10/12/1999	14:20	0.74	T	0.74
SJRCW	11/9/1999	12:00	0.56	T	0.56
SJRCW	12/6/1999	14:00	0.37	T	0.37
SJRCW	1/10/2000	14:10	1.03	T	1.03
SJRCW	2/7/2000	15:30	0.85	T	0.85
SJRCW	3/6/2000	15:00	0.52	T	0.52
SJRCW	4/10/2000	11:00	0.7	T	0.70
SJRCW	5/8/2000	11:25	0.65	T	0.65
SJRCW	6/12/2000	14:55	0.24	T	0.24
SJRCW	7/10/2000	10:50	0.13	T	0.13
SJRCW	8/7/2000	11:00	0.99	T	0.99
SJRCW	9/11/2000	10:05	0.6	T	0.60
SJRCW	10/11/2000	15:15	0.39	T	0.39
SJRCW	11/13/2000	9:50	1.22	T	1.22
SJRCW	12/14/2000	10:05	0.582	T	0.58
SJRCW	1/9/2001	11:30	-0.024	T	3.26
SJRCW	2/15/2001	10:10	0.19	T	0.19
SJRCW	3/15/2001	9:15	-0.177	T	3.26
SJRCW	4/10/2001	8:55	0.062	T	0.06
SJRCW	5/14/2001	14:10	1.02	T	1.02
SJRCW	6/11/2001	13:55	-0.401	T	3.26
SJRCW	7/11/2001	12:25	0.25	T	0.25
SJRCW	8/9/2001	11:40	-0.446	T	3.26
SJRCW	9/11/2001	14:30	1.634	T	1.63
SJRCW	10/9/2001	12:05	1.328	T	1.33
SJRCW	11/20/2001	12:55	0.501	T	0.50
SJRCW	12/5/2001	12:40	0.481	T	0.48
SJRCW	1/8/2002	12:00	1.353	T	1.35
SJRCW	2/11/2002	11:25	0.267		0.27
SJRCW	3/11/2002	9:35	0.133	T	0.13
SJRCW	4/8/2002	12:55	1		1.00
SJRCW	5/13/2002	12:00	0.29	T	0.29
SJRCW	6/10/2002	12:10	2.5	T	2.50
SJRCW	7/15/2002	12:30	0.31	T	0.31
SJRCW	8/12/2002	11:35	0.471	T	0.47
SJRCW	9/12/2002	11:20	0.482	T	0.48
SJRCW	10/7/2002	12:10	0.614	T	0.61
SJRCW	11/11/2002	11:40	-0.338	T	3.26
SJRCW	12/9/2002	11:15	1.202	T	1.20
SJRCW	1/6/2003	11:10	0.79	T	0.79
SJRCW	2/11/2003	9:50	1.473		1.47

Ambient Lead Data in St. Johns River near SECI Palatka Plant

Average MDL = 40.7 µg/L

Class III Water Quality Standard = 6.52 µg/L

Average =	1.77 µg/L
Maximum =	10.00 µg/L
Standard Dev =	1.40 µg/L
95 Percentile =	3.26 µg/L
Count	375.00

Station	Date	Time	Lead (µg/L)	Remark Code	Value Used (µg/L)
SJRCW	3/11/2003	13:05	0.563	T	0.56
SJRCW	4/14/2003	12:00	0.507	T	0.51
SJRCW	5/12/2003	12:40	0.062	T	0.06
SJRCW	6/9/2003	12:15	0.397	T	0.40
SJRCW	8/12/2003	12:45	1.174		1.17
SJRCW	9/8/2003	12:00	0.105	T	0.11
SJRCW	10/7/2003	11:35	-1.52	T	3.26
SJRCW	11/12/2003	12:20	1.96	T	1.96
SJRCW	12/10/2003	13:40	2.01	I	2.01
SJRCW	1/12/2004	13:25	0.598	T	0.60
SJRCW	2/9/2004	12:45	0.614	T	0.61

Note: If non-detect was reported, half of the detection limit or half of the water quality standard was used, whichever was less. If all samples are non-detect then the constitutent is assumed absent.

Source: SJRWMD, 2004.
ECT, 2004.

Ambient Mercury Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 0.012 µg/L

Average =	0.0038	µg/L
Maximum =	0.0170	µg/L
Standard Dev =	0.0031	µg/L
95 Percentile =	0.0101	µg/L
Count	61.0000	

Station	Date	Time	Mercury (µg/L)		Value Used (µg/L)
SECI D-005	12/4/2000		0.00175		0.00175
SECI D-005	01/24/01		0.001	*	0.001
SECI D-005	03/21/01		0.0101	*	0.0101
SECI D-005	04/09/01		0.0021	*	0.0021
SECI D-005	05/07/01		0.0092	*	0.0092
SECI D-005	06/06/01		0.0128	*	0.0128
SECI D-005	07/02/01		0.0041	*	0.0041
SECI D-005	08/08/01		0.0091	*	0.0091
SECI D-005	09/05/01		0.017	*	0.017
SECI D-005	10/04/01		0.0055	*	0.0055
SECI D-005	11/19/01		0.0021	*	0.0021
SECI D-005	12/03/01		0.0013	*	0.0013
SECI D-005	01/14/02		0.009	*	0.009
SECI D-005	02/11/02		0.0032	*	0.0032
SECI D-005	03/11/02		0.0017	*	0.0017
SECI D-005	04/08/02		0.0032	*	0.0032
SECI D-005	05/13/02		0.0132	*	0.0132
SECI D-005	06/05/02		0.0003	*	0.0003
SECI D-005	07/09/02		0.0034	*	0.0034
SECI D-005	08/26/03		0.0022	*	0.0022
SECI D-005	10/30/03		0.00013	*	0.00013
SECI D-005	02/04/04		0.00057	*	0.00057
SECI D-005	04/27/04		0.0025		0.0025
SECI D-005	07/27/04		0.0013		0.0013
SECI D-005	10/12/04		0.0054		0.0054
SECI D-005	01/25/05		0.0042		0.0042
SECI D-005	02/23/05		0.0029		0.0029
SJRCC	02/23/05		0.0031		0.0031
Intake	02/23/05		0.0033		0.0033
SJ6	02/23/05		0.0029		0.0029
SJRM74C	02/23/05		0.0026		0.0026
SECI D-005	3/24/2005		0.0034		0.0034
Intake	3/24/2005		0.0035		0.0035
sjrcc	3/24/2005	10:16	0.0026	*	0.0026
SJRM 74C	3/24/2005	2:15	0.0029	*	0.0029
SJ6	3/24/2005	3:00	0.0033	*	0.0033
SECI D-005	4/26/2005		0.0028		0.0028
Intake	4/26/2005		0.0032		0.0032
SJRCC	4/26/2005	1:00	0.0031	*	0.0031
SJ6	4/26/2005	4:45	0.0029	*	0.0029
SJRM 74C	4/26/2005	5:15	0.003	*	0.003
SECI D-005	5/17/2005		0.0026		0.0026
SJRCC	5/17/2005	9:00	0.0028	*	0.0028
SJ6	5/17/2005	10:45	0.0025	*	0.0025
SJRM 74C	5/17/2005	11:15	0.0023	*	0.0023
SECI D-005	6/20/2005		0.0033		0.0033
SJRCC	6/20/2005	10:00	0.0031	*	0.0031
SJRM 74C	6/20/2005	3:15	0.0039	*	0.0039
SJ6	6/20/2005	2:45	0.0039	*	0.0039
SECI D-005	7/25/2005		0.0031		0.0031
SJRCC	7/25/2005	7:30	0.0032	*	0.0032
SJ6	7/25/2005	2:00	0.0031	*	0.0031

SJRM 74C	7/25/2005	2:15	0.003	*	0.003
SECI D-005	8/31/2005		0.0037		0.0037
SJRCC	8/31/2005	9:30	0.0028	*	0.0028
SJ6	8/31/2005	1:30	0.0029	*	0.0029
SJRM 74C	8/31/2005	2:00	0.0032	*	0.0032
SECI D-005	9/27/2005		0.0034		0.0034
SJ6	9/27/2005	12:45	0.004	*	0.004
SJRM 74C	9/27/2005	1:30	0.0028	*	0.0028
SJRCC	9/27/2005	2:00	0.0028	*	0.0028

* -- Low level analysis

Note: If non-detect was reported, half of the detection limit or half of the water quality standard was used, whichever was less. If all samples are non-detect then the constitutent is assumed absent.

Source: SECI, 2004.
ECT, 2004.

Ambient Daily Maximum Oil and Grease Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 5.0 mg/L

Average =	1.42	mg/L
Maximum =	6.40	mg/L
Standard Dev =	1.13	mg/L
95 Percentile =	3.08	mg/L
Count	253.00	

Station	Date	Time		Oil/Grease (mg/L)	Remark Code	Value Used (mg/L)
SECI D-005	Apr-93		<	5	K	2.5
SECI D-005	May-93		<	5	K	2.5
SECI D-005	Jun-93		<	5	K	2.5
SECI D-005	Jul-93		<	5	K	2.5
SECI D-005	Aug-93		<	5	K	2.5
SECI D-005	Sep-93		<	5	K	2.5
SECI D-005	Oct-93		<	5	K	2.5
SECI D-005	Nov-93		<	5	K	2.5
SECI D-005	Dec-93		<	5	K	2.5
SECI D-005	Jan-94		<	5	K	2.5
SECI D-005	Feb-94		<	5	K	2.5
SECI D-005	Mar-94		<	5	K	2.5
SECI D-005	Apr-94		<	5	K	2.5
SECI D-005	May-94		<	5	K	2.5
SECI D-005	Jun-94		<	5	K	2.5
SECI D-005	Jul-94		<	5	K	2.5
SECI D-005	Aug-94			1.1		1.1
SECI D-005	Sep-94		<	1	K	0.5
SECI D-005	Oct-94			2.5		2.5
SECI D-005	Nov-94			3.6		3.6
SECI D-005	Dec-94		<	1	K	0.5
SECI D-005	Jan-95			2.3		2.3
SECI D-005	Feb-95		<	1	K	0.5
SECI D-005	Mar-95		<	2.2	K	1.1
SECI D-005	Apr-95			3		3
SECI D-005	May-95		<	1	K	0.5
SECI D-005	Jun-95			6.4		6.4
SECI D-005	Jul-95			5.9		5.9
SECI D-005	Aug-95		<	5	K	2.5
SECI D-005	Sep-95		<	5	K	2.5
SECI D-005	Oct-95		<	5	K	2.5
SECI D-005	Nov-95		<	5	K	2.5
SECI D-005	Dec-95		<	5	K	2.5
SECI D-005	Jan-96		<	5	K	2.5
SECI D-005	Feb-96		<	5	K	2.5
SECI D-005	Mar-96		<	5	K	2.5
SECI D-005	Apr-96		<	5	K	2.5
SECI D-005	May-96		<	5	K	2.5
SECI D-005	Jun-96		<	5	K	2.5
SECI D-005	Jul-96		<	5	K	2.5
SECI D-005	Aug-96		<	5	K	2.5
SECI D-005	Sep-96		<	5	K	2.5
SECI D-005	Oct-96		<	5	K	2.5
SECI D-005	Dec-96		<	5	K	2.5
SECI D-005	Jan-97			1.8		1.8
SECI D-005	Feb-97			6.2		6.2
SECI D-005	Mar-97		<	5	K	2.5
SECI D-005	Apr-97		<	5	K	2.5
SECI D-005	May-97		<	5	K	2.5
SECI D-005	Jun-97		<	5	K	2.5
SECI D-005	Jul-97		<	5	K	2.5
SECI D-005	Aug-97		<	5	K	2.5

SECI D-005	Sep-97	<	5	K	2.5
SECI D-005	Oct-97	<	5	K	2.5
SECI D-005	Nov-97	<	5	K	2.5
SECI D-005	Dec-97	<	5	K	2.5
SECI D-005	Feb-00	<	5	K	2.5
SECI D-005	Mar-00	<	5	K	2.5
SECI D-005	Apr-00	<	5	K	2.5
SECI D-005	May-00	<	5	K	2.5
SECI D-005	Jun-00	<	5	K	2.5
SECI D-005	Jul-00	<	5	K	2.5
SECI D-005	Aug-00	<	5	K	2.5
SECI D-005	Sep-00	<	5	K	2.5
SECI D-005	Oct-00	<	0.89	K	0.445
SECI D-005	Nov-00		1		1
SECI D-005	Dec-00		0.7		0.7
SECI D-005	01/02/01		0.55		0.55
SECI D-005	01/09/01		0.9		0.9
SECI D-005	01/16/01		0.8		0.8
SECI D-005	01/23/01		1		1
SECI D-005	01/30/01		0.55		0.55
SECI D-005	02/06/01		0.7		0.7
SECI D-005	02/13/01		0.55		0.55
SECI D-005	02/20/01		0.55		0.55
SECI D-005	02/27/01		0.55		0.55
SECI D-005	03/06/01		0.7		0.7
SECI D-005	03/14/01		0.55		0.55
SECI D-005	03/20/01		1.5		1.5
SECI D-005	03/27/01		0.55		0.55
SECI D-005	04/03/01		0.6		0.6
SECI D-005	04/10/01		0.55		0.55
SECI D-005	04/17/01		1		1
SECI D-005	04/24/01		1		1
SECI D-005	05/01/01		0.55		0.55
SECI D-005	05/08/01		0.55		0.55
SECI D-005	05/14/01		1.2		1.2
SECI D-005	05/22/01		0.55		0.55
SECI D-005	05/29/01		0.8		0.8
SECI D-005	06/05/01		0.7		0.7
SECI D-005	06/11/01		0.55		0.55
SECI D-005	06/18/01		0.9		0.9
SECI D-005	06/26/01		1.2		1.2
SECI D-005	07/03/01		1.4		1.4
SECI D-005	07/10/01		0.55		0.55
SECI D-005	07/16/01		2.1		2.1
SECI D-005	07/23/01		0.55		0.55
SECI D-005	07/30/01		0.55		0.55
SECI D-005	08/13/01		0.55		0.55
SECI D-005	08/20/01		6.4		6.4
SECI D-005	08/27/01		1.2		1.2
SECI D-005	09/04/01		0.55		0.55
SECI D-005	09/10/01		0.55		0.55
SECI D-005	09/18/01		1.3		1.3
SECI D-005	09/25/01		3		3
SECI D-005	10/01/01		3.4		3.4
SECI D-005	10/08/01		0.8		0.8
SECI D-005	10/15/01		1.6		1.6
SECI D-005	10/22/01		1.3		1.3
SECI D-005	10/29/01		1.2		1.2
SECI D-005	11/05/01	<	0.55	K	0.275
SECI D-005	11/15/01	<	0.55	K	0.275
SECI D-005	11/19/01	<	0.55	K	0.275

SECI D-005	11/26/01	<	0.55	K	0.275
SECI D-005	12/03/01		3.9		3.9
SECI D-005	12/10/01		0.55		0.55
SECI D-005	12/18/01		0.6		0.6
SECI D-005	12/23/01		2.5		2.5
SECI D-005	01/03/02		0.55		0.55
SECI D-005	01/15/02		1.1		1.1
SECI D-005	01/21/02		3.2		3.2
SECI D-005	01/29/02		1		1
SECI D-005	02/05/02		0.55		0.55
SECI D-005	02/12/02		0.55		0.55
SECI D-005	02/20/02		0.55		0.55
SECI D-005	02/26/02		0.8		0.8
SECI D-005	03/05/02		1.2		1.2
SECI D-005	03/12/02		1.7		1.7
SECI D-005	03/19/02		1.1		1.1
SECI D-005	03/27/02		0.55		0.55
SECI D-005	04/02/02		0.73		0.73
SECI D-005	04/08/02		0.55		0.55
SECI D-005	04/22/02		0.6		0.6
SECI D-005	05/01/02		0.7		0.7
SECI D-005	05/07/02		0.9		0.9
SECI D-005	05/20/02		1.1		1.1
SECI D-005	05/28/02		0.55		0.55
SECI D-005	06/04/02		0.55		0.55
SECI D-005	06/11/02		0.55		0.55
SECI D-005	06/19/02		0.55		0.55
SECI D-005	06/25/02		0.55		0.55
SECI D-005	07/01/02		0.55		0.55
SECI D-005	07/08/02		1.5		1.5
SECI D-005	07/16/02		0.55		0.55
SECI D-005	07/23/02		0.6		0.6
SECI D-005	07/29/02		4.6		4.6
SECI D-005	08/05/02		1.6		1.6
SECI D-005	08/13/02		2.5		2.5
SECI D-005	08/20/02		0.55		0.55
SECI D-005	08/27/02		1.9		1.9
SECI D-005	09/03/02		0.55		0.55
SECI D-005	09/10/02		0.7		0.7
SECI D-005	09/17/02		1.8		1.8
SECI D-005	09/24/02		4		4
SECI D-005	10/01/02		0.55		0.55
SECI D-005	10/07/02	<	0.55	K	0.275
SECI D-005	10/14/02	<	0.55	K	0.275
SECI D-005	10/21/02		0.9		0.9
SECI D-005	10/29/02	<	0.55	K	0.275
SECI D-005	11/04/02	<	0.55	K	0.275
SECI D-005	11/12/02		1.6		1.6
SECI D-005	11/18/02	<	0.55	K	0.275
SECI D-005	11/25/02	<	0.55	K	0.275
SECI D-005	12/03/02		3.3		3.3
SECI D-005	12/09/02		2.3		2.3
SECI D-005	12/16/02	<	0.55	K	0.275
SECI D-005	12/24/02	<	2.7	K	1.35
SECI D-005	12/31/02	<	2.7	K	1.35
SECI D-005	01/08/03	<	2.7	K	1.35
SECI D-005	01/13/03	<	2.7	K	1.35
SECI D-005	01/21/03	<	2.7	K	1.35
SECI D-005	01/27/03	<	2.7	K	1.35
SECI D-005	02/03/03	<	2.7	K	1.35
SECI D-005	02/10/03	<	2.7	K	1.35

SECI D-005	02/18/03		<	2.7	K	1.35
SECI D-005	02/24/03		<	2.7	K	1.35
SECI D-005	03/04/03		<	2.7	K	1.35
SECI D-005	03/10/03		<	2.7	K	1.35
SECI D-005	03/17/03		<	2.7	K	1.35
SECI D-005	03/24/03		<	2.7	K	1.35
SECI D-005	04/01/03		<	0.73	K	0.365
SECI D-005	04/07/03		<	0.73	K	0.365
SECI D-005	04/15/03			1.5		1.5
SECI D-005	04/21/03			3		3
SECI D-005	04/28/03		<	0.73	K	0.365
SECI D-005	05/06/03			1.1		1.1
SECI D-005	05/12/03		<	0.73	K	0.365
SECI D-005	05/20/03			2.7		2.7
SECI D-005	05/27/03		<	0.73	K	0.365
SECI D-005	06/03/03			1.1		1.1
SECI D-005	06/09/03		<	0.073	K	0.0365
SECI D-005	06/16/03		<	0.73	K	0.365
SECI D-005	06/24/03			1.2		1.2
SECI D-005	07/01/03		<	0.73	K	0.365
SECI D-005	07/08/03		<	0.73	K	0.365
SECI D-005	07/14/03			0.8		0.8
SECI D-005	07/21/03			1.4		1.4
SECI D-005	07/29/03		<	0.73	K	0.365
SECI D-005	08/04/03		<	0.73	K	0.365
SECI D-005	08/11/03		<	0.73	K	0.365
SECI D-005	08/18/03		<	0.73	K	0.365
SECI D-005	08/25/03		<	0.73	K	0.365
SECI D-005	09/02/03		<	0.73	K	0.365
SECI D-005	09/09/03		<	0.73	K	0.365
SECI D-005	09/16/03		<	0.73	K	0.365
SECI D-005	09/23/03		<	0.73	K	0.365
SECI D-005	09/29/03		<	0.73	K	0.365
SECI D-005	10/07/03		<	0.73	K	0.365
SECI D-005	10/14/03			1.3		1.3
SECI D-005	10/21/03			1.3		1.3
SECI D-005	10/27/03			1.1		1.1
SECI D-005	11/04/03		<	0.73	K	0.365
SECI D-005	11/11/03			0.95		0.95
SECI D-005	11/20/03		<	0.73	K	0.365
SECI D-005	11/24/03		<	0.73	K	0.365
SECI D-005	12/02/03			1.3		1.3
SECI D-005	12/09/03		<	0.73	K	0.365
SECI D-005	12/16/03		<	0.73	K	0.365
SECI D-005	12/22/03		<	0.73	K	0.365
SECI D-005	12/29/03		<	0.73	K	0.365
SECI D-005	01/06/04			1.7		1.7
SECI D-005	01/13/04		<	0.73	K	0.365
SECI D-005	01/20/04			2.2		2.2
SECI D-005	01/27/04		<	0.73	K	0.365
SECI D-005	02/02/04		<	0.73	K	0.365
SECI D-005	02/10/04		<	0.73	K	0.365
SECI D-005	02/17/04		<	0.73	K	0.365
SECI D-005	02/24/04		<	0.73	K	0.365
SECI D-005	03/02/04			0.80		0.8
sjrcc	3/24/2005	10:16		1.3	U	0.65
SJRM 74C	3/24/2005	2:15				0
SJ6	3/24/2005	3:00				0
SJRCC	4/26/2005	1:00		2.5	U	1.25
SJ6	4/26/2005	4:45		2.5	U	1.25
SJRM 74C	4/26/2005	5:15		2.5	U	1.25

SJRCC	5/17/2005	9:00	2.8	I	2.8
SJ6	5/17/2005	10:45	4.3	I	4.3
SJRM 74C	5/17/2005	11:15	3.8	I	3.8
SJRCC	6/20/2005	10:00	1.3	U	0.65
SJRCC	6/20/2005	10:00	2.5	U	1.25
SJRM 74C	6/20/2005	3:15	2.5	U	1.25
SJRM 74C	6/20/2005	3:15	2.6		2.6
SJ6	6/20/2005	2:45	1.3	U	0.65
SJ6	6/20/2005	2:45	2.5	U	1.25
SJRCC	7/25/2005	7:30	2.5	U	1.25
SJ6	7/25/2005	2:00	2.5	U	1.25
SJRM 74C	7/25/2005	2:15	2.5	U	1.25
SJRCC	8/31/2005	9:30	2.5	U	1.25
SJ6	8/31/2005	1:30	2.5	U	1.25
SJRM 74C	8/31/2005	2:00	2.5	U	1.25
SJ6	9/27/2005	12:45	2.5	U	1.25
SJRM 74C	9/27/2005	1:30	2.5	U	1.25
SJRCC	9/27/2005	2:00	2.5	U	1.25

Note: If non-detect was reported, half of the detection limit or half of the water quality standard was used, whichever was less. If all samples are non-detect then the constitutent is assumed absent.

Source: SJRWMD, 2004.
ECT, 2004.

Ambient Selenium Data in St. Johns River near SECI Palatka Plant

Class III Water Quality Standard = 5 µg/L

Average MDL = 14.7 µg/L

Average =	1.16 µg/L
Maximum =	4.90 µg/L
Standard Dev =	1.04 µg/L
95 Percentile =	2.50 µg/L
Count	75.00

Station	Date	Time		Selenium (µg/L)	Remark Code	Value Used (µg/L)
SECI D-005	6/18/98		<	1		0.50
SECI D-005	3/1/2000		<	10		2.50
SECI D-005	6/1/2000		<	10		2.50
SECI D-005	9/1/2000		<	2		1.00
SECI D-005	12/1/2000		<	2		1.00
SECI D-005	3/1/2001			4.9		4.90
SECI D-005	6/1/2001		<	4.2		2.10
SECI D-005	7/1/2001		<	4.2		2.10
SECI D-005	12/1/2001		<	4.2		2.10
SECI D-005	3/1/2002		<	3.3		1.65
SECI D-005	6/1/2002		<	3.3		1.65
SECI D-005	7/29/2002		<	4.2		2.10
SECI D-005	10/22/2002		<	4.2		2.10
SECI D-005	1/28/2003		<	4.2		2.10
SECI D-005	5/13/2003		<	4.2		2.10
SECI D-005	8/26/2003		<	4.2		2.10
SJ6	5/16/2002	10:45		0.12	T	0.12
SJRCC	11/20/2001	13:10		0.281	T	0.28
SJRCC	12/5/2001	12:50		-0.69	T	2.50
SJRCC	1/8/2002	12:15		1.442	T	1.44
SJRCC	2/11/2002	11:40		-1.534	T	2.50
SJRCC	3/11/2002	9:20		-0.976	T	2.50
SJRCC	4/8/2002	13:05		2	U	1.00
SJRCC	5/13/2002	12:10		0.22	T	0.22
SJRCC	6/10/2002	12:15		0.71	T	0.71
SJRCC	7/15/2002	12:50		0.15	T	0.15
SJRCC	8/12/2002	11:45		0.323	T	0.32
SJRCC	9/12/2002	11:30		0.186	T	0.19
SJRCC	10/7/2002	12:20		0.078	T	0.08
SJRCC	11/11/2002	11:50		1.57	T	1.57
SJRCC	12/9/2002	11:30		0.12	T	0.12
SJRCC	1/6/2003	11:20		0.318	T	0.32
SJRCC	2/11/2003	10:00		0.305	T	0.31
SJRCC	3/11/2003	13:10		0.485	T	0.49
SJRCC	3/11/2003	13:15		0.511	T	0.51
SJRCC	4/14/2003	12:15		-0.095	T	2.50
SJRCC	4/14/2003	12:20		-0.126	T	2.50
SJRCC	5/12/2003	12:50		-1.231	T	2.50
SJRCC	5/12/2003	13:00		-1.128	T	2.50
SJRCC	6/9/2003	12:20		0.592	T	0.59
SJRCC	6/9/2003	12:25		0.298	T	0.30
SJRCC	8/12/2003	12:50		0.379	T	0.38
SJRCC	8/12/2003	12:55		0.269	T	0.27
SJRCC	9/8/2003	12:10		1.409	T	1.41
SJRCC	10/7/2003	11:45		0.105	T	0.11
SJRCC	11/12/2003	12:25		0.539	T	0.54
SJRCC	1/12/2004	13:30		0.14	T	0.14
SJRCC	2/9/2004	12:55		0.225	T	0.23
SJRCW	11/20/2001	12:55		0.589	T	0.59
SJRCW	12/5/2001	12:40		0.202	T	0.20
SJRCW	1/8/2002	12:00		0.698	T	0.70

SJRCW	2/11/2002	11:25	-0.47		T	2.50
SJRCW	3/11/2002	9:35	0.63		T	0.63
SJRCW	4/8/2002	12:55	2		U	1.00
SJRCW	5/13/2002	12:00	0.081		T	0.08
SJRCW	6/10/2002	12:10	0.001		T	0.00
SJRCW	7/15/2002	12:30	0.17		T	0.17
SJRCW	8/12/2002	11:35	0.066		T	0.07
SJRCW	9/12/2002	11:20	-0.211		T	2.50
SJRCW	10/7/2002	12:10	-0.046		T	2.50
SJRCW	11/11/2002	11:40	1.096		T	1.10
SJRCW	12/9/2002	11:15	0.128		T	0.13
SJRCW	1/6/2003	11:10	0.447		T	0.45
SJRCW	2/11/2003	9:50	0.515		T	0.52
SJRCW	3/11/2003	13:05	0.659		T	0.66
SJRCW	4/14/2003	12:00	0.084		T	0.08
SJRCW	5/12/2003	12:40	-1.347		T	2.50
SJRCW	6/9/2003	12:15	0.654		T	0.65
SJRCW	8/12/2003	12:45	0.27		T	0.27
SJRCW	9/8/2003	12:00	2.01		T	2.01
SJRCW	10/7/2003	11:35	0.427		T	0.43
SJRCW	11/12/2003	12:20	0.106		T	0.11
SJRCW	12/10/2003	13:40	-0.376		T	2.50
SJRCW	1/12/2004	13:25	0.278		T	0.28
SJRCW	2/9/2004	12:45	-0.088		T	2.50
sjrcc	3/24/2005	10:16	0.16	I		0.16
SJRM 74C	3/24/2005	2:15	0.13	U		0.07
SJ6	3/24/2005	3:00	0.14	I		0.14
SJRCC	4/26/2005	1:00	0.65	IV		0.65
SJ6	4/26/2005	4:45	0.42	IV		0.42
SJRM 74C	4/26/2005	5:15	0.3	IV		0.30
SJRCC	5/17/2005	9:00	0.18	I		0.18
SJ6	5/17/2005	10:45	0.22	I		0.22
SJRM 74C	5/17/2005	11:15	0.13	U		0.07
SJRCC	6/20/2005	10:00	0.28	I		0.28
SJRM 74C	6/20/2005	3:15	0.18	I		0.18
SJ6	6/20/2005	2:45	0.28	I		0.28
SJRCC	7/25/2005	7:30	0.13	U		0.07
SJ6	7/25/2005	2:00	0.13	U		0.07
SJRM 74C	7/25/2005	2:15	0.13	U		0.07
SJRCC	8/31/2005	9:30	0.17	I		0.17
SJ6	8/31/2005	1:30	0.15	I		0.15
SJRM 74C	8/31/2005	2:00	0.14	I		0.14
SJ6	9/27/2005	12:45	0.13	U		0.07
SJRM 74C	9/27/2005	1:30	0.13	U		0.07
SJRCC	9/27/2005	2:00	0.13	U		0.07

Note: If non-detect was reported, half of the detection limit or half of the water quality standard was used, whichever was less. If all samples are non-detect then the constitutent is assumed absent.

Source: SJRWMD, 2004.
ECT, 2004.

Ambient Silver Data in St. Johns River near SECI Palatka Plant

Average MDL = 4.4 µg/L

Class III Water Quality Standard = 0.07 µg/L

Average =	0.010 (µg/L)
Maximum =	16.000 (µg/L)
Standard Dev =	0.915 (µg/L)
95 Percentile =	0.020 (µg/L)
Count	49.000

Station	Date	Time	Silver (µg/L)	Remark Code	Value Used (µg/L)
20030235	7/29/2004		0.01	U	0.005
20030236	7/29/2004		0.01	U	0.005
20030237	7/29/2004		0.01	U	0.005
20030235	8/12/2004		0.01	U	0.005
20030236	8/12/2004		0.01	U	0.005
20030237	8/12/2004		0.01	U	0.005
20030235	10/12/2004		0.02	U	0.010
20030236	10/12/2004		0.02	U	0.010
20030237	10/12/2004		0.02	U	0.010
20030235	10/28/2004		0.02	U	0.010
20030236	10/28/2004		0.02	U	0.010
20030237	10/28/2004		0.02	U	0.010
SJRCC	2/23/2005		0.018	U	0.009
Intake	2/23/2005		0.018	U	0.009
SJ6	2/23/2005		0.018	U	0.009
SJRM 74C	2/23/2005		0.018	U	0.009
Intake	3/24/2005		0.018	U	0.009
SJ6	3/24/2005	3:00	0.018	U	0.009
sjrcc	3/24/2005	10:16	0.018	U	0.009
SJRM 74C	3/24/2005	2:15	0.018	U	0.009
Intake	4/26/2005		0.018	U	0.009
SJ6	4/26/2005	4:45	0.018	U	0.009
SJRCC	4/26/2005	1:00	0.018	U	0.009
SJRM 74C	4/26/2005	5:15	0.018	U	0.009
SJ6	5/17/2005	10:45	0.018	U	0.009
SJRCC	5/17/2005	9:00	0.018	U	0.009
SJRM 74C	5/17/2005	11:15	0.018	U	0.009
SJ6	6/20/2005	2:45	0.034	I	0.034
SJRCC	6/20/2005	10:00	0.045	I	0.045
SJRM 74C	6/20/2005	3:15	0.026	I	0.026
SJ6	7/25/2005	2:00	0.018	U	0.009
SJRCC	7/25/2005	7:30	0.018	U	0.009
SJRM 74C	7/25/2005	2:15	0.018	U	0.009
SJ6	8/31/2005	1:30	0.018	U	0.009
SJRCC	8/31/2005	9:30	0.018	U	0.009
SJRM 74C	8/31/2005	2:00	0.018	U	0.009
SJ6	9/27/2005	12:45	0.018	U	0.009
SJRCC	9/27/2005	2:00	0.018	U	0.009
SJRM 74C	9/27/2005	1:30	0.018	U	0.009
SJ6	10/31/2005		0.018	U	0.009

Ambient Silver Data in St. Johns River near SECI Palatka Plant

Average MDL = 4.4 µg/L

Class III Water Quality Standard = 0.07 µg/L

Average =	0.010 (µg/L)
Maximum =	16.000 (µg/L)
Standard Dev =	0.915 (µg/L)
95 Percentile =	0.020 (µg/L)
Count	49.000

Station	Date	Time	Silver (µg/L)	Remark Code	Value Used (µg/L)
SJRCC	10/31/2005		0.018	U	0.009
SJRM 74C	10/31/2005		0.018	U	0.009
SJ6	11/29/2005		0.018	U	0.009
SJRCC	11/29/2005		0.018	U	0.009
SJRM 74C	11/29/2005		0.018	U	0.009
SJ6	12/20/2005		0.018	U	0.009
SJRCC	12/20/2005		0.018	U	0.009
SJRM 74C	12/20/2005		0.018	U	0.009
20030235	9/23/2004		0.01	U	0.005

Note: If non-detect was reported, half of the detection limit or half of the water quality standard was used, whichever was less. If all samples are non-detect then the constitutent is assumed absent.

Source: SJRWMD, 2004.
ECT, 2004.

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
FP41	9/22/1993	14:50	30.64	
FP41	10/20/1993	13:20	27.17	
FP41	11/30/1993	13:40	17.89	
FP41	12/28/1993	13:05	12.13	
FP41	1/26/1994	12:35	13.83	
FP41	2/23/1994	11:40	20.57	
FP41	3/30/1994	13:01	21.81	
FP41	4/20/1994	12:09	26.09	
FP41	5/25/1994	12:02	26.65	
FP41	6/29/1994	12:15	30.25	
FP41	7/27/1994	12:15	28.3	
FP41	8/23/1994	11:34	28.4	
FP41	9/29/1994	11:45	26.26	
FP41	10/24/1994	9:45	24.15	
FP41	11/30/1994	10:05	20.68	
FP41	12/28/1994	10:00	14.77	
FP41	2/15/1995	10:00	15.18	
FP41	3/1/1995	11:10	18.61	
FP41	3/29/1995	12:15	23.51	
FP41	5/2/1995	12:05	26.76	
FP41	5/31/1995	12:15	29.88	
FP41	6/29/1995	12:45	29.08	
FP41	7/27/1995	11:45	30.59	
FP41	8/31/1995	15:30	27.97	
FP41	9/26/1995	14:55	27.87	
FP41	10/24/1995	14:25	24.83	
FP41	11/21/1995	13:00	17.51	
FP41	1/3/1996	14:00	13.42	
FP41	1/30/1996	14:10	17.39	
FP41	2/27/1996	14:00	20.68	
FP41	3/26/1996	14:05	21.41	
FP41	4/30/1996	14:45	25.87	
FP41	5/28/1996	14:50	29.19	
FP41	7/2/1996	15:40	30.1	
FP41	8/6/1996	13:50	30.94	
FP41	9/12/1996	13:35	29.47	
FP41	10/1/1996	13:30	27.73	
FP41	10/24/1996	13:30	23.17	
FP42	9/22/1993	15:00	30.02	
FP42	10/20/1993	13:35	25.9	
FP42	11/30/1993	13:55	18.28	
FP42	12/28/1993	13:20	12.22	
FP42	1/26/1994	12:45	13.65	
FP42	2/23/1994	11:49	20.53	
FP42	3/30/1994	13:14	22.66	
FP42	4/20/1994	12:00	26	
FP42	5/25/1994	12:20	25.73	
FP42	6/29/1994	12:20	31.36	
FP42	7/27/1994	12:10	28.29	
FP42	8/23/1994	11:40	28.26	
FP42	9/29/1994	11:55	26.05	
FP42	10/24/1994	10:00	23.89	
FP42	11/30/1994	10:12	20.71	
FP42	12/28/1994	10:20	14.5	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
FP42	2/15/1995	10:10	15.01	
FP42	3/1/1995	11:20	18.84	
FP42	3/29/1995	12:30	23.34	
FP42	5/2/1995	12:15	26.28	
FP42	5/31/1995	12:26	30.3	
FP42	6/29/1995	13:00	28.09	
FP42	7/27/1995	11:55	30.68	
FP42	8/31/1995	15:45	27.91	
FP42	9/26/1995	14:50	27.9	
FP42	10/24/1995	14:35	24.64	
FP42	11/21/1995	13:10	17.38	
FP42	1/3/1996	14:10	13.14	
FP42	1/30/1996	14:25	15.48	
FP42	2/27/1996	14:10	20.94	
FP42	3/26/1996	14:10	18.33	
FP42	4/30/1996	15:00	26.32	
FP42	5/28/1996	15:00	29.27	
FP42	7/2/1996	15:55	30.68	
FP42	8/6/1996	14:00	31.44	
FP42	9/12/1996	13:20	29.23	
FP42	10/1/1996	13:55	28.13	
FP42	10/24/1996	13:20	23.02	
FP42	2/26/1997	13:30	19.1	
FP42	3/26/1997	13:10	22.4	
FP42	5/28/1997	13:45	27.29	
FP42	5/28/1997	13:45	27.29	
FP42	6/25/1997	13:40	29.86	
FP42	6/25/1997	13:40	29.86	
FP42	7/23/1997	13:35	30.99	
FP42	7/23/1997	13:35	30.99	
FP42	8/20/1997	13:40	31.7	
FP42	8/20/1997	13:40	31.7	
FP42	9/25/1997	13:20	29.7	
FP42	9/25/1997	13:20	29.7	
FP42	10/28/1997	14:05	22.21	
FP42	11/24/1997	13:10	17.99	
FP42	12/22/1997	12:15	14.66	
FP42	2/2/1998	9:30	15.15	
FP42	2/23/1998	14:40	17.52	
FP42	4/2/1998	12:40	23.88	
FP42	4/27/1998	12:20	23.79	
FP42	5/26/1998	13:10	29.73	
FP42	6/30/1998	13:50	31.11	
FP42	8/3/1998	12:15	29.08	
FP42	8/24/1998	12:00	29.52	
FP42	9/22/1998	13:40	27.99	
FP42	9/22/1998	13:40	28.12	
FP42	9/22/1998	13:40	28.24	
FP42	10/28/1998	13:35	23.22	
FP42	10/28/1998	13:35	24.64	
FP42	10/28/1998	13:35	26.06	
FP42	11/24/1998	13:25	23.05	
FP42	11/24/1998	13:25	23.17	
FP42	11/24/1998	13:25	23.29	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Station	Date	Time	Temperature (°C)	Remark Code
FP42	12/28/1998	14:55	17.45	
FP42	12/28/1998	14:55	17.54	
FP42	12/28/1998	14:55	17.63	
FP42	1/27/1999	10:10	18.5	
FP42	1/27/1999	10:10	18.52	
FP42	1/27/1999	10:10	18.54	
FP42	2/24/1999	14:55	14.99	
FP42	2/24/1999	14:55	16.1	
FP42	2/24/1999	14:55	17.2	
FP42	3/30/1999	10:30	20.86	
FP42	3/30/1999	10:30	21.25	
FP42	3/30/1999	10:30	21.63	
FP42	4/29/1999	10:00	25.56	
FP42	4/29/1999	10:00	25.66	
FP42	4/29/1999	10:00	25.76	
FP42	5/27/1999	14:50	27.52	
FP42	5/27/1999	14:50	27.58	
FP42	5/27/1999	14:50	27.64	
FP42	6/29/1999	16:30	27.99	
FP42	6/29/1999	16:30	27.99	
FP42	6/29/1999	16:30	27.99	
FP42	8/12/1999	9:35	29.37	
FP42	8/12/1999	9:35	29.4	
FP42	8/12/1999	9:35	29.43	
FP42	8/26/1999	14:45	30.43	
FP42	8/26/1999	14:45	31.08	
FP42	8/26/1999	14:45	31.73	
FP42	9/23/1999	15:40	25.37	
FP42	9/23/1999	15:40	25.38	
FP42	9/23/1999	15:40	25.39	
FP42	10/26/1999	16:30	21.65	
FP42	10/26/1999	16:30	21.66	
FP42	10/26/1999	16:30	21.66	
FP42	11/23/1999	14:10	19.99	
FP42	11/23/1999	14:10	20.66	
FP42	11/23/1999	14:10	21.32	
FP42	12/21/1999	10:15	17.26	
FP42	12/21/1999	10:15	17.38	
FP42	12/21/1999	10:15	17.49	
FP42	1/27/2000	14:50	11.69	
FP42	1/27/2000	14:50	12.1	
FP42	1/27/2000	14:50	12.51	
FP42	2/21/2000	13:50	18.41	
FP42	2/21/2000	13:50	18.46	
FP42	2/21/2000	13:50	18.51	
FP42	3/29/2000	10:10	21.33	
FP42	3/29/2000	10:10	21.64	
FP42	3/29/2000	10:10	21.96	
FP42	4/26/2000	9:30	22.92	
FP42	4/26/2000	9:30	22.96	
FP42	4/26/2000	9:30	23	
FP42	5/24/2000	14:45	28.5	
FP42	5/24/2000	14:45	28.84	
FP42	5/24/2000	14:45	29.18	

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Station	Date	Time	Temperature (°C)	Remark Code
FP42	6/29/2000	9:10	28.7	
FP42	6/29/2000	9:10	28.75	
FP42	6/29/2000	9:10	28.8	
FP42	7/27/2000	14:55	29.5	
FP42	7/27/2000	14:55	29.56	
FP42	7/27/2000	14:55	29.62	
FP42	8/24/2000	14:00	29.57	
FP42	8/24/2000	14:00	30.05	
FP42	8/24/2000	14:00	30.53	
FP42	9/28/2000	13:45	26.97	
FP42	9/28/2000	13:45	26.98	
FP42	9/28/2000	13:45	26.98	
FP42	10/26/2000	13:15	22.14	
FP42	10/26/2000	13:15	22.19	
FP42	10/26/2000	13:15	22.24	
FP42	11/27/2000	15:15	18	
FP42	11/27/2000	15:15	18	
FP42	11/27/2000	15:15	18	
FP42	12/21/2000	12:55	13.01	
FP42	12/21/2000	12:55	13.3	
FP42	12/21/2000	12:55	13.59	
FP42	2/27/2001	15:20	21.62	
FP42	2/27/2001	15:20	22.2	
FP42	2/27/2001	15:20	22.78	
FP42	3/29/2001	15:00	18.52	
FP42	3/29/2001	15:00	18.54	
FP42	3/29/2001	15:00	18.55	
FP42	5/1/2001	10:20	22.62	
FP42	5/1/2001	10:20	22.64	
FP42	5/1/2001	10:20	22.67	
FP42	5/30/2001	13:50	27.73	
FP42	5/30/2001	13:50	28.66	
FP42	5/30/2001	13:50	29.58	
FP42	6/28/2001	14:45	28.47	
FP42	6/28/2001	14:45	28.5	
FP42	6/28/2001	14:45	28.52	
FP42	7/23/2001	14:55	29.29	
FP42	7/23/2001	14:55	29.3	
FP42	7/23/2001	14:55	29.3	
FP42	8/20/2001	10:00	30.91	
FP42	8/20/2001	10:00	30.96	
FP42	8/20/2001	10:00	31	
FP42	9/25/2001	10:25	26.92	
FP42	9/25/2001	10:25	26.94	
FP42	9/25/2001	10:25	26.95	
FP42	10/24/2001	14:55	24.35	
FP42	10/24/2001	14:55	24.48	
FP42	10/24/2001	14:55	24.61	
FP42	11/27/2001	10:00	21.54	
FP42	11/27/2001	10:00	21.88	
FP42	11/27/2001	10:00	22.23	
FP42	2/26/2002	10:50	16.36	
FP42	2/26/2002	10:50	16.94	
FP42	2/26/2002	10:50	17.33	

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
FP42	3/25/2002	15:30	22.72	
FP42	3/25/2002	15:30	22.8	
FP42	3/25/2002	15:30	22.87	
FP42	4/29/2002	14:55	27.52	
FP42	4/29/2002	14:55	27.62	
FP42	4/29/2002	14:55	27.71	
FP42	5/29/2002	13:45	26.3	
FP42	5/29/2002	13:45	26.36	
FP42	5/29/2002	13:45	26.41	
FP42	6/26/2002	15:10	27.29	
FP42	6/26/2002	15:10	28.29	
FP42	6/26/2002	15:10	29.29	
FP42	7/30/2002	14:00	30.5	
FP42	7/30/2002	14:00	30.8	
FP42	7/30/2002	14:00	31.11	
FP42	8/26/2002	10:00	30.03	
FP42	8/26/2002	10:00	30.14	
FP42	8/26/2002	10:00	30.24	
FP42	9/25/2002	14:30	28.13	
FP42	9/25/2002	14:30	28.68	
FP42	9/25/2002	14:30	29.22	
FP42	10/24/2002	14:35	24.9	
FP42	10/24/2002	14:35	26.8	
FP42	10/24/2002	14:35	28.71	
FP42	11/25/2002	15:05	17.53	
FP42	11/25/2002	15:05	18.24	
FP42	11/25/2002	15:05	18.95	
FP42	1/28/2003	9:45	10.72	
FP42	1/28/2003	9:45	10.74	
FP42	1/28/2003	9:45	10.75	
FP43	9/22/1993	15:15	31.1	
FP43	10/20/1993	13:50	25.16	
FP43	11/30/1993	14:05	18.18	
FP43	12/28/1993	13:32	11.55	
FP43	1/26/1994	12:53	13.63	
FP43	2/23/1994	12:00	20.72	
FP43	3/30/1994	13:45	22.45	
FP43	4/20/1994	11:55	25.49	
FP43	5/25/1994	12:30	25.84	
FP43	6/29/1994	12:30	30	
FP43	7/27/1994	12:00	28.34	
FP43	8/23/1994	11:45	27.97	
FP43	9/29/1994	12:10	26.65	
FP43	10/24/1994	10:05	23.82	
FP43	11/30/1994	10:24	20.84	
FP43	12/28/1994	10:30	14.37	
FP43	2/15/1995	10:15	14.8	
FP43	3/1/1995	11:30	18.99	
FP43	3/29/1995	12:40	23	
FP43	5/2/1995	12:25	26.43	
FP43	5/31/1995	12:40	29.8	
FP43	6/29/1995	13:08	29.22	
FP43	7/27/1995	12:05	30.78	
FP43	8/31/1995	15:55	27.91	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
FP43	9/26/1995	14:40	27.68	
FP43	10/24/1995	14:40	23.91	
FP43	11/21/1995	13:20	17.04	
FP43	1/3/1996	14:20	13.42	
FP43	1/30/1996	14:30	16.68	
FP43	2/27/1996	14:20	19.98	
FP43	3/26/1996	14:20	17.75	
FP43	4/30/1996	15:10	26.2	
FP43	7/2/1996	16:00	30.46	
FP43	8/6/1996	14:10	30.35	
FP43	9/12/1996	13:10	29.19	
FP43	10/1/1996	14:05	28.43	
FP43	10/24/1996	13:10	22.85	
PA34	2/23/1994	11:22	21.37	
PA34	3/30/1994	12:35	22.5	
PA34	4/20/1994	11:43	26.46	
PA34	5/25/1994	11:45	25.74	
PA34	6/29/1994	11:55	29.95	
PA34	7/27/1994	11:47	27.98	
PA34	8/23/1994	11:20	28.23	
PA34	9/29/1994	11:20	26.23	
PA34	10/24/1994	9:30	23.8	
PA34	11/30/1994	9:49	20.84	
PA34	12/28/1994	9:40	14.35	
PA34	2/15/1995	9:50	15.01	
PA34	3/1/1995	11:00	18.94	
PA34	3/29/1995	11:55	22.78	
PA34	5/2/1995	11:50	25.53	
PA34	5/31/1995	12:00	30.41	
PA34	6/29/1995	12:28	28.4	
PA34	7/27/1995	11:28	29.81	
PA34	8/31/1995	16:10	27.83	
PA34	9/26/1995	15:10	28.14	
PA34	10/24/1995	15:00	23.95	
PA34	11/21/1995	13:30	17.61	
PA34	1/3/1996	14:40	13.19	
PA34	1/30/1996	14:55	16.63	
PA34	2/27/1996	14:30	20.21	
PA34	3/26/1996	14:35	22.23	
PA34	4/30/1996	15:45	26	
PA34	5/28/1996	15:40	29.12	
PA34	7/9/1996	10:20	27.9	
PA34	8/6/1996	14:20	33.49	
PA34	9/12/1996	12:55	29.11	
PA34	10/1/1996	13:10	27.67	
PA34	10/24/1996	12:50	22.95	
SJ6	5/16/2002	10:45	26.6	
SJ6	5/16/2002	10:45	26.69	
SJ6	5/16/2002	10:45	26.77	
SJRCC	3/9/1993	15:00	18.7	
SJRCC	4/13/1993	15:10	23	
SJRCC	5/12/1993	13:40	25.6	
SJRCC	7/7/1993	11:20	31.4	
SJRCC	8/12/1993	11:00	30.9	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Station	Date	Time	Temperature (°C)	Remark Code
SJRCC	9/22/1993	8:50	29.8	
SJRCC	10/20/1993	10:30	25.43	
SJRCC	11/15/1993	11:40	20.93	
SJRCC	12/15/1993	11:30	15.1	
SJRCC	1/20/1994	12:05	12.1	
SJRCC	2/15/1994	10:15	18.1	
SJRCC	3/14/1994	12:10	18.3	
SJRCC	4/12/1994	11:30	24.4	
SJRCC	5/16/1994	12:05	28.5	
SJRCC	6/14/1994	12:25	30.6	
SJRCC	7/12/1994	11:40	30.4	
SJRCC	8/16/1994	11:45	27.8	
SJRCC	9/13/1994	11:55	27.9	
SJRCC	10/17/1994	11:25	23.6	
SJRCC	11/18/1994	10:40	21.34	
SJRCC	12/13/1994	12:10	19.2	
SJRCC	1/19/1995	11:40	16.5	
SJRCC	2/15/1995	9:45	14.6	
SJRCC	3/15/1995	10:40	20.3	
SJRCC	4/11/1995	9:30	23.2	
SJRCC	5/16/1995	11:25	28.97	
SJRCC	6/13/1995	10:00	29.4	
SJRCC	7/11/1995	11:15	30.6	
SJRCC	8/15/1995	12:15	32	
SJRCC	9/13/1995	12:10	28	
SJRCC	10/17/1995	11:00	24.7	
SJRCC	11/16/1995	11:20	16.8	
SJRCC	12/13/1995	10:40	16.1	
SJRCC	1/16/1996	10:50	11.7	
SJRCC	2/13/1996	11:25	14	
SJRCC	3/13/1996	11:15	12.3	
SJRCC	4/16/1996	10:40	21.6	
SJRCC	5/14/1996	11:00	27.2	
SJRCC	6/12/1996	11:15	28.7	
SJRCC	7/16/1996	10:55	30.1	
SJRCC	8/21/1996	11:20	29.2	
SJRCC	9/17/1996	10:15	28.6	
SJRCC	10/15/1996	10:15	22.8	
SJRCC	11/13/1996	10:40	18.5	
SJRCC	12/3/1996	10:40	18.1	
SJRCC	1/14/1997	10:25	15.4	
SJRCC	2/11/1997	10:25	16.9	
SJRCC	3/11/1997	10:25	22.5	
SJRCC	4/15/1997	10:25	21.9	
SJRCC	4/15/1997	10:25	21.9	
SJRCC	5/13/1997	10:20	24.8	
SJRCC	5/13/1997	10:20	24.8	
SJRCC	6/10/1997	10:40	24.3	
SJRCC	6/10/1997	10:40	24.3	
SJRCC	7/8/1997	10:40	31	
SJRCC	7/8/1997	10:40	31	
SJRCC	8/5/1997	10:30	29.9	
SJRCC	8/5/1997	10:30	29.9	
SJRCC	9/16/1997	9:40	29.5	

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
SJRCC	9/16/1997	9:40	29.5	
SJRCC	10/9/1997	14:20	27.1	
SJRCC	11/11/1997	9:50	19	
SJRCC	12/9/1997	9:45	16.4	
SJRCC	1/13/1998	10:10	17	
SJRCC	2/10/1998	9:45	13.6	
SJRCC	3/17/1998	10:20	16.7	
SJRCC	4/14/1998	9:45	21.7	
SJRCC	5/12/1998	13:40	26	
SJRCC	6/9/1998	13:25	29.2	
SJRCC	7/14/1998	14:00	30.9	
SJRCC	8/18/1998	9:15	30.5	
SJRCC	9/8/1998	13:30	29.4	
SJRCC	10/15/1998	14:00	27.6	
SJRCC	12/15/1998	13:30	20.4	
SJRCC	1/12/1999	9:50	13.5	
SJRCC	2/9/1999	10:30	20.5	
SJRCC	3/10/1999	13:35	18.6	
SJRCC	4/27/1999	10:45	26.4	
SJRCC	5/10/1999	10:30	25.5	
SJRCC	6/7/1999	10:15	28.1	
SJRCC	7/12/1999	13:10	31.2	
SJRCC	8/10/1999	13:20	30.2	
SJRCC	9/28/1999	14:30	27.64	
SJRCC	10/12/1999	14:30	26.89	
SJRCC	11/9/1999	11:40	20.2	
SJRCC	12/6/1999	14:10	17.1	
SJRCC	1/10/2000	14:20	17.98	
SJRCC	2/7/2000	15:40	13.65	
SJRCC	3/6/2000	15:10	20.59	
SJRCC	4/10/2000	10:50	20.7	
SJRCC	5/8/2000	11:15	26.25	
SJRCC	6/12/2000	15:00	28.7	
SJRCC	7/10/2000	10:30	29.79	
SJRCC	8/7/2000	10:45	30.9	
SJRCC	9/11/2000	9:55	27.76	
SJRCC	10/11/2000	15:25	21.49	
SJRCC	11/13/2000	9:40	21.58	
SJRCC	12/14/2000	9:55	17.34	
SJRCC	1/9/2001	11:40	10.86	
SJRCC	2/15/2001	10:00	18.36	
SJRCC	3/15/2001	9:00	19.01	
SJRCC	4/10/2001	8:50	24.13	
SJRCC	5/14/2001	13:55	26.05	
SJRCC	6/11/2001	13:50	29.95	
SJRCC	7/11/2001	12:34	29.55	
SJRCC	8/9/2001	11:50	30.33	
SJRCC	9/11/2001	14:40	29.12	
SJRCC	10/9/2001	12:20	23.27	
SJRCC	11/20/2001	13:10	21.9	
SJRCC	12/5/2001	12:50	22.3	
SJRCC	1/8/2002	12:15	11.28	
	2/11/2002	11:40	17.24	
SJRCC	3/11/2002	9:20	18.04	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
SJRCC	4/8/2002	13:05	22.47	
SJRCC	5/13/2002	12:10	28.77	
SJRCC	6/10/2002	12:15	28.93	
SJRCC	7/15/2002	12:50	29.75	
SJRCC	8/12/2002	11:45	28.34	
SJRCC	9/12/2002	11:30	28.69	
SJRCC	10/7/2002	12:20	29.49	
SJRCC	11/11/2002	11:50	23.13	
SJRCC	12/9/2002	11:30	15.26	
SJRCC	1/6/2003	11:20	14.27	
SJRCC	2/11/2003	10:00	14.46	
SJRCC	3/11/2003	13:10	19.76	
SJRCC	3/11/2003	13:10	20.23	
SJRCC	3/11/2003	13:15	20.7	
SJRCC	4/14/2003	12:15	21.3	
SJRCC	4/14/2003	12:15	22.175	
SJRCC	4/14/2003	12:20	23.05	
SJRCC	8/12/2003	12:50	28.38	
SJRCC	8/12/2003	12:50	28.79	
SJRCC	8/12/2003	12:55	29.2	
SJRCC	9/8/2003	12:10	27.76	
SJRCC	9/8/2003	12:10	27.88	
SJRCC	10/7/2003	11:45	25.88	
SJRCC	11/12/2003	12:25	22.77	
SJRCC	11/12/2003	12:25	23.3	
SJRCC	11/12/2003	12:25	23.83	
SJRCC	12/10/2003	13:30	16.3	
SJRCC	12/10/2003	13:30	16.3	
SJRCC	12/10/2003	13:30	16.31	
SJRCC	1/12/2004	13:30	12.85	
SJRCC	2/9/2004	12:55	15.04	
SJRCC	2/9/2004	12:55	16.66	
SJRCC	2/9/2004	12:55	18.27	
SJRCE	3/9/1993	15:05	19.1	
SJRCE	4/13/1993	15:15	24.1	
SJRCE	5/12/1993	13:50	25.8	
SJRCE	7/7/1993	11:10	31.4	
SJRCE	8/12/1993	10:50	30.6	
SJRCE	9/22/1993	8:40	29.5	
SJRCE	10/20/1993	10:10	25.37	
SJRCE	11/15/1993	11:30	22.43	
SJRCE	12/15/1993	11:20	15.43	
SJRCE	1/20/1994	11:50	11.8	
SJRCE	2/15/1994	10:30	17.8	
SJRCE	3/14/1994	11:55	18.2	
SJRCE	4/12/1994	11:20	23.8	
SJRCE	5/16/1994	11:50	28.5	
SJRCE	6/14/1994	12:05	29.8	
SJRCE	7/12/1994	11:20	30.5	
SJRCE	8/16/1994	11:35	27.9	
SJRCE	9/13/1994	11:40	27.5	
SJRCE	10/17/1994	11:10	23.6	
SJRCE	11/18/1994	10:30	21.38	
SJRCE	12/13/1994	12:00	18.7	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Station	Date	Time	Temperature (°C)	Remark Code
SJRCE	1/19/1995	11:30	16.3	
SJRCE	2/15/1995	9:40	14.3	
SJRCE	3/15/1995	10:30	19	
SJRCE	4/11/1995	9:25	22.6	
SJRCE	5/16/1995	11:15	29.13	
SJRCE	6/13/1995	9:50	29.2	
SJRCE	7/11/1995	10:55	30.8	
SJRCE	8/15/1995	12:00	31.3	
SJRCE	9/13/1995	11:55	28	
SJRCE	10/17/1995	10:45	24.8	
SJRCE	11/16/1995	11:05	16.6	
SJRCE	12/13/1995	10:25	15.9	
SJRCE	1/16/1996	10:45	11.8	
SJRCE	2/13/1996	11:15	13.9	
SJRCE	3/13/1996	11:05	13	
SJRCE	4/16/1996	10:30	21.5	
SJRCE	5/14/1996	10:50	27	
SJRCE	6/12/1996	11:05	29.2	
SJRCE	7/16/1996	10:45	29.7	
SJRCE	8/21/1996	11:05	28.9	
SJRCE	9/17/1996	9:55	28.6	
SJRCE	10/15/1996	10:30	22.8	
SJRCE	11/13/1996	10:15	18.4	
SJRCE	12/3/1996	10:25	18	
SJRCE	1/14/1997	10:15	14.7	
SJRCE	2/11/1997	10:15	16.5	
SJRCE	3/11/1997	10:20	22.9	
SJRCE	4/15/1997	10:15	21.2	
SJRCE	4/15/1997	10:15	21.2	
SJRCE	5/13/1997	10:10	24.6	
SJRCE	5/13/1997	10:10	24.6	
SJRCE	6/10/1997	10:25	24	
SJRCE	6/10/1997	10:25	24	
SJRCE	7/8/1997	10:30	30.4	
SJRCE	7/8/1997	10:30	30.4	
SJRCE	8/5/1997	10:20	29.9	
SJRCE	8/5/1997	10:20	29.9	
SJRCE	9/16/1997	9:35	28.9	
SJRCE	9/16/1997	9:35	28.9	
SJRCE	10/9/1997	14:00	27.2	
SJRCE	11/11/1997	9:45	18.9	
SJRCE	12/9/1997	9:30	16.4	
SJRCE	1/13/1998	9:55	16.8	
SJRCE	2/10/1998	9:40	13.6	
SJRCE	3/17/1998	10:15	16.7	
SJRCE	4/14/1998	9:30	21.6	
SJRCE	5/12/1998	13:45	26.9	
SJRCE	6/9/1998	13:45	29.8	
SJRCE	7/14/1998	13:45	30.3	
SJRCE	8/18/1998	9:00	30.4	
SJRCE	9/8/1998	13:20	29.3	
SJRCE	10/15/1998	13:40	27.4	
SJRCE	12/15/1998	13:40	19.9	
SJRCE	1/12/1999	9:45	13.2	

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
SJRCE	2/9/1999	10:15	20.7	
SJRCE	3/10/1999	13:45	18.7	
SJRCE	4/27/1999	10:20	25.4	
SJRCE	5/10/1999	10:10	25	
SJRCE	6/7/1999	10:00	27.9	
SJRCE	7/12/1999	13:20	31.6	
SJRCE	8/10/1999	13:35	30.7	
SJRCE	9/28/1999	14:40	26.98	
SJRCE	10/12/1999	14:40	26.62	
SJRCE	11/9/1999	11:20	19.91	
SJRCE	12/6/1999	14:20	17.2	
SJRCE	1/10/2000	14:30	18.04	
SJRCE	2/7/2000	15:50	13.93	
SJRCE	3/6/2000	15:20	20.67	
SJRCE	4/10/2000	10:40	20.79	
SJRCE	5/8/2000	10:55	25.94	
SJRCE	6/12/2000	15:15	28.66	
SJRCE	7/10/2000	10:15	29.55	
SJRCE	8/7/2000	10:35	30	
SJRCE	9/11/2000	9:45	27.74	
SJRCE	10/11/2000	15:35	20.81	
SJRCE	11/13/2000	9:30	21.06	
SJRCE	12/14/2000	9:45	17.04	
SJRCE	1/9/2001	11:50	10.82	
SJRCE	2/15/2001	9:50	18.03	
SJRCE	3/15/2001	8:45	19.04	
SJRCE	4/10/2001	8:45	23.58	
SJRCE	5/14/2001	13:40	25.91	
SJRCE	6/11/2001	13:40	31.3	
SJRCE	7/11/2001	12:45	29.58	
SJRCE	8/9/2001	12:00	31.98	
SJRCE	9/11/2001	14:50	29.09	
SJRCE	10/9/2001	12:30	23.58	
SJRCW	3/9/1993	14:50	19	
SJRCW	4/13/1993	15:05	23.6	
SJRCW	5/12/1993	13:30	25.7	
SJRCW	7/7/1993	11:30	31.2	
SJRCW	8/12/1993	11:10	30.7	
SJRCW	9/22/1993	9:00	30.3	
SJRCW	10/20/1993	10:40	24.94	
SJRCW	11/15/1993	11:50	20.75	
SJRCW	12/15/1993	11:45	14.83	
SJRCW	1/20/1994	12:15	11.9	
SJRCW	2/15/1994	9:50	18.02	
SJRCW	3/14/1994	12:25	19.6	
SJRCW	4/12/1994	11:40	25	
SJRCW	5/16/1994	12:20	28.8	
SJRCW	6/14/1994	12:35	31	
SJRCW	7/12/1994	11:55	30.3	
SJRCW	8/16/1994	12:00	27.3	
SJRCW	9/13/1994	11:55	27.7	
SJRCW	10/17/1994	11:45	22.5	
SJRCW	11/18/1994	10:50	20.8	
SJRCW	12/13/1994	12:20	19	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Station	Date	Time	Temperature (°C)	Remark Code
SJRCW	1/19/1995	11:50	15.9	
SJRCW	3/15/1995	10:55	20.4	
SJRCW	4/11/1995	9:40	23.8	
SJRCW	5/16/1995	11:35	27.75	
SJRCW	6/13/1995	10:15	29.8	
SJRCW	7/11/1995	11:30	30.2	
SJRCW	8/15/1995	12:30	32.3	
SJRCW	9/13/1995	12:25	28.3	
SJRCW	10/17/1995	11:20	24.4	
SJRCW	11/16/1995	11:35	16.9	
SJRCW	12/13/1995	10:50	15.4	
SJRCW	1/16/1996	11:00	12	
SJRCW	2/13/1996	11:35	14.7	
SJRCW	3/13/1996	11:25	12.9	
SJRCW	4/16/1996	10:50	21.6	
SJRCW	5/14/1996	11:15	27.7	
SJRCW	6/12/1996	11:30	28.9	
SJRCW	7/16/1996	11:10	30.2	
SJRCW	8/21/1996	11:35	29.1	
SJRCW	9/17/1996	10:30	28.5	
SJRCW	10/15/1996	10:00	22.1	
SJRCW	11/13/1996	11:00	17.6	
SJRCW	12/3/1996	10:55	18.2	
SJRCW	1/14/1997	10:40	15.1	
SJRCW	2/11/1997	10:40	17	
SJRCW	3/11/1997	10:45	22.7	
SJRCW	4/15/1997	10:35	21.9	
SJRCW	4/15/1997	10:35	21.9	
SJRCW	5/13/1997	10:25	24.8	
SJRCW	5/13/1997	10:25	24.8	
SJRCW	6/10/1997	10:50	24.5	
SJRCW	6/10/1997	10:50	24.5	
SJRCW	7/8/1997	10:45	30	
SJRCW	7/8/1997	10:45	30	
SJRCW	8/5/1997	10:40	28.8	
SJRCW	8/5/1997	10:40	28.8	
SJRCW	9/16/1997	9:50	30.9	
SJRCW	9/16/1997	9:50	30.9	
SJRCW	10/9/1997	14:50	27.1	
SJRCW	11/11/1997	10:00	18.3	
SJRCW	12/9/1997	10:00	16	
SJRCW	1/13/1998	10:20	17	
SJRCW	2/10/1998	10:00	13.4	
SJRCW	3/17/1998	10:35	17.6	
SJRCW	4/14/1998	10:10	21.8	
SJRCW	5/12/1998	13:20	26.2	
SJRCW	6/9/1998	13:20	29.6	
SJRCW	7/14/1998	14:15	31.2	
SJRCW	8/18/1998	9:30	30.6	
SJRCW	9/8/1998	10:45	28.3	
SJRCW	9/8/1998	13:45	29.8	
SJRCW	10/15/1998	14:15	27.7	
SJRCW	11/10/1998	13:30	22.3	
SJRCW	12/15/1998	13:15	20.6	

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
SJRCW	1/12/1999	10:15	13.2	
SJRCW	2/9/1999	10:40	20.5	
SJRCW	3/10/1999	13:20	18.5	
SJRCW	4/27/1999	11:00	26.5	
SJRCW	5/10/1999	11:00	26	
SJRCW	6/7/1999	10:30	28.5	
SJRCW	7/12/1999	13:00	31.3	
SJRCW	8/10/1999	13:15	30.1	
SJRCW	9/28/1999	14:20	29.52	
SJRCW	10/12/1999	14:20	27.65	
SJRCW	11/9/1999	12:00	20.93	
SJRCW	12/6/1999	14:00	17.79	
SJRCW	1/10/2000	14:10	17.92	
SJRCW	2/7/2000	15:30	15.12	
SJRCW	3/6/2000	15:00	21.86	
SJRCW	4/10/2000	11:00	21.17	
SJRCW	5/8/2000	11:25	26.96	
SJRCW	6/12/2000	14:55	29.02	
SJRCW	7/10/2000	10:50	30.18	
SJRCW	8/7/2000	11:00	31.18	
SJRCW	9/11/2000	10:05	26.9	
SJRCW	10/11/2000	15:15	21.58	
SJRCW	11/13/2000	9:50	21.76	
SJRCW	12/14/2000	10:05	18.01	
SJRCW	1/9/2001	11:30	10.97	
SJRCW	2/15/2001	10:10	18.43	
SJRCW	3/15/2001	9:15	19.48	
SJRCW	4/10/2001	8:55	24.27	
SJRCW	5/14/2001	14:10	26.11	
SJRCW	6/11/2001	13:55	31.34	
SJRCW	7/11/2001	12:25	29.34	
SJRCW	8/9/2001	11:40	29.24	
SJRCW	9/11/2001	14:30	29.06	
SJRCW	10/9/2001	12:05	23.38	
SJRCW	11/20/2001	12:55	20.7	
SJRCW	12/5/2001	12:40	22.16	
SJRCW	1/8/2002	12:00	11.54	
SJRCW	2/11/2002	11:25	17.33	
SJRCW	3/11/2002	9:35	19.14	
SJRCW	4/8/2002	12:55	22.91	
SJRCW	5/13/2002	12:00	29.16	
SJRCW	6/10/2002	12:10	29.06	
SJRCW	7/15/2002	12:30	29.68	
SJRCW	8/12/2002	11:35	28.07	
SJRCW	9/12/2002	11:20	28.9	
SJRCW	10/7/2002	12:10	29.92	
SJRCW	11/11/2002	11:40	23.25	
SJRCW	12/9/2002	11:15	15.41	
SJRCW	1/6/2003	11:10	13	
SJRCW	2/11/2003	9:50	14.11	
SJRCW	3/11/2003	13:05	19.8	
SJRCW	3/11/2003	13:05	24.77	
SJRCW	4/14/2003	12:00	22.98	
SJRCW	8/12/2003	12:45	28.66	

Average =	25.1	(°C)
Maximum =	33.5	(°C)
Standard Dev =	5.5	(°C)
95 Percentile =	14.0	(°C)
Count	947.0	

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Station	Date	Time	Temperature (°C)	Remark Code
SJRCW	9/8/2003	12:00	28.04	
SJRCW	10/7/2003	11:35	26.16	
SJRCW	11/12/2003	12:20	22.94	
SJRCW	11/12/2003	12:20	23.27	
SJRCW	11/12/2003	12:20	23.6	
SJRCW	12/10/2003	13:40	17.07	
SJRCW	1/12/2004	13:25	12.34	
SJRCW	1/12/2004	13:25	13.36	
SJRCW	1/12/2004	13:25	13.56	
SJRCW	2/9/2004	12:45	18.11	
SJRM70B	6/7/2000	10:10	28.08	
SJRM70B	6/7/2000	10:10	28.09	
SJRM70B	6/7/2000	10:10	28.1	
SJRM70B	6/14/2000	9:55	29.18	
SJRM70B	6/14/2000	9:55	29.24	
SJRM70B	6/14/2000	9:55	29.3	
SJRM70B	6/21/2000	9:10	29.92	
SJRM70B	6/21/2000	9:10	29.95	
SJRM70B	6/21/2000	9:10	29.98	
SJRM70B	6/28/2000	8:50	29.06	
SJRM70B	6/28/2000	8:50	29.09	
SJRM70B	6/28/2000	8:50	29.11	
SJRM70B	7/5/2000	10:25	28.88	
SJRM70B	7/5/2000	10:25	29.32	
SJRM70B	7/5/2000	10:25	29.77	
SJRM70B	7/12/2000	9:50	29.84	
SJRM70B	7/12/2000	9:50	29.85	
SJRM70B	7/12/2000	9:50	29.86	
SJRM70B	7/19/2000	10:30	29.72	
SJRM70B	7/19/2000	10:30	29.96	
SJRM70B	7/19/2000	10:30	30.19	
SJRM70B	7/26/2000	9:10	28.37	
SJRM70B	7/26/2000	9:10	28.43	
SJRM70B	7/26/2000	9:10	28.49	
SJRM70B	8/2/2000	7:55	30.4	
SJRM70B	8/2/2000	7:55	30.4	
SJRM70B	8/2/2000	7:55	30.41	
SJRM70B	8/23/2000	7:55	29.5	
SJRM70B	8/23/2000	7:55	29.5	
SJRM70B	8/23/2000	7:55	29.51	
SJRM70B	6/6/2001	8:30	29.03	
SJRM70B	6/6/2001	8:30	29.04	
SJRM70B	6/6/2001	8:30	29.04	
SJRM70B	6/27/2001	12:40	29.55	
SJRM70B	6/27/2001	12:40	29.64	
SJRM70B	6/27/2001	12:40	29.74	
SJRM70C	6/7/2000	10:20	28.09	
SJRM70C	6/7/2000	10:20	28.09	
SJRM70C	6/7/2000	10:20	28.09	
SJRM70C	6/14/2000	10:05	29.06	
SJRM70C	6/14/2000	10:05	29.18	
SJRM70C	6/14/2000	10:05	29.3	
SJRM70C	6/21/2000	9:15	29.96	
SJRM70C	6/21/2000	9:15	30.13	

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Station	Date	Time	Temperature (°C)	Remark Code
SJRM70C	6/21/2000	9:15	30.3	
SJRM70C	6/28/2000	9:00	29.03	
SJRM70C	6/28/2000	9:00	29.05	
SJRM70C	6/28/2000	9:00	29.07	
SJRM70C	7/5/2000	10:35	28.8	
SJRM70C	7/5/2000	10:35	29.08	
SJRM70C	7/5/2000	10:35	29.36	
SJRM70C	7/12/2000	10:00	30.05	
SJRM70C	7/12/2000	10:00	30.14	
SJRM70C	7/12/2000	10:00	30.22	
SJRM70C	7/19/2000	10:40	29.94	
SJRM70C	7/19/2000	10:40	29.99	
SJRM70C	7/19/2000	10:40	30.33	
SJRM70C	7/26/2000	9:20	28.43	
SJRM70C	7/26/2000	9:20	28.6	
SJRM70C	7/26/2000	9:20	28.76	
SJRM70C	8/2/2000	8:10	30.2	
SJRM70C	8/2/2000	8:10	30.24	
SJRM70C	8/2/2000	8:10	30.27	
SJRM70C	8/23/2000	8:05	29.43	
SJRM70C	8/23/2000	8:05	29.44	
SJRM70C	8/23/2000	8:05	29.44	
SJRM70C	6/6/2001	8:40	28.99	
SJRM70C	6/6/2001	8:40	29	
SJRM70C	6/6/2001	8:40	29.02	
SJRM70C	6/27/2001	12:50	29.39	
SJRM70C	6/27/2001	12:50	29.6	
SJRM70C	6/27/2001	12:50	29.81	
SJRM70D	6/7/2000	10:35	28.3	
SJRM70D	6/7/2000	10:35	28.3	
SJRM70D	6/7/2000	10:35	28.31	
SJRM70D	6/14/2000	10:15	28.7	
SJRM70D	6/14/2000	10:15	28.81	
SJRM70D	6/14/2000	10:15	28.92	
SJRM70D	6/21/2000	9:25	30.45	
SJRM70D	6/21/2000	9:25	30.56	
SJRM70D	6/21/2000	9:25	30.67	
SJRM70D	6/28/2000	9:10	28.23	
SJRM70D	6/28/2000	9:10	28.31	
SJRM70D	6/28/2000	9:10	28.38	
SJRM70D	7/5/2000	10:45	28.73	
SJRM70D	7/5/2000	10:45	29.18	
SJRM70D	7/12/2000	10:15	29.3	
SJRM70D	7/12/2000	10:15	29.8	
SJRM70D	7/12/2000	10:15	30.3	
SJRM70D	7/19/2000	10:50	30.28	
SJRM70D	7/19/2000	10:50	30.55	
SJRM70D	7/19/2000	10:50	30.82	
SJRM70D	7/26/2000	9:30	28.38	
SJRM70D	7/26/2000	9:30	28.52	
SJRM70D	7/26/2000	9:30	28.65	
SJRM70D	8/2/2000	8:20	29.79	
SJRM70D	8/2/2000	8:20	29.81	
SJRM70D	8/2/2000	8:20	29.83	

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
SJRM70D	8/23/2000	8:15	29.54	
SJRM70D	8/23/2000	8:15	29.54	
SJRM70D	8/23/2000	8:15	29.55	
SJRM70D	6/6/2001	8:50	28.54	
SJRM70D	6/6/2001	8:50	28.62	
SJRM70D	6/6/2001	8:50	28.69	
SJRM70D	6/27/2001	12:55	29.83	
SJRM70D	6/27/2001	12:55	29.92	
SJRM70D	6/27/2001	12:55	30	
SJRM70E	6/7/2000	10:45	28.48	
SJRM70E	6/14/2000	10:25	28.85	
SJRM70E	6/21/2000	9:40	30.7	
SJRM70E	6/28/2000	9:20	28	
SJRM70E	7/5/2000	10:55	29.42	
SJRM70E	7/12/2000	10:30	30.38	
SJRM70E	7/19/2000	11:00	31.01	
SJRM70E	7/26/2000	9:45	28.26	
SJRM70E	8/2/2000	8:30	29.74	
SJRM70E	8/23/2000	8:25	29.43	
SJRM70E	8/23/2000	8:25	29.43	
SJRM70E	8/23/2000	8:25	29.43	
SJRM70E	6/6/2001	9:05	28.63	
SJRM70E	6/27/2001	13:05	30.53	
SJRM70W	6/7/2000	10:00	27.72	
SJRM70W	6/14/2000	9:45	29.1	
SJRM70W	6/21/2000	9:00	29.77	
SJRM70W	6/28/2000	8:40	28.66	
SJRM70W	7/5/2000	10:10	29.4	
SJRM70W	7/12/2000	9:45	29.99	
SJRM70W	7/19/2000	10:20	30.2	
SJRM70W	7/26/2000	8:55	27.94	
SJRM70W	8/2/2000	7:35	30.4	
SJRM70W	8/23/2000	7:35	28.62	
SJRM70W	6/6/2001	8:10	28.83	
SJRM70W	6/27/2001	12:30	30.26	
SJRM74B	6/7/2000	9:20	28.43	
SJRM74B	6/7/2000	9:20	28.44	
SJRM74B	6/7/2000	9:20	28.44	
SJRM74B	6/14/2000	9:15	29.14	
SJRM74B	6/14/2000	9:15	29.25	
SJRM74B	6/14/2000	9:15	29.36	
SJRM74B	6/21/2000	8:30	30.71	
SJRM74B	6/21/2000	8:30	30.73	
SJRM74B	6/21/2000	8:30	30.75	
SJRM74B	6/28/2000	8:15	28.21	
SJRM74B	7/5/2000	9:35	28.91	
SJRM74B	7/5/2000	9:35	29.08	
SJRM74B	7/5/2000	9:35	29.26	
SJRM74B	7/12/2000	9:10	29.83	
SJRM74B	7/12/2000	9:10	29.92	
SJRM74B	7/12/2000	9:10	30.01	
SJRM74B	7/19/2000	9:45	29.77	
SJRM74B	7/19/2000	9:45	29.95	
SJRM74B	7/19/2000	9:45	30.13	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
SJRM74B	7/26/2000	8:25	28.55	
SJRM74B	7/26/2000	8:25	28.58	
SJRM74B	7/26/2000	8:25	28.6	
SJRM74C	6/7/2000	9:10	28.03	
SJRM74C	6/7/2000	9:10	28.03	
SJRM74C	6/7/2000	9:10	28.03	
SJRM74C	6/14/2000	9:00	28.8	
SJRM74C	6/14/2000	9:00	28.82	
SJRM74C	6/14/2000	9:00	28.84	
SJRM74C	6/21/2000	8:20	30.63	
SJRM74C	6/21/2000	8:20	30.64	
SJRM74C	6/21/2000	8:20	30.65	
SJRM74C	6/28/2000	8:00	28.52	
SJRM74C	6/28/2000	8:00	28.53	
SJRM74C	6/28/2000	8:00	28.54	
SJRM74C	6/28/2000	8:15	28.2	
SJRM74C	6/28/2000	8:15	28.21	
SJRM74C	7/5/2000	9:15	28.86	
SJRM74C	7/5/2000	9:15	29.18	
SJRM74C	7/5/2000	9:25	29.02	
SJRM74C	7/12/2000	9:00	29.7	
SJRM74C	7/12/2000	9:00	29.72	
SJRM74C	7/12/2000	9:00	29.73	
SJRM74C	7/19/2000	9:30	29.55	
SJRM74C	7/19/2000	9:30	29.81	
SJRM74C	7/19/2000	9:30	30.07	
SJRM74C	7/26/2000	8:10	28.1	
SJRM74C	7/26/2000	8:10	28.1	
SJRM74C	7/26/2000	8:10	28.1	
SJRM74D	6/7/2000	9:00	27.98	
SJRM74D	6/7/2000	9:00	27.98	
SJRM74D	6/7/2000	9:00	27.98	
SJRM74D	6/14/2000	8:50	28.62	
SJRM74D	6/14/2000	8:50	28.64	
SJRM74D	6/14/2000	8:50	28.67	
SJRM74D	6/21/2000	8:05	30.51	
SJRM74D	6/21/2000	8:05	30.52	
SJRM74D	6/21/2000	8:05	30.52	
SJRM74D	6/28/2000	7:55	28.49	
SJRM74D	6/28/2000	7:55	28.49	
SJRM74D	6/28/2000	7:55	28.49	
SJRM74D	7/5/2000	9:15	29.03	
SJRM74D	7/5/2000	9:15	29.2	
SJRM74D	7/5/2000	9:15	29.38	
SJRM74D	7/12/2000	8:50	29.82	
SJRM74D	7/12/2000	8:50	29.84	
SJRM74D	7/12/2000	8:50	29.86	
SJRM74D	7/19/2000	9:15	29.53	
SJRM74D	7/19/2000	9:15	29.55	
SJRM74D	7/19/2000	9:15	29.57	
SJRM74D	7/26/2000	7:55	28.12	
SJRM74D	7/26/2000	7:55	28.12	
SJRM74D	7/26/2000	7:55	28.13	
SJRM74E	6/7/2000	8:45	27.49	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Ambient Temperature Data in St. Johns River near SECI Palatka Plant

Station	Date	Time	Temperature (°C)	Remark Code
SJRM74E	6/14/2000	8:40	28.2	
SJRM74E	6/14/2000	8:40	28.25	
SJRM74E	6/14/2000	8:40	28.3	
SJRM74E	6/21/2000	7:50	29.76	
SJRM74E	6/21/2000	7:50	29.84	
SJRM74E	6/21/2000	7:50	29.92	
SJRM74E	6/28/2000	7:40	27.88	
SJRM74E	6/28/2000	7:40	27.97	
SJRM74E	6/28/2000	7:40	28.05	
SJRM74E	7/5/2000	9:05	28.73	
SJRM74E	7/5/2000	9:05	28.84	
SJRM74E	7/5/2000	9:05	28.96	
SJRM74E	7/12/2000	8:40	29.76	
SJRM74E	7/12/2000	8:40	29.79	
SJRM74E	7/12/2000	8:40	29.81	
SJRM74E	7/19/2000	9:00	29.45	
SJRM74E	7/19/2000	9:00	29.46	
SJRM74E	7/19/2000	9:00	29.47	
SJRM74E	7/26/2000	7:30	28.24	
SJRM74W	6/7/2000	9:30	28.25	
SJRM74W	6/14/2000	9:25	30.12	
SJRM74W	6/21/2000	8:35	30.58	
SJRM74W	6/21/2000	8:35	30.59	
SJRM74W	6/21/2000	8:35	30.6	
SJRM74W	6/28/2000	8:20	28.51	
SJRM74W	7/5/2000	9:45	29.45	
SJRM74W	7/12/2000	9:20	30.31	
SJRM74W	7/19/2000	9:55	30.4	
SJRM74W	7/26/2000	8:35	28.57	

Average =	25.1 (°C)
Maximum =	33.5 (°C)
Standard Dev =	5.5 (°C)
95 Percentile =	14.0 (°C)
Count	947.0

Note: If non-detect was reported, half of the detection limit or half of the water quality standard was used, whichever was less. If all samples are non-detect then the constitutent is assumed absent.

10.1.2

ATTACHMENT C

CORMIX1 PREDICTION FILE

```
CORMIX1 PREDICTION FILE:
11111111111111111111111111111111111111111111111111111111111111111111111111
                      CORNELL MIXING ZONE EXPERT SYSTEM
Subsystem CORMIX1:                                       Subsystem version:
 Submerged Single Port Discharges           CORMIX-GI Version 4.03b
---------------------------------------------------------------------------
---------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:          SECI SGS Outfall D-001
 Design case:              8.598 mgd, High Ebb Current 16 in discharge
 FILE NAME:                C:\Documents and Settings\mfeldmeyer\Desktop\Cormi
 Time of Fortran run:      02/03/2006--15:02:03

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS     =   1829.00  AS     =   5578.45  QA     =    374.07  ICHREG= 2
 HA     =      3.05  HD     =      2.14
 UA     =      .067  F      =      .063  USTAR = .5930E-02
 UW     =     2.000  UWSTAR= .2198E-02
 Uniform density environment
 STRCND=  U          RHOAM =  997.5800

DISCHARGE PARAMETERS (metric units)
 BANK  =  LEFT       DISTB =    274.30
 D0    =       .406  A0    =       .130  H0    =        .18
 THETA =      20.00  SIGMA =    290.00
 U0    =      2.904  Q0    =       .377        = .3767E+00
 RHO0  =  995.0961   DRHO0 = .2484E+01  GP0   = .2442E-01
 C0    = .1000E+03   CUNITS=  mg/l
 IPOLL =  1          KS    = .0000E+00  KD    = .0000E+00

FLUX VARIABLES (metric units)
 Q0    = .3767E+00  M0    = .1094E+01  J0    = .9198E-02  SIGNJ0=      1.0
 Associated length scales (meters)
 LQ    =       .36  LM    =     11.15  Lm    =     15.60  Lb    =     30.51
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =     29.15  R     =     43.31

FLOW CLASSIFICATION
 111111111111111111111111111111111111111111
 1  Flow class (CORMIX1)       =    H5-90  1
 1  Applicable layer depth HS =     2.14  1
 111111111111111111111111111111111111111111

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    = .1000E+03  CUNITS=  mg/l
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =  18290.00  XMAX  =  18290.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and below the center of the port:
       274.30 m  from the LEFT  bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP = 50 display intervals per module
---------------------------------------------------------------------------
---------------------------------------------------------------------------
BEGIN MOD101: DISCHARGE MODULE
```

COANDA ATTACHMENT immediately following the discharge.

X	Y	Z	S	C	B
.00	.00	.00	1.0	.100E+03	.29

END OF MOD101: DISCHARGE MODULE

BEGIN CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

Bottom-attached jet motion.

Profile definitions:
B = Gaussian 1/e (37%) half-width, normal to trajectory
Half wall jet, attached to bottom.
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	B
.00	.00	.00	1.0	.100E+03	.21
.10	-.28	.00	1.0	.100E+03	.24
.21	-.56	.00	1.0	.100E+03	.27
.32	-.86	.00	1.0	.100E+03	.31
.43	-1.14	.00	1.0	.996E+02	.34
.54	-1.44	.00	1.1	.899E+02	.38
.65	-1.72	.00	1.2	.823E+02	.41
.76	-2.00	.00	1.3	.759E+02	.45
.88	-2.30	.00	1.4	.700E+02	.49
.99	-2.58	.00	1.5	.653E+02	.52
1.11	-2.87	.00	1.6	.608E+02	.56
1.23	-3.15	.00	1.7	.572E+02	.59
1.35	-3.45	.00	1.9	.537E+02	.63
1.47	-3.72	.00	2.0	.508E+02	.67
1.59	-4.00	.00	2.1	.481E+02	.70
1.71	-4.29	.00	2.2	.456E+02	.74
1.84	-4.57	.00	2.3	.434E+02	.78
1.97	-4.86	.00	2.4	.413E+02	.82
2.09	-5.13	.00	2.5	.395E+02	.85
2.22	-5.42	.00	2.7	.377E+02	.89
2.35	-5.70	.00	2.8	.362E+02	.93
2.48	-5.97	.00	2.9	.348E+02	.96
2.61	-6.26	.00	3.0	.333E+02	1.00
2.74	-6.53	.00	3.1	.321E+02	1.04
2.88	-6.82	.00	3.2	.309E+02	1.08
3.02	-7.08	.00	3.4	.298E+02	1.12
3.16	-7.37	.00	3.5	.287E+02	1.16
3.30	-7.64	.00	3.6	.278E+02	1.20
3.43	-7.91	.00	3.7	.269E+02	1.23
3.58	-8.19	.00	3.8	.260E+02	1.28
3.72	-8.46	.00	4.0	.252E+02	1.31
3.87	-8.74	.00	4.1	.244E+02	1.35
4.01	-9.00	.00	4.2	.237E+02	1.39
4.16	-9.29	.00	4.4	.229E+02	1.43
4.31	-9.55	.00	4.5	.223E+02	1.47
4.46	-9.81	.00	4.6	.217E+02	1.51
4.61	-10.09	.00	4.8	.210E+02	1.56
4.76	-10.35	.00	4.9	.205E+02	1.59
4.92	-10.63	.00	5.0	.199E+02	1.64
5.07	-10.88	.00	5.2	.194E+02	1.68
5.24	-11.16	.00	5.3	.189E+02	1.72

```
     5.39    -11.42      .00      5.4  .184E+02   1.76
     5.55    -11.67      .00      5.6  .180E+02   1.80
     5.72    -11.95      .00      5.7  .175E+02   1.84
     5.88    -12.20      .00      5.8  .171E+02   1.88
     6.05    -12.47      .00      6.0  .167E+02   1.93
     6.21    -12.72      .00      6.1  .163E+02   1.97
     6.38    -12.99      .00      6.3  .159E+02   2.01
     6.55    -13.24      .00      6.4  .156E+02   2.06
     6.71    -13.49      .00      6.6  .152E+02   2.10
     6.89    -13.76      .00      6.7  .149E+02   2.14
 Cumulative travel time =          15. sec

END OF CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
BEGIN MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

  Control volume inflow:
       X         Y         Z         S        C        B
     6.89    -13.76      .00      6.7  .149E+02   2.14

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)

       X         Y         Z         S        C        BV       BH        ZU        ZL
     4.75    -15.53     2.14      6.7  .149E+02    .00       .00      2.14      2.14
     5.09    -15.53     2.14      6.7  .149E+02   2.14       .56      2.14       .00
     5.42    -15.53     2.14      6.7  .149E+02   2.14       .79      2.14       .00
     5.75    -15.53     2.14      6.7  .149E+02   2.14       .97      2.14       .00
     6.09    -15.53     2.14      6.7  .149E+02   2.14      1.12      2.14       .00
     6.42    -15.53     2.14      6.7  .149E+02   2.14      1.25      2.14       .00
     6.76    -15.53     2.14      6.7  .149E+02   2.14      1.37      2.14       .00
     7.09    -15.53     2.14      7.0  .143E+02   2.14      1.48      2.14       .00
     7.42    -15.53     2.14      8.2  .122E+02   2.14      1.59      2.14       .00
     7.76    -15.53     2.14      9.1  .110E+02   2.14      1.68      2.14       .00
     8.09    -15.53     2.14      9.4  .106E+02   2.14      1.77      2.14       .00
 Cumulative travel time =          27. sec

END OF MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
BEGIN MOD154: VERTICALLY MIXED PLUME IN WEAK CROSS-FLOW

 Phase 1: Vertically mixed, Phase 2: Re-stratified

 Phase 1: The plume is VERTICALLY FULLY MIXED over the entire layer depth.
 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = Gaussian 1/e (37%) half-width in horizontal plane normal to trajectory
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)

       X         Y         Z         S        C        BV       BH        ZU        ZL
     8.09    -15.53     2.14      9.4  .106E+02   2.14      1.52      2.14       .00
```

8.57	-16.06	2.14	9.6	.105E+02	2.14	1.56	2.14	.00
9.06	-16.58	2.14	9.7	.103E+02	2.14	1.61	2.14	.00
9.55	-17.10	2.14	9.8	.102E+02	2.14	1.65	2.14	.00
10.05	-17.62	2.14	10.0	.100E+02	2.14	1.70	2.14	.00
10.55	-18.15	2.14	10.1	.988E+01	2.14	1.74	2.14	.00
11.05	-18.67	2.14	10.3	.975E+01	2.14	1.79	2.14	.00
11.56	-19.19	2.14	10.4	.962E+01	2.14	1.83	2.14	.00
12.08	-19.71	2.14	10.5	.950E+01	2.14	1.88	2.14	.00
12.59	-20.24	2.14	10.7	.938E+01	2.14	1.92	2.14	.00
13.11	-20.76	2.14	10.8	.927E+01	2.14	1.97	2.14	.00
13.64	-21.28	2.14	10.9	.916E+01	2.14	2.01	2.14	.00
14.17	-21.80	2.14	11.0	.905E+01	2.14	2.05	2.14	.00
14.70	-22.33	2.14	11.2	.895E+01	2.14	2.10	2.14	.00
15.24	-22.85	2.14	11.3	.885E+01	2.14	2.14	2.14	.00
15.78	-23.37	2.14	11.4	.876E+01	2.14	2.18	2.14	.00
16.32	-23.89	2.14	11.5	.867E+01	2.14	2.23	2.14	.00
16.87	-24.42	2.14	11.7	.858E+01	2.14	2.27	2.14	.00
17.42	-24.94	2.14	11.8	.849E+01	2.14	2.32	2.14	.00
17.98	-25.46	2.14	11.9	.841E+01	2.14	2.36	2.14	.00
18.54	-25.98	2.14	12.0	.833E+01	2.14	2.40	2.14	.00
19.10	-26.51	2.14	12.1	.825E+01	2.14	2.45	2.14	.00
19.67	-27.03	2.14	12.2	.817E+01	2.14	2.49	2.14	.00
20.24	-27.55	2.14	12.4	.809E+01	2.14	2.53	2.14	.00
20.81	-28.08	2.14	12.5	.802E+01	2.14	2.57	2.14	.00
21.39	-28.60	2.14	12.6	.795E+01	2.14	2.62	2.14	.00
21.97	-29.12	2.14	12.7	.788E+01	2.14	2.66	2.14	.00
22.55	-29.64	2.14	12.8	.781E+01	2.14	2.70	2.14	.00
23.14	-30.17	2.14	12.9	.775E+01	2.14	2.75	2.14	.00
23.73	-30.69	2.14	13.0	.768E+01	2.14	2.79	2.14	.00
24.32	-31.21	2.14	13.1	.762E+01	2.14	2.83	2.14	.00
24.92	-31.73	2.14	13.2	.756E+01	2.14	2.87	2.14	.00
25.52	-32.26	2.14	13.3	.750E+01	2.14	2.92	2.14	.00
26.12	-32.78	2.14	13.4	.744E+01	2.14	2.96	2.14	.00
26.73	-33.30	2.14	13.5	.739E+01	2.14	3.00	2.14	.00
27.34	-33.82	2.14	13.6	.733E+01	2.14	3.04	2.14	.00
27.95	-34.35	2.14	13.7	.728E+01	2.14	3.08	2.14	.00
28.56	-34.87	2.14	13.8	.722E+01	2.14	3.13	2.14	.00
29.18	-35.39	2.14	13.9	.717E+01	2.14	3.17	2.14	.00
29.81	-35.91	2.14	14.0	.712E+01	2.14	3.21	2.14	.00
30.43	-36.44	2.14	14.1	.707E+01	2.14	3.25	2.14	.00
31.06	-36.96	2.14	14.2	.702E+01	2.14	3.29	2.14	.00
31.69	-37.48	2.14	14.3	.697E+01	2.14	3.34	2.14	.00
32.32	-38.00	2.14	14.4	.693E+01	2.14	3.38	2.14	.00
32.96	-38.53	2.14	14.5	.688E+01	2.14	3.42	2.14	.00
33.60	-39.05	2.14	14.6	.684E+01	2.14	3.46	2.14	.00
34.24	-39.57	2.14	14.7	.679E+01	2.14	3.50	2.14	.00
34.89	-40.09	2.14	14.8	.675E+01	2.14	3.54	2.14	.00
35.54	-40.62	2.14	14.9	.671E+01	2.14	3.58	2.14	.00
36.19	-41.14	2.14	15.0	.667E+01	2.14	3.63	2.14	.00
36.85	-41.66	2.14	15.1	.662E+01	2.14	3.67	2.14	.00

Cumulative travel time = 417. sec

Entire region is occupied by Phase 1.
Plume does not re-stratify in this flow region.

END OF MOD154: VERTICALLY MIXED PLUME IN WEAK CROSS-FLOW

** End of NEAR-FIELD REGION (NFR) **

The initial plume WIDTH values in the next far-field module will be CORRECTED by a factor 5.40 to conserve the mass flux in the far-field!

The correction factor is quite large because of the small ambient velocity relative to the strong mixing characteristics of the discharge!
This indicates localized RECIRCULATION REGIONS and internal hydraulic JUMPS.
Flow appears highly UNSTEADY and prediction results are UNRELIABLE!

BEGIN MOD141: BUOYANT AMBIENT SPREADING

Profile definitions:
- BV = top-hat thickness, measured vertically
- BH = top-hat half-width, measured horizontally in Y-direction
- ZU = upper plume boundary (Z-coordinate)
- ZL = lower plume boundary (Z-coordinate)
- S = hydrodynamic average (bulk) dilution
- C = average (bulk) concentration (includes reaction effects, if any)

Plume Stage 1 (not bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL
36.85	-41.66	2.14	15.1	.662E+01	2.14	19.79	2.14	.00
61.05	-41.66	2.14	17.2	.581E+01	1.47	32.77	2.14	.67
85.25	-41.66	2.14	18.6	.537E+01	1.20	43.49	2.14	.94
109.44	-41.66	2.14	19.8	.505E+01	1.05	52.96	2.14	1.09
133.64	-41.66	2.14	20.9	.479E+01	.95	61.62	2.14	1.19
157.84	-41.66	2.14	22.0	.455E+01	.88	69.66	2.14	1.26
182.04	-41.66	2.14	23.1	.434E+01	.84	77.24	2.14	1.30
206.24	-41.66	2.14	24.2	.413E+01	.80	84.43	2.14	1.34
230.44	-41.66	2.14	25.4	.393E+01	.78	91.30	2.14	1.36
254.64	-41.66	2.14	26.8	.374E+01	.77	97.90	2.14	1.37
278.84	-41.66	2.14	28.2	.355E+01	.76	104.26	2.14	1.38
303.04	-41.66	2.14	29.7	.337E+01	.75	110.42	2.14	1.39
327.24	-41.66	2.14	31.3	.319E+01	.76	116.39	2.14	1.38
351.44	-41.66	2.14	33.1	.302E+01	.76	122.20	2.14	1.38
375.64	-41.66	2.14	35.0	.286E+01	.77	127.87	2.14	1.37
399.84	-41.66	2.14	37.0	.271E+01	.78	133.40	2.14	1.36
424.04	-41.66	2.14	39.1	.256E+01	.79	138.82	2.14	1.35
448.24	-41.66	2.14	41.4	.242E+01	.81	144.12	2.14	1.33
472.44	-41.66	2.14	43.8	.228E+01	.82	149.33	2.14	1.32
496.64	-41.66	2.14	46.4	.216E+01	.84	154.44	2.14	1.30
520.84	-41.66	2.14	49.1	.204E+01	.86	159.47	2.14	1.28
545.04	-41.66	2.14	52.0	.192E+01	.89	164.42	2.14	1.25
569.24	-41.66	2.14	55.1	.182E+01	.91	169.29	2.14	1.23
593.44	-41.66	2.14	58.3	.172E+01	.94	174.09	2.14	1.20
617.64	-41.66	2.14	61.6	.162E+01	.97	178.83	2.14	1.17
641.84	-41.66	2.14	65.1	.153E+01	1.00	183.51	2.14	1.14
666.04	-41.66	2.14	68.8	.145E+01	1.03	188.13	2.14	1.11
690.24	-41.66	2.14	72.7	.138E+01	1.06	192.70	2.14	1.08
714.44	-41.66	2.14	76.8	.130E+01	1.09	197.21	2.14	1.05
738.64	-41.66	2.14	81.0	.123E+01	1.13	201.68	2.14	1.01
762.84	-41.66	2.14	85.4	.117E+01	1.16	206.10	2.14	.98
787.04	-41.66	2.14	90.0	.111E+01	1.20	210.47	2.14	.94
811.24	-41.66	2.14	94.7	.106E+01	1.24	214.80	2.14	.90
835.44	-41.66	2.14	99.7	.100E+01	1.28	219.09	2.14	.86
859.64	-41.66	2.14	104.8	.954E+00	1.32	223.34	2.14	.82
883.84	-41.66	2.14	110.2	.908E+00	1.36	227.56	2.14	.78
908.04	-41.66	2.14	115.7	.864E+00	1.40	231.74	2.14	.74
932.24	-41.66	2.14	121.4	.824E+00	1.44	235.88	2.14	.70
956.44	-41.66	2.14	127.3	.785E+00	1.49	239.99	2.14	.65
980.64	-41.66	2.14	133.4	.749E+00	1.53	244.06	2.14	.61
1004.84	-41.66	2.14	139.7	.716E+00	1.58	248.11	2.14	.56
1029.04	-41.66	2.14	146.3	.684E+00	1.63	252.13	2.14	.51
1053.24	-41.66	2.14	153.0	.654E+00	1.68	256.11	2.14	.46
1077.44	-41.66	2.14	159.9	.625E+00	1.73	260.07	2.14	.41

1101.64	-41.66	2.14	167.0	.599E+00	1.78	264.00	2.14	.36
1125.84	-41.66	2.14	174.4	.574E+00	1.83	267.91	2.14	.31
1150.04	-41.66	2.14	181.9	.550E+00	1.88	271.78	2.14	.26
1174.24	-41.66	2.14	189.7	.527E+00	1.93	275.64	2.14	.21
1198.44	-41.66	2.14	197.7	.506E+00	1.98	279.47	2.14	.16
1222.64	-41.66	2.14	205.9	.486E+00	2.04	283.27	2.14	.10
1246.84	-41.66	2.14	214.3	.467E+00	2.09	287.05	2.14	.05

Cumulative travel time = 18444. sec

END OF MOD141: BUOYANT AMBIENT SPREADING

Bottom coordinate for FAR-FIELD is determined by average depth, ZFB = -.91m

---

BEGIN MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = .258E-02 m^2/s
Horizontal diffusivity (initial value) = .645E-02 m^2/s

Profile definitions:
BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
= or equal to layer depth, if fully mixed
BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

Plume Stage 1 (not bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL
1246.84	-41.66	2.14	214.3	.467E+00	2.09	287.05	2.14	.05
1587.70	-41.66	2.14	263.0	.380E+00	2.57	287.23	2.14	-.43

Plume interacts with BOTTOM.
The passive diffusion plume becomes VERTICALLY FULLY MIXED within this prediction interval.

1928.56	-41.66	2.14	312.4	.320E+00	3.05	287.41	2.14	-.91
2269.43	-41.66	2.14	312.6	.320E+00	3.05	287.59	2.14	-.91
2610.29	-41.66	2.14	312.8	.320E+00	3.05	287.77	2.14	-.91
2951.15	-41.66	2.14	313.0	.320E+00	3.05	287.95	2.14	-.91
3292.02	-41.66	2.14	313.2	.319E+00	3.05	288.13	2.14	-.91
3632.88	-41.66	2.14	313.4	.319E+00	3.05	288.31	2.14	-.91
3973.74	-41.66	2.14	313.6	.319E+00	3.05	288.48	2.14	-.91
4314.60	-41.66	2.14	313.8	.319E+00	3.05	288.66	2.14	-.91
4655.47	-41.66	2.14	314.0	.319E+00	3.05	288.84	2.14	-.91
4996.33	-41.66	2.14	314.1	.318E+00	3.05	289.02	2.14	-.91
5337.19	-41.66	2.14	314.3	.318E+00	3.05	289.20	2.14	-.91
5678.06	-41.66	2.14	314.5	.318E+00	3.05	289.38	2.14	-.91
6018.92	-41.66	2.14	314.7	.318E+00	3.05	289.55	2.14	-.91
6359.78	-41.66	2.14	314.9	.318E+00	3.05	289.73	2.14	-.91
6700.65	-41.66	2.14	315.1	.317E+00	3.05	289.91	2.14	-.91
7041.51	-41.66	2.14	315.3	.317E+00	3.05	290.09	2.14	-.91
7382.37	-41.66	2.14	315.5	.317E+00	3.05	290.26	2.14	-.91
7723.24	-41.66	2.14	315.7	.317E+00	3.05	290.44	2.14	-.91
8064.10	-41.66	2.14	315.9	.317E+00	3.05	290.62	2.14	-.91
8404.96	-41.66	2.14	316.1	.316E+00	3.05	290.80	2.14	-.91
8745.83	-41.66	2.14	316.3	.316E+00	3.05	290.97	2.14	-.91
9086.69	-41.66	2.14	316.5	.316E+00	3.05	291.15	2.14	-.91
9427.55	-41.66	2.14	316.7	.316E+00	3.05	291.33	2.14	-.91
9768.42	-41.66	2.14	316.8	.316E+00	3.05	291.50	2.14	-.91
10109.28	-41.66	2.14	317.0	.315E+00	3.05	291.68	2.14	-.91
10450.14	-41.66	2.14	317.2	.315E+00	3.05	291.86	2.14	-.91

10791.01	-41.66	2.14	317.4	.315E+00	3.05	292.03	2.14	-.91
11131.87	-41.66	2.14	317.6	.315E+00	3.05	292.21	2.14	-.91
11472.73	-41.66	2.14	317.8	.315E+00	3.05	292.38	2.14	-.91
11813.60	-41.66	2.14	318.0	.314E+00	3.05	292.56	2.14	-.91
12154.46	-41.66	2.14	318.2	.314E+00	3.05	292.74	2.14	-.91
12495.32	-41.66	2.14	318.4	.314E+00	3.05	292.91	2.14	-.91
12836.19	-41.66	2.14	318.6	.314E+00	3.05	293.09	2.14	-.91
13177.05	-41.66	2.14	318.8	.314E+00	3.05	293.26	2.14	-.91
13517.91	-41.66	2.14	319.0	.314E+00	3.05	293.44	2.14	-.91
13858.78	-41.66	2.14	319.1	.313E+00	3.05	293.61	2.14	-.91
14199.64	-41.66	2.14	319.3	.313E+00	3.05	293.79	2.14	-.91
14540.50	-41.66	2.14	319.5	.313E+00	3.05	293.96	2.14	-.91
14881.37	-41.66	2.14	319.7	.313E+00	3.05	294.14	2.14	-.91
15222.23	-41.66	2.14	319.9	.313E+00	3.05	294.31	2.14	-.91
15563.09	-41.66	2.14	320.1	.312E+00	3.05	294.49	2.14	-.91
15903.96	-41.66	2.14	320.3	.312E+00	3.05	294.66	2.14	-.91
16244.82	-41.66	2.14	320.5	.312E+00	3.05	294.84	2.14	-.91
16585.68	-41.66	2.14	320.7	.312E+00	3.05	295.01	2.14	-.91
16926.55	-41.66	2.14	320.9	.312E+00	3.05	295.19	2.14	-.91
17267.41	-41.66	2.14	321.0	.311E+00	3.05	295.36	2.14	-.91
17608.27	-41.66	2.14	321.2	.311E+00	3.05	295.54	2.14	-.91
17949.14	-41.66	2.14	321.4	.311E+00	3.05	295.71	2.14	-.91
18290.00	-41.66	2.14	321.6	.311E+00	3.05	295.88	2.14	-.91

Cumulative travel time = 272351. sec

Simulation limit based on maximum specified distance = 18290.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

CORMIX1: Submerged Single Port Discharges End of Prediction File

11111111111111111111111111111111111111111111111111111111111111111111111111111

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                  CORMIX: CORNELL MIXING ZONE EXPERT SYSTEM
                      CORMIX-GI Version 4.03b
SITE NAME/LABEL:                SECI SGS Outfall D-001
  DESIGN CASE:                  8.598 mgd, High Ebb Current 16 in discharge
  FILE NAME:                    C:\Documents and
Settings\mfeldmeyer\Desktop\Cormix Unit 3\HiEbb-AADF16.prd
Using subsystem CORMIX1:        Submerged Single Port Discharges
  Start of session:             02/03/2006--15:02:03
*****************************************************************************
SUMMARY OF INPUT DATA:
-----------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                           = bounded
  Width                         BS        = 1829 m
  Channel regularity            ICHREG    = 2
  Ambient flowrate              QA        = 374.07 m^3/s
  Average depth                 HA        = 3.05 m
  Depth at discharge            HD        = 2.14 m
  Ambient velocity              UA        = 0.0671 m/s
  Darcy-Weisbach friction factor F        = 0.0626
    Calculated from Manning's n           = 0.034
  Wind velocity                 UW        = 2 m/s
Stratification Type             STRCND    = U
  Surface density               RHOAS     = 997.5800 kg/m^3
  Bottom density                RHOAB     = 997.5800 kg/m^3
-----------------------------------------------------------------------------
DISCHARGE PARAMETERS:           Submerged Single Port Discharge
  Nearest bank                            = left
  Distance to bank              DISTB     = 274.30 m
  Port diameter                 D0        = 0.4064 m
  Port cross-sectional area     A0        = 0.1297 m^2
  Discharge velocity            U0        = 2.90 m/s
  Discharge flowrate            Q0        = 0.376701 m^3/s
  Discharge port height         H0        = 0.18 m
  Vertical discharge angle      THETA     = 20 deg
  Horizontal discharge angle    SIGMA     = 290 deg
  Discharge temperature (freshwater)      = 31.78 degC
    Corresponding density       RHO0      = 995.0960 kg/m^3
  Density difference            DRHO      = 2.4840 kg/m^3
  Buoyant acceleration          GP0       = 0.0244 m/s^2
  Discharge concentration       C0        = 100 mg/l
  Surface heat exchange coeff.  KS        = 0 m/s
  Coefficient of decay          KD        = 0 /s
-----------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  = 0.36 m         Lm  = 15.60 m          Lb  = 30.51 m
  LM  = 11.15 m         Lm' = 99999 m          Lb' = 99999 m
-----------------------------------------------------------------------------
NON-DIMENSIONAL PARAMETERS:
  Port densimetric Froude number FR0      = 29.15
  Velocity ratio                R         = 43.31
-----------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                         = no
  Water quality standard specified        = no
  Regulatory mixing zone                  = no
  Region of interest                      = 18290 m downstream
*****************************************************************************
HYDRODYNAMIC CLASSIFICATION:
```

```
  *------------------------*
  | FLOW CLASS    = H5-90 |
  *------------------------*
  This flow configuration applies to a layer corresponding to the full water
  depth at the discharge site.
  Applicable layer depth = water depth = 2.14 m
*****************************************************************************
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

-----------------------------------------------------------------------------
X-Y-Z Coordinate system:
  Origin is located at the bottom below the port center:
    274.30 m from the left bank/shore.
  Number of display steps NSTEP = 50 per module.
-----------------------------------------------------------------------------
NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no regulatory
  implication.  However, this information may be useful for the discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at edge of NFR = 6.625 mg/l
  Dilution at edge of NFR                  = 15.1
  NFR Location:                          x = 36.85 m
    (centerline coordinates)             y = -41.66 m
                                         z = 2.14 m
  NFR plume dimensions:         half-width = 3.67 m
                                 thickness = 2.14 m
-----------------------------------------------------------------------------
Buoyancy assessment:
  The effluent density is less than the surrounding ambient water
  density at the discharge level.
  Therefore, the effluent is POSITIVELY BUOYANT and will tend to rise towards
  the surface.
-----------------------------------------------------------------------------
Near-field instability behavior:
  The discharge flow will experience instabilities with full vertical mixing
  in the near-field.
  There may be benthic impact of high pollutant concentrations.
-----------------------------------------------------------------------------
FAR-FIELD MIXING SUMMARY:
  Plume is vertically fully mixed WITHIN NEAR-FIELD (or a fraction thereof),
  but RE-STRATIFIES LATER.
  Plume becomes vertically fully mixed again at 1928.56 m downstream.
-----------------------------------------------------------------------------
PLUME BANK CONTACT SUMMARY:
  Plume in bounded section does not contact bank.
************************ TOXIC DILUTION ZONE SUMMARY ************************
No TDZ was specified for this simulation.
********************** REGULATORY MIXING ZONE SUMMARY **********************
No RMZ and no ambient water quality standard have been specified.
********************* FINAL DESIGN ADVICE AND COMMENTS *********************
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any known
  technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the
  CORMIX predictions on dilutions and concentrations (with associated
  plume geometries) are reliable for the majority of cases and are accurate
  to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges
  the design configuration as highly complex and uncertain for prediction.
```

```
CORMIX1 PREDICTION FILE:
11111111111111111111111111111111111111111111111111111111111111111111111111111
                      CORNELL MIXING ZONE EXPERT SYSTEM
Subsystem CORMIX1:                                          Subsystem version:
 Submerged Single Port Discharges           CORMIX-GI Version 4.03b
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:          SECI SGS Outfall D-001
 Design case:              8.598 mgd, High Flood Current 16 in discharge
 FILE NAME:                C:\Documents and Settings\mfeldmeyer\Desktop\Cormi
 Time of Fortran run:      02/03/2006--15:02:44

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS     =   1829.00  AS     =   5578.45  QA     =    374.07  ICHREG= 2
 HA     =      3.05  HD     =      2.14
 UA     =      .067  F      =      .063  USTAR = .5930E-02
 UW     =     2.000  UWSTAR= .2198E-02
 Uniform density environment
 STRCND=  U          RHOAM =  997.5800

DISCHARGE PARAMETERS (metric units)
 BANK  =  RIGHT      DISTB =    274.30
 D0    =       .406  A0    =       .130  H0     =       .18
 THETA =     20.00   SIGMA =    110.00
 U0    =      2.904  Q0    =       .377         = .3767E+00
 RHO0  =  995.0961   DRHO0 = .2484E+01  GP0    = .2442E-01
 C0    = .1000E+03   CUNITS=  mg/l
 IPOLL =  1          KS    = .0000E+00  KD     = .0000E+00

FLUX VARIABLES (metric units)
 Q0    = .3767E+00  M0    = .1094E+01  J0     = .9198E-02  SIGNJ0=      1.0
 Associated length scales (meters)
 LQ    =       .36  LM    =     11.15  Lm     =     15.60  Lb     =     30.51
                                       Lmp    =  99999.00  Lbp    =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =     29.15  R     =     43.31

FLOW CLASSIFICATION
 111111111111111111111111111111111111111111
 1  Flow class (CORMIX1)       =    H5-90  1
 1  Applicable layer depth HS =     2.14  1
 111111111111111111111111111111111111111111

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    = .1000E+03  CUNITS=  mg/l
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =  18290.00  XMAX  =  18290.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and below the center of the port:
       274.30 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP = 50 display intervals per module
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
BEGIN MOD101: DISCHARGE MODULE
```

COANDA ATTACHMENT immediately following the discharge.

X	Y	Z	S	C	B
.00	.00	.00	1.0	.100E+03	.29

END OF MOD101: DISCHARGE MODULE

BEGIN CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

Bottom-attached jet motion.

Profile definitions:
B = Gaussian 1/e (37%) half-width, normal to trajectory
Half wall jet, attached to bottom.
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	B
.00	.00	.00	1.0	.100E+03	.21
-.12	.34	.00	1.0	.100E+03	.24
-.25	.70	.00	1.0	.100E+03	.29
-.38	1.07	.00	1.0	.100E+03	.33
-.50	1.41	.00	1.1	.948E+02	.37
-.62	1.78	.00	1.2	.854E+02	.41
-.75	2.14	.00	1.3	.777E+02	.45
-.86	2.49	.00	1.4	.717E+02	.48
-.98	2.85	.00	1.5	.663E+02	.52
-1.10	3.22	.00	1.6	.616E+02	.56
-1.20	3.57	.00	1.7	.578E+02	.60
-1.32	3.94	.00	1.8	.543E+02	.64
-1.43	4.31	.00	2.0	.512E+02	.68
-1.53	4.65	.00	2.1	.485E+02	.72
-1.64	5.02	.00	2.2	.461E+02	.76
-1.75	5.39	.00	2.3	.438E+02	.80
-1.84	5.74	.00	2.4	.419E+02	.84
-1.95	6.12	.00	2.5	.401E+02	.87
-2.05	6.49	.00	2.6	.384E+02	.91
-2.14	6.84	.00	2.7	.369E+02	.95
-2.23	7.21	.00	2.8	.355E+02	.99
-2.33	7.59	.00	2.9	.342E+02	1.03
-2.41	7.94	.00	3.0	.330E+02	1.06
-2.50	8.31	.00	3.1	.319E+02	1.10
-2.59	8.69	.00	3.2	.308E+02	1.14
-2.67	9.04	.00	3.3	.299E+02	1.18
-2.75	9.42	.00	3.5	.289E+02	1.22
-2.83	9.80	.00	3.6	.281E+02	1.26
-2.91	10.15	.00	3.7	.273E+02	1.29
-2.98	10.53	.00	3.8	.265E+02	1.33
-3.06	10.91	.00	3.9	.258E+02	1.37
-3.13	11.29	.00	4.0	.251E+02	1.41
-3.19	11.65	.00	4.1	.244E+02	1.44
-3.26	12.03	.00	4.2	.238E+02	1.48
-3.33	12.41	.00	4.3	.232E+02	1.52
-3.38	12.76	.00	4.4	.227E+02	1.56
-3.44	13.14	.00	4.5	.221E+02	1.60
-3.50	13.53	.00	4.6	.216E+02	1.64
-3.55	13.89	.00	4.7	.211E+02	1.67
-3.60	14.27	.00	4.8	.207E+02	1.71
-3.65	14.65	.00	4.9	.202E+02	1.75

-3.69	15.01	.00	5.1	.198E+02	1.79
-3.74	15.39	.00	5.2	.194E+02	1.83
-3.78	15.78	.00	5.3	.190E+02	1.87
-3.82	16.14	.00	5.4	.186E+02	1.90
-3.85	16.52	.00	5.5	.182E+02	1.94
-3.88	16.91	.00	5.6	.178E+02	1.98
-3.91	17.27	.00	5.7	.175E+02	2.02
-3.94	17.65	.00	5.8	.171E+02	2.06
-3.96	18.04	.00	5.9	.168E+02	2.10
-3.98	18.40	.00	6.1	.165E+02	2.14

Cumulative travel time = 19. sec

END OF CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

BEGIN MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

Control volume inflow:

X	Y	Z	S	C	B
-3.98	18.40	.00	6.1	.165E+02	2.14

Profile definitions:
BV = layer depth (vertically mixed)
BH = top-hat half-width, in horizontal plane normal to trajectory
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH	ZU	ZL
-6.12	16.26	2.14	6.1	.165E+02	.00	.00	2.14	2.14
-5.90	16.26	2.14	6.1	.165E+02	2.14	.55	2.14	.00
-5.67	16.26	2.14	6.1	.165E+02	2.14	.78	2.14	.00
-5.45	16.26	2.14	6.1	.165E+02	2.14	.96	2.14	.00
-5.22	16.26	2.14	6.1	.165E+02	2.14	1.10	2.14	.00
-5.00	16.26	2.14	6.1	.165E+02	2.14	1.24	2.14	.00
-4.77	16.26	2.14	6.1	.165E+02	2.14	1.35	2.14	.00
-4.55	16.26	2.14	6.1	.165E+02	2.14	1.46	2.14	.00
-4.32	16.26	2.14	6.1	.165E+02	2.14	1.56	2.14	.00
-4.10	16.26	2.14	6.1	.165E+02	2.14	1.66	2.14	.00
-3.87	16.26	2.14	8.5	.118E+02	2.14	1.75	2.14	.00

Cumulative travel time = 32. sec

END OF MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

BEGIN MOD154: VERTICALLY MIXED PLUME IN WEAK CROSS-FLOW

Phase 1: Vertically mixed, Phase 2: Re-stratified

Phase 1: The plume is VERTICALLY FULLY MIXED over the entire layer depth.
Profile definitions:
BV = layer depth (vertically mixed)
BH = Gaussian 1/e (37%) half-width in horizontal plane normal to trajectory
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH	ZU	ZL
-3.87	16.26	2.14	8.5	.118E+02	2.14	1.28	2.14	.00

-3.79	16.84	2.14	8.7	.116E+02	2.14	1.33	2.14	.00
-3.70	17.42	2.14	8.8	.113E+02	2.14	1.38	2.14	.00
-3.60	18.00	2.14	9.0	.111E+02	2.14	1.43	2.14	.00
-3.49	18.57	2.14	9.2	.109E+02	2.14	1.48	2.14	.00
-3.38	19.15	2.14	9.3	.107E+02	2.14	1.53	2.14	.00
-3.27	19.73	2.14	9.5	.105E+02	2.14	1.58	2.14	.00
-3.15	20.31	2.14	9.6	.104E+02	2.14	1.63	2.14	.00
-3.02	20.88	2.14	9.8	.102E+02	2.14	1.68	2.14	.00
-2.89	21.46	2.14	9.9	.101E+02	2.14	1.73	2.14	.00
-2.76	22.04	2.14	10.1	.991E+01	2.14	1.78	2.14	.00
-2.62	22.62	2.14	10.2	.977E+01	2.14	1.82	2.14	.00
-2.47	23.19	2.14	10.4	.963E+01	2.14	1.87	2.14	.00
-2.32	23.77	2.14	10.5	.950E+01	2.14	1.92	2.14	.00
-2.16	24.35	2.14	10.7	.937E+01	2.14	1.97	2.14	.00
-2.00	24.93	2.14	10.8	.925E+01	2.14	2.02	2.14	.00
-1.83	25.50	2.14	10.9	.914E+01	2.14	2.07	2.14	.00
-1.66	26.08	2.14	11.1	.902E+01	2.14	2.12	2.14	.00
-1.49	26.66	2.14	11.2	.892E+01	2.14	2.16	2.14	.00
-1.31	27.24	2.14	11.3	.881E+01	2.14	2.21	2.14	.00
-1.12	27.81	2.14	11.5	.871E+01	2.14	2.26	2.14	.00
-.93	28.39	2.14	11.6	.861E+01	2.14	2.31	2.14	.00
-.74	28.97	2.14	11.7	.852E+01	2.14	2.36	2.14	.00
-.54	29.55	2.14	11.9	.843E+01	2.14	2.40	2.14	.00
-.34	30.12	2.14	12.0	.834E+01	2.14	2.45	2.14	.00
-.13	30.70	2.14	12.1	.825E+01	2.14	2.50	2.14	.00
.08	31.28	2.14	12.2	.817E+01	2.14	2.55	2.14	.00
.29	31.86	2.14	12.4	.809E+01	2.14	2.59	2.14	.00
.51	32.43	2.14	12.5	.801E+01	2.14	2.64	2.14	.00
.73	33.01	2.14	12.6	.794E+01	2.14	2.69	2.14	.00
.96	33.59	2.14	12.7	.786E+01	2.14	2.74	2.14	.00
1.19	34.17	2.14	12.8	.779E+01	2.14	2.78	2.14	.00
1.43	34.74	2.14	13.0	.772E+01	2.14	2.83	2.14	.00
1.67	35.32	2.14	13.1	.765E+01	2.14	2.88	2.14	.00
1.91	35.90	2.14	13.2	.759E+01	2.14	2.92	2.14	.00
2.16	36.48	2.14	13.3	.752E+01	2.14	2.97	2.14	.00
2.41	37.05	2.14	13.4	.746E+01	2.14	3.02	2.14	.00
2.67	37.63	2.14	13.5	.740E+01	2.14	3.06	2.14	.00
2.93	38.21	2.14	13.6	.734E+01	2.14	3.11	2.14	.00
3.19	38.79	2.14	13.7	.728E+01	2.14	3.15	2.14	.00
3.46	39.36	2.14	13.8	.722E+01	2.14	3.20	2.14	.00
3.73	39.94	2.14	14.0	.717E+01	2.14	3.25	2.14	.00
4.00	40.52	2.14	14.1	.711E+01	2.14	3.29	2.14	.00
4.28	41.10	2.14	14.2	.706E+01	2.14	3.34	2.14	.00
4.56	41.67	2.14	14.3	.701E+01	2.14	3.38	2.14	.00
4.84	42.25	2.14	14.4	.696E+01	2.14	3.43	2.14	.00
5.13	42.83	2.14	14.5	.691E+01	2.14	3.48	2.14	.00
5.43	43.41	2.14	14.6	.686E+01	2.14	3.52	2.14	.00
5.72	43.98	2.14	14.7	.681E+01	2.14	3.57	2.14	.00
6.02	44.56	2.14	14.8	.676E+01	2.14	3.61	2.14	.00
6.32	45.14	2.14	14.9	.672E+01	2.14	3.66	2.14	.00

Cumulative travel time = 452. sec

Entire region is occupied by Phase 1.
Plume does not re-stratify in this flow region.

END OF MOD154: VERTICALLY MIXED PLUME IN WEAK CROSS-FLOW

** End of NEAR-FIELD REGION (NFR) **

The initial plume WIDTH values in the next far-field module will be CORRECTED by a factor 5.34 to conserve the mass flux in the far-field!

The correction factor is quite large because of the small ambient velocity
relative to the strong mixing characteristics of the discharge!
This indicates localized RECIRCULATION REGIONS and internal hydraulic JUMPS.
Flow appears highly UNSTEADY and prediction results are UNRELIABLE!

BEGIN MOD141: BUOYANT AMBIENT SPREADING

Profile definitions:
BV = top-hat thickness, measured vertically
BH = top-hat half-width, measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)

Plume Stage 1 (not bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL
6.32	45.14	2.14	14.9	.672E+01	2.14	19.52	2.14	.00
30.14	45.14	2.14	17.0	.589E+01	1.47	32.38	2.14	.67
53.95	45.14	2.14	18.4	.545E+01	1.20	42.98	2.14	.94
77.76	45.14	2.14	19.5	.512E+01	1.05	52.36	2.14	1.09
101.57	45.14	2.14	20.6	.486E+01	.95	60.93	2.14	1.19
125.39	45.14	2.14	21.6	.462E+01	.88	68.89	2.14	1.26
149.20	45.14	2.14	22.7	.440E+01	.83	76.39	2.14	1.31
173.01	45.14	2.14	23.8	.419E+01	.80	83.50	2.14	1.34
196.83	45.14	2.14	25.0	.399E+01	.78	90.30	2.14	1.36
220.64	45.14	2.14	26.3	.380E+01	.76	96.83	2.14	1.38
244.45	45.14	2.14	27.7	.361E+01	.75	103.13	2.14	1.39
268.26	45.14	2.14	29.1	.343E+01	.75	109.22	2.14	1.39
292.08	45.14	2.14	30.7	.325E+01	.75	115.13	2.14	1.39
315.89	45.14	2.14	32.4	.308E+01	.75	120.88	2.14	1.39
339.70	45.14	2.14	34.2	.292E+01	.76	126.49	2.14	1.38
363.51	45.14	2.14	36.2	.276E+01	.77	131.97	2.14	1.37
387.33	45.14	2.14	38.3	.261E+01	.78	137.32	2.14	1.36
411.14	45.14	2.14	40.5	.247E+01	.80	142.57	2.14	1.34
434.95	45.14	2.14	42.8	.234E+01	.81	147.72	2.14	1.33
458.76	45.14	2.14	45.3	.221E+01	.83	152.78	2.14	1.31
482.58	45.14	2.14	47.9	.209E+01	.85	157.75	2.14	1.29
506.39	45.14	2.14	50.7	.197E+01	.87	162.65	2.14	1.27
530.20	45.14	2.14	53.6	.186E+01	.90	167.47	2.14	1.24
554.02	45.14	2.14	56.7	.176E+01	.92	172.22	2.14	1.22
577.83	45.14	2.14	60.0	.167E+01	.95	176.91	2.14	1.19
601.64	45.14	2.14	63.4	.158E+01	.98	181.53	2.14	1.16
625.45	45.14	2.14	66.9	.149E+01	1.01	186.10	2.14	1.13
649.27	45.14	2.14	70.7	.142E+01	1.04	190.62	2.14	1.10
673.08	45.14	2.14	74.6	.134E+01	1.07	195.08	2.14	1.07
696.89	45.14	2.14	78.6	.127E+01	1.11	199.50	2.14	1.03
720.70	45.14	2.14	82.9	.121E+01	1.14	203.87	2.14	1.00
744.52	45.14	2.14	87.3	.115E+01	1.18	208.19	2.14	.96
768.33	45.14	2.14	91.9	.109E+01	1.21	212.48	2.14	.93
792.14	45.14	2.14	96.7	.103E+01	1.25	216.72	2.14	.89
815.96	45.14	2.14	101.6	.984E+00	1.29	220.92	2.14	.85
839.77	45.14	2.14	106.7	.937E+00	1.33	225.09	2.14	.81
863.58	45.14	2.14	112.1	.892E+00	1.37	229.22	2.14	.77
887.39	45.14	2.14	117.6	.851E+00	1.41	233.32	2.14	.73
911.21	45.14	2.14	123.3	.811E+00	1.46	237.38	2.14	.68
935.02	45.14	2.14	129.2	.774E+00	1.50	241.42	2.14	.64
958.83	45.14	2.14	135.2	.739E+00	1.55	245.42	2.14	.59
982.64	45.14	2.14	141.5	.707E+00	1.59	249.39	2.14	.55
1006.46	45.14	2.14	148.0	.676E+00	1.64	253.33	2.14	.50
1030.27	45.14	2.14	154.7	.647E+00	1.69	257.24	2.14	.45

1054.08	45.14	2.14	161.5	.619E+00	1.74	261.13	2.14	.40
1077.89	45.14	2.14	168.6	.593E+00	1.79	264.99	2.14	.35
1101.71	45.14	2.14	175.9	.569E+00	1.84	268.83	2.14	.30
1125.52	45.14	2.14	183.3	.545E+00	1.89	272.64	2.14	.25
1149.33	45.14	2.14	191.0	.523E+00	1.94	276.42	2.14	.20
1173.15	45.14	2.14	198.9	.503E+00	1.99	280.19	2.14	.15
1196.96	45.14	2.14	207.0	.483E+00	2.05	283.93	2.14	.09

Cumulative travel time = 18190. sec

END OF MOD141: BUOYANT AMBIENT SPREADING

Bottom coordinate for FAR-FIELD is determined by average depth, ZFB = -.91m

---

BEGIN MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = .258E-02 m^2/s
Horizontal diffusivity (initial value) = .645E-02 m^2/s

Profile definitions:
BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
= or equal to layer depth, if fully mixed
BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

Plume Stage 1 (not bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL
1196.96	45.14	2.14	207.0	.483E+00	2.05	283.93	2.14	.09
1538.82	45.14	2.14	252.8	.396E+00	2.50	284.11	2.14	-.36

Plume interacts with BOTTOM.
The passive diffusion plume becomes VERTICALLY FULLY MIXED within this prediction interval.

1880.68	45.14	2.14	309.0	.324E+00	3.05	284.29	2.14	-.91
2222.54	45.14	2.14	309.2	.323E+00	3.05	284.47	2.14	-.91
2564.40	45.14	2.14	309.4	.323E+00	3.05	284.65	2.14	-.91
2906.26	45.14	2.14	309.6	.323E+00	3.05	284.83	2.14	-.91
3248.12	45.14	2.14	309.8	.323E+00	3.05	285.01	2.14	-.91
3589.98	45.14	2.14	310.0	.323E+00	3.05	285.20	2.14	-.91
3931.84	45.14	2.14	310.2	.322E+00	3.05	285.38	2.14	-.91
4273.71	45.14	2.14	310.4	.322E+00	3.05	285.56	2.14	-.91
4615.57	45.14	2.14	310.6	.322E+00	3.05	285.74	2.14	-.91
4957.43	45.14	2.14	310.8	.322E+00	3.05	285.92	2.14	-.91
5299.29	45.14	2.14	311.0	.322E+00	3.05	286.10	2.14	-.91
5641.15	45.14	2.14	311.2	.321E+00	3.05	286.28	2.14	-.91
5983.01	45.14	2.14	311.4	.321E+00	3.05	286.46	2.14	-.91
6324.87	45.14	2.14	311.6	.321E+00	3.05	286.64	2.14	-.91
6666.73	45.14	2.14	311.8	.321E+00	3.05	286.82	2.14	-.91
7008.59	45.14	2.14	312.0	.321E+00	3.05	287.00	2.14	-.91
7350.45	45.14	2.14	312.1	.320E+00	3.05	287.18	2.14	-.91
7692.31	45.14	2.14	312.3	.320E+00	3.05	287.36	2.14	-.91
8034.17	45.14	2.14	312.5	.320E+00	3.05	287.54	2.14	-.91
8376.04	45.14	2.14	312.7	.320E+00	3.05	287.72	2.14	-.91
8717.90	45.14	2.14	312.9	.320E+00	3.05	287.90	2.14	-.91
9059.76	45.14	2.14	313.1	.319E+00	3.05	288.08	2.14	-.91
9401.62	45.14	2.14	313.3	.319E+00	3.05	288.26	2.14	-.91
9743.48	45.14	2.14	313.5	.319E+00	3.05	288.44	2.14	-.91
10085.34	45.14	2.14	313.7	.319E+00	3.05	288.61	2.14	-.91
10427.20	45.14	2.14	313.9	.319E+00	3.05	288.79	2.14	-.91

10769.06	45.14	2.14	314.1	.318E+00	3.05	288.97	2.14	-.91
11110.93	45.14	2.14	314.3	.318E+00	3.05	289.15	2.14	-.91
11452.79	45.14	2.14	314.5	.318E+00	3.05	289.33	2.14	-.91
11794.65	45.14	2.14	314.7	.318E+00	3.05	289.51	2.14	-.91
12136.51	45.14	2.14	314.9	.318E+00	3.05	289.69	2.14	-.91
12478.37	45.14	2.14	315.1	.317E+00	3.05	289.86	2.14	-.91
12820.23	45.14	2.14	315.3	.317E+00	3.05	290.04	2.14	-.91
13162.09	45.14	2.14	315.5	.317E+00	3.05	290.22	2.14	-.91
13503.96	45.14	2.14	315.6	.317E+00	3.05	290.40	2.14	-.91
13845.82	45.14	2.14	315.8	.317E+00	3.05	290.58	2.14	-.91
14187.68	45.14	2.14	316.0	.316E+00	3.05	290.75	2.14	-.91
14529.54	45.14	2.14	316.2	.316E+00	3.05	290.93	2.14	-.91
14871.40	45.14	2.14	316.4	.316E+00	3.05	291.11	2.14	-.91
15213.26	45.14	2.14	316.6	.316E+00	3.05	291.29	2.14	-.91
15555.12	45.14	2.14	316.8	.316E+00	3.05	291.46	2.14	-.91
15896.98	45.14	2.14	317.0	.315E+00	3.05	291.64	2.14	-.91
16238.85	45.14	2.14	317.2	.315E+00	3.05	291.82	2.14	-.91
16580.71	45.14	2.14	317.4	.315E+00	3.05	291.99	2.14	-.91
16922.57	45.14	2.14	317.6	.315E+00	3.05	292.17	2.14	-.91
17264.43	45.14	2.14	317.8	.315E+00	3.05	292.35	2.14	-.91
17606.29	45.14	2.14	318.0	.315E+00	3.05	292.52	2.14	-.91
17948.15	45.14	2.14	318.1	.314E+00	3.05	292.70	2.14	-.91
18290.01	45.14	2.14	318.3	.314E+00	3.05	292.88	2.14	-.91

Cumulative travel time = 272841. sec

Simulation limit based on maximum specified distance = 18290.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

CORMIX1: Submerged Single Port Discharges End of Prediction File

11111111111111111111111111111111111111111111111111111111111111111111111111111

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                  CORMIX: CORNELL MIXING ZONE EXPERT SYSTEM
                      CORMIX-GI Version 4.03b
SITE NAME/LABEL:                SECI SGS Outfall D-001
  DESIGN CASE:                  8.598 mgd, High Flood Current 16 in discharge
  FILE NAME:                    C:\Documents and
Settings\mfeldmeyer\Desktop\Cormix Unit 3\HiFlood-AADF16.prd
Using subsystem CORMIX1:        Submerged Single Port Discharges
  Start of session:             02/03/2006--15:02:44
*****************************************************************************
SUMMARY OF INPUT DATA:
-----------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                              = bounded
  Width                           BS         = 1829 m
  Channel regularity              ICHREG     = 2
  Ambient flowrate                QA         = 374.07 m^3/s
  Average depth                   HA         = 3.05 m
  Depth at discharge              HD         = 2.14 m
  Ambient velocity                UA         = 0.0671 m/s
  Darcy-Weisbach friction factor  F          = 0.0626
    Calculated from Manning's n              = 0.034
  Wind velocity                   UW         = 2 m/s
Stratification Type               STRCND     = U
  Surface density                 RHOAS      = 997.5800 kg/m^3
  Bottom density                  RHOAB      = 997.5800 kg/m^3
-----------------------------------------------------------------------------
DISCHARGE PARAMETERS:             Submerged Single Port Discharge
  Nearest bank                               = right
  Distance to bank                DISTB      = 274.30 m
  Port diameter                   D0         = 0.4064 m
  Port cross-sectional area       A0         = 0.1297 m^2
  Discharge velocity              U0         = 2.90 m/s
  Discharge flowrate              Q0         = 0.376701 m^3/s
  Discharge port height           H0         = 0.18 m
  Vertical discharge angle        THETA      = 20 deg
  Horizontal discharge angle      SIGMA      = 110 deg
  Discharge temperature (freshwater)         = 31.78 degC
    Corresponding density         RHO0       = 995.0960 kg/m^3
  Density difference              DRHO       = 2.4840 kg/m^3
  Buoyant acceleration            GP0        = 0.0244 m/s^2
  Discharge concentration         C0         = 100 mg/l
  Surface heat exchange coeff.    KS         = 0 m/s
  Coefficient of decay            KD         = 0 /s
-----------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  = 0.36 m          Lm  = 15.60 m          Lb  = 30.51 m
  LM  = 11.15 m          Lm' = 99999 m          Lb' = 99999 m
-----------------------------------------------------------------------------
NON-DIMENSIONAL PARAMETERS:
  Port densimetric Froude number  FR0        = 29.15
  Velocity ratio                  R          = 43.31
-----------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                            = no
  Water quality standard specified           = no
  Regulatory mixing zone                     = no
  Region of interest                         = 18290 m downstream
*****************************************************************************
HYDRODYNAMIC CLASSIFICATION:
```

```
  *-------------------------*
  | FLOW CLASS    = H5-90 |
  *-------------------------*
  This flow configuration applies to a layer corresponding to the full water
  depth at the discharge site.
  Applicable layer depth = water depth = 2.14 m
*****************************************************************************
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

-----------------------------------------------------------------------------
X-Y-Z Coordinate system:
  Origin is located at the bottom below the port center:
    274.30 m from the right bank/shore.
  Number of display steps NSTEP = 50 per module.
-----------------------------------------------------------------------------
NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no regulatory
  implication.  However, this information may be useful for the discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at edge of NFR = 6.7169 mg/l
  Dilution at edge of NFR                = 14.9
  NFR Location:                        x = 6.32 m
    (centerline coordinates)           y = 45.14 m
                                       z = 2.14 m
  NFR plume dimensions:       half-width = 3.66 m
                               thickness = 2.14 m
-----------------------------------------------------------------------------
Buoyancy assessment:
  The effluent density is less than the surrounding ambient water
  density at the discharge level.
  Therefore, the effluent is POSITIVELY BUOYANT and will tend to rise towards
  the surface.
-----------------------------------------------------------------------------
Near-field instability behavior:
  The discharge flow will experience instabilities with full vertical mixing
  in the near-field.
  There may be benthic impact of high pollutant concentrations.
-----------------------------------------------------------------------------
FAR-FIELD MIXING SUMMARY:
  Plume is vertically fully mixed WITHIN NEAR-FIELD (or a fraction thereof),
  but RE-STRATIFIES LATER.
  Plume becomes vertically fully mixed again at 1880.68 m downstream.
-----------------------------------------------------------------------------
PLUME BANK CONTACT SUMMARY:
  Plume in bounded section does not contact bank.
************************ TOXIC DILUTION ZONE SUMMARY ************************
No TDZ was specified for this simulation.
********************** REGULATORY MIXING ZONE SUMMARY ***********************
No RMZ and no ambient water quality standard have been specified.
********************* FINAL DESIGN ADVICE AND COMMENTS **********************
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any known
  technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the
  CORMIX predictions on dilutions and concentrations (with associated
  plume geometries) are reliable for the majority of cases and are accurate
  to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges
  the design configuration as highly complex and uncertain for prediction.
```

```
CORMIX1 PREDICTION FILE:
11111111111111111111111111111111111111111111111111111111111111111111111111111
                      CORNELL MIXING ZONE EXPERT SYSTEM
Subsystem CORMIX1:                                          Subsystem version:
 Submerged Single Port Discharges          CORMIX-GI Version 4.03b
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:          SECI SGS Outfall D-001
 Design case:              8.598 mgd, Low Ebb Current, 16 in discharge
 FILE NAME:                C:\Documents and Settings\mfeldmeyer\Desktop\Cormi
 Time of Fortran run:      02/03/2006--15:03:44

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =   1829.00  AS    =   5578.45  QA    =      25.50  ICHREG= 2
 HA    =      3.05  HD    =      2.14
 UA    =      .005  F     =      .063  USTAR = .4043E-03
 UW    =     2.000  UWSTAR= .2198E-02
 Uniform density environment
 STRCND=  U         RHOAM =  997.5800

DISCHARGE PARAMETERS (metric units)
 BANK  =  LEFT      DISTB =    274.30
 D0    =      .406  A0    =      .130  H0    =       .18
 THETA =     20.00  SIGMA =    290.00
 U0    =     2.904  Q0    =      .377        = .3767E+00
 RHO0  =  995.0961  DRHO0 = .2484E+01  GP0   = .2442E-01
 C0    = .1000E+03  CUNITS=  mg/l
 IPOLL =  1         KS    = .0000E+00  KD    = .0000E+00

FLUX VARIABLES (metric units)
 Q0    = .3767E+00  M0    = .1094E+01  J0    = .9198E-02  SIGNJ0=      1.0
 Associated length scales (meters)
 LQ    =       .36  LM    =     11.15  Lm    =    228.77  Lb    = 96248.73
                                       Lmp   =  99999.00  Lbp   = 99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =     29.15  R     =    635.17

FLOW CLASSIFICATION
 111111111111111111111111111111111111111111
 1  Flow class (CORMIX1)       =    H5-90  1
 1  Applicable layer depth HS =     2.14  1
 111111111111111111111111111111111111111111

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    = .1000E+03  CUNITS=  mg/l
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =  18290.00  XMAX  =  18290.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and below the center of the port:
       274.30 m  from the LEFT  bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP = 50 display intervals per module
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
BEGIN MOD101: DISCHARGE MODULE
```

COANDA ATTACHMENT immediately following the discharge.

X	Y	Z	S	C	B
.00	.00	.00	1.0	.100E+03	.29

END OF MOD101: DISCHARGE MODULE

BEGIN CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

Bottom-attached jet motion.

Profile definitions:
B = Gaussian 1/e (37%) half-width, normal to trajectory
Half wall jet, attached to bottom.
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	B
.00	.00	.00	1.0	.100E+03	.21
.12	-.32	.00	1.0	.100E+03	.24
.23	-.64	.00	1.0	.100E+03	.28
.35	-.97	.00	1.0	.100E+03	.32
.48	-1.31	.00	1.0	.959E+02	.36
.59	-1.63	.00	1.2	.868E+02	.40
.71	-1.95	.00	1.3	.792E+02	.43
.84	-2.29	.00	1.4	.725E+02	.47
.95	-2.61	.00	1.5	.671E+02	.51
1.07	-2.93	.00	1.6	.625E+02	.55
1.20	-3.28	.00	1.7	.583E+02	.59
1.32	-3.60	.00	1.8	.548E+02	.63
1.43	-3.92	.00	1.9	.516E+02	.67
1.56	-4.26	.00	2.1	.487E+02	.71
1.68	-4.58	.00	2.2	.462E+02	.74
1.80	-4.90	.00	2.3	.440E+02	.78
1.92	-5.24	.00	2.4	.418E+02	.82
2.04	-5.57	.00	2.5	.400E+02	.86
2.16	-5.89	.00	2.6	.383E+02	.90
2.28	-6.21	.00	2.7	.367E+02	.94
2.40	-6.55	.00	2.8	.352E+02	.98
2.52	-6.87	.00	3.0	.339E+02	1.01
2.64	-7.19	.00	3.1	.327E+02	1.05
2.77	-7.53	.00	3.2	.315E+02	1.09
2.89	-7.85	.00	3.3	.304E+02	1.13
3.01	-8.17	.00	3.4	.294E+02	1.17
3.13	-8.51	.00	3.5	.284E+02	1.21
3.25	-8.84	.00	3.6	.276E+02	1.25
3.37	-9.16	.00	3.7	.267E+02	1.28
3.50	-9.50	.00	3.9	.259E+02	1.33
3.62	-9.82	.00	4.0	.252E+02	1.36
3.74	-10.14	.00	4.1	.245E+02	1.40
3.87	-10.48	.00	4.2	.238E+02	1.44
3.99	-10.80	.00	4.3	.232E+02	1.48
4.11	-11.12	.00	4.4	.226E+02	1.52
4.23	-11.44	.00	4.5	.221E+02	1.56
4.36	-11.78	.00	4.7	.215E+02	1.60
4.48	-12.10	.00	4.8	.210E+02	1.63
4.60	-12.42	.00	4.9	.205E+02	1.67
4.73	-12.76	.00	5.0	.200E+02	1.71
4.85	-13.08	.00	5.1	.196E+02	1.75

4.97	-13.40	.00	5.2	.192E+02	1.79
5.10	-13.74	.00	5.3	.188E+02	1.83
5.22	-14.06	.00	5.4	.184E+02	1.87
5.34	-14.39	.00	5.6	.180E+02	1.91
5.47	-14.73	.00	5.7	.176E+02	1.95
5.59	-15.05	.00	5.8	.173E+02	1.99
5.71	-15.37	.00	5.9	.170E+02	2.02
5.84	-15.71	.00	6.0	.166E+02	2.06
5.96	-16.03	.00	6.1	.163E+02	2.10
6.08	-16.35	.00	6.2	.160E+02	2.14

Cumulative travel time = 17. sec

END OF CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

BEGIN MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

Control volume inflow:

X	Y	Z	S	C	B
6.08	-16.35	.00	6.2	.160E+02	2.14

Profile definitions:
BV = layer depth (vertically mixed)
BH = top-hat half-width, in horizontal plane normal to trajectory
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH	ZU	ZL
3.94	-18.35	2.14	6.2	.160E+02	.00	.00	2.14	2.14
4.23	-18.35	2.14	6.2	.160E+02	2.14	.60	2.14	.00
4.52	-18.35	2.14	6.2	.160E+02	2.14	.85	2.14	.00
4.81	-18.35	2.14	6.2	.160E+02	2.14	1.04	2.14	.00
5.10	-18.35	2.14	6.2	.160E+02	2.14	1.20	2.14	.00
5.39	-18.35	2.14	6.2	.160E+02	2.14	1.34	2.14	.00
5.68	-18.35	2.14	6.2	.160E+02	2.14	1.47	2.14	.00
5.97	-18.35	2.14	6.2	.160E+02	2.14	1.59	2.14	.00
6.26	-18.35	2.14	6.7	.148E+02	2.14	1.70	2.14	.00
6.55	-18.35	2.14	8.2	.122E+02	2.14	1.80	2.14	.00
6.84	-18.35	2.14	8.7	.114E+02	2.14	1.90	2.14	.00

Cumulative travel time = 30. sec

END OF MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

BEGIN MOD154: VERTICALLY MIXED PLUME IN WEAK CROSS-FLOW

Phase 1: Vertically mixed, Phase 2: Re-stratified

Phase 1: The plume is VERTICALLY FULLY MIXED over the entire layer depth.
Profile definitions:
BV = layer depth (vertically mixed)
BH = Gaussian 1/e (37%) half-width in horizontal plane normal to trajectory
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH	ZU	ZL
6.84	-18.35	2.14	8.7	.114E+02	2.14	1.68	2.14	.00

7.84	-20.83	2.14	9.4	.107E+02	2.14	1.93	2.14	.00
8.85	-23.31	2.14	10.0	.100E+02	2.14	2.18	2.14	.00
9.87	-25.80	2.14	10.5	.950E+01	2.14	2.43	2.14	.00
10.89	-28.28	2.14	11.1	.904E+01	2.14	2.68	2.14	.00
11.91	-30.77	2.14	11.6	.864E+01	2.14	2.93	2.14	.00
12.94	-33.25	2.14	12.1	.829E+01	2.14	3.18	2.14	.00
13.98	-35.73	2.14	12.5	.798E+01	2.14	3.43	2.14	.00
15.02	-38.22	2.14	13.0	.771E+01	2.14	3.68	2.14	.00
16.06	-40.70	2.14	13.4	.746E+01	2.14	3.93	2.14	.00
17.11	-43.18	2.14	13.8	.723E+01	2.14	4.18	2.14	.00
18.17	-45.67	2.14	14.2	.702E+01	2.14	4.43	2.14	.00
19.23	-48.15	2.14	14.6	.683E+01	2.14	4.68	2.14	.00
20.29	-50.64	2.14	15.0	.665E+01	2.14	4.93	2.14	.00
21.36	-53.12	2.14	15.4	.649E+01	2.14	5.18	2.14	.00
22.43	-55.60	2.14	15.8	.634E+01	2.14	5.43	2.14	.00
23.51	-58.09	2.14	16.1	.620E+01	2.14	5.68	2.14	.00
24.58	-60.57	2.14	16.5	.606E+01	2.14	5.92	2.14	.00
25.67	-63.06	2.14	16.8	.594E+01	2.14	6.17	2.14	.00
26.75	-65.54	2.14	17.2	.582E+01	2.14	6.42	2.14	.00
27.84	-68.02	2.14	17.5	.571E+01	2.14	6.67	2.14	.00
28.94	-70.51	2.14	17.8	.561E+01	2.14	6.92	2.14	.00
30.03	-72.99	2.14	18.2	.551E+01	2.14	7.17	2.14	.00
31.14	-75.47	2.14	18.5	.542E+01	2.14	7.41	2.14	.00
32.24	-77.96	2.14	18.8	.533E+01	2.14	7.66	2.14	.00
33.35	-80.44	2.14	19.1	.524E+01	2.14	7.91	2.14	.00
34.46	-82.93	2.14	19.4	.516E+01	2.14	8.16	2.14	.00
35.57	-85.41	2.14	19.7	.508E+01	2.14	8.41	2.14	.00
36.69	-87.89	2.14	20.0	.501E+01	2.14	8.65	2.14	.00
37.81	-90.38	2.14	20.2	.494E+01	2.14	8.90	2.14	.00
38.93	-92.86	2.14	20.5	.487E+01	2.14	9.15	2.14	.00
40.06	-95.35	2.14	20.8	.481E+01	2.14	9.39	2.14	.00
41.18	-97.83	2.14	21.1	.474E+01	2.14	9.64	2.14	.00
42.32	-100.31	2.14	21.4	.468E+01	2.14	9.89	2.14	.00
43.45	-102.80	2.14	21.6	.462E+01	2.14	10.14	2.14	.00
44.59	-105.28	2.14	21.9	.457E+01	2.14	10.38	2.14	.00
45.73	-107.76	2.14	22.1	.451E+01	2.14	10.63	2.14	.00
46.87	-110.25	2.14	22.4	.446E+01	2.14	10.87	2.14	.00
48.02	-112.73	2.14	22.7	.441E+01	2.14	11.12	2.14	.00
49.17	-115.22	2.14	22.9	.436E+01	2.14	11.37	2.14	.00
50.32	-117.70	2.14	23.2	.432E+01	2.14	11.61	2.14	.00
51.47	-120.18	2.14	23.4	.427E+01	2.14	11.86	2.14	.00
52.63	-122.67	2.14	23.7	.423E+01	2.14	12.11	2.14	.00
53.79	-125.15	2.14	23.9	.418E+01	2.14	12.35	2.14	.00
54.95	-127.64	2.14	24.1	.414E+01	2.14	12.60	2.14	.00
56.11	-130.12	2.14	24.4	.410E+01	2.14	12.84	2.14	.00
57.28	-132.60	2.14	24.6	.406E+01	2.14	13.09	2.14	.00
58.45	-135.09	2.14	24.8	.403E+01	2.14	13.34	2.14	.00
59.62	-137.57	2.14	25.1	.399E+01	2.14	13.58	2.14	.00
60.80	-140.05	2.14	25.3	.395E+01	2.14	13.83	2.14	.00
61.97	-142.54	2.14	25.5	.392E+01	2.14	14.07	2.14	.00

Cumulative travel time = 2981. sec

End of Phase 1:

The mixed diffuser flow has RESTRATIFIED and is now detached from the bottom or surface/interface.

Phase 2: The flow has RESTRATIFIED at the beginning of this zone.

Profile definitions:

BV = top-hat thickness, measured vertically

BH = Gaussian 1/e (37%) half-width in horizontal plane normal to trajectory

ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH	ZU	ZL
61.97	-142.54	2.14	25.5	.392E+01	2.14	14.07	2.14	.00
153.29	-323.57	2.14	38.6	.259E+01	.82	83.38	2.14	1.32
253.28	-504.60	2.14	48.3	.207E+01	.72	145.47	2.14	1.42
360.13	-685.63	2.14	56.3	.178E+01	.68	208.80	2.14	1.46
472.83	-866.66	2.14	63.3	.158E+01	.65	273.53	2.14	1.49
590.72	-1047.68	2.14	69.6	.144E+01	.63	339.53	2.14	1.51
713.34	-1228.71	2.14	75.4	.133E+01	.62	406.67	2.14	1.52
840.31	-1409.74	2.14	80.8	.124E+01	.60	474.83	2.14	1.54
971.35	-1590.77	2.14	85.8	.117E+01	.59	543.93	2.14	1.55
1106.21	-1771.80	2.14	90.6	.110E+01	.58	613.87	2.14	1.56
1244.69	-1952.83	2.14	95.1	.105E+01	.57	684.59	2.14	1.57
1386.63	-2133.86	2.14	99.4	.101E+01	.56	756.04	2.14	1.58
1531.87	-2314.89	2.14	103.5	.966E+00	.55	828.16	2.14	1.59
1680.27	-2495.92	2.14	107.5	.930E+00	.55	900.90	2.14	1.59
1831.73	-2676.95	2.14	111.3	.898E+00	.54	974.24	2.14	1.60
1986.14	-2857.98	2.14	115.0	.869E+00	.54	1048.14	2.14	1.60
2143.40	-3039.01	2.14	118.6	.843E+00	.53	1122.56	2.14	1.61
2303.42	-3220.04	2.14	122.1	.819E+00	.52	1197.49	2.14	1.62
2466.13	-3401.06	2.14	125.5	.797E+00	.52	1272.90	2.14	1.62
2631.45	-3582.09	2.14	128.8	.776E+00	.52	1348.76	2.14	1.62
2799.32	-3763.12	2.14	132.0	.758E+00	.51	1425.07	2.14	1.63
2969.67	-3944.15	2.14	135.1	.740E+00	.51	1501.79	2.14	1.63
3142.45	-4125.18	2.14	138.2	.724E+00	.50	1578.92	2.14	1.64
3317.61	-4306.21	2.14	141.2	.708E+00	.50	1656.44	2.14	1.64
3495.08	-4487.24	2.14	144.2	.694E+00	.50	1734.33	2.14	1.64
3674.83	-4668.27	2.14	147.0	.680E+00	.49	1812.58	2.14	1.65
3856.81	-4849.30	2.14	149.9	.667E+00	.49	1891.19	2.14	1.65
4040.98	-5030.33	2.14	152.6	.655E+00	.49	1970.14	2.14	1.65
4227.30	-5211.36	2.14	155.4	.644E+00	.48	2049.41	2.14	1.66
4415.73	-5392.39	2.14	158.0	.633E+00	.48	2129.00	2.14	1.66
4606.24	-5573.42	2.14	160.7	.622E+00	.48	2208.91	2.14	1.66
4798.79	-5754.45	2.14	163.2	.613E+00	.47	2289.11	2.14	1.67
4993.34	-5935.47	2.14	165.8	.603E+00	.47	2369.61	2.14	1.67
5189.88	-6116.50	2.14	168.3	.594E+00	.47	2450.40	2.14	1.67
5388.36	-6297.53	2.14	170.8	.586E+00	.47	2531.46	2.14	1.67
5588.76	-6478.56	2.14	173.2	.577E+00	.46	2612.80	2.14	1.68
5791.06	-6659.59	2.14	175.6	.569E+00	.46	2694.40	2.14	1.68
5995.22	-6840.62	2.14	178.0	.562E+00	.46	2776.26	2.14	1.68
6201.22	-7021.65	2.14	180.3	.555E+00	.46	2858.37	2.14	1.68
6409.05	-7202.68	2.14	182.6	.548E+00	.45	2940.74	2.14	1.69
6618.67	-7383.71	2.14	184.9	.541E+00	.45	3023.34	2.14	1.69
6830.06	-7564.74	2.14	187.2	.534E+00	.45	3106.19	2.14	1.69
7043.21	-7745.77	2.14	189.4	.528E+00	.45	3189.26	2.14	1.69
7258.08	-7926.80	2.14	191.6	.522E+00	.44	3272.56	2.14	1.70
7474.67	-8107.83	2.14	193.8	.516E+00	.44	3356.09	2.14	1.70
7692.95	-8288.86	2.14	195.9	.510E+00	.44	3439.84	2.14	1.70
7912.90	-8469.88	2.14	198.1	.505E+00	.44	3523.80	2.14	1.70
8134.51	-8650.91	2.14	200.2	.500E+00	.44	3607.98	2.14	1.70
8357.76	-8831.94	2.14	202.3	.494E+00	.44	3692.36	2.14	1.70
8582.63	-9012.97	2.14	204.3	.489E+00	.43	3776.95	2.14	1.71
8809.11	-9194.00	2.14	206.4	.485E+00	.43	3861.73	2.14	1.71

Cumulative travel time = 1623717. sec

END OF MOD154: VERTICALLY MIXED PLUME IN WEAK CROSS-FLOW

```
** End of NEAR-FIELD REGION (NFR) **

 Bank nearest to plume centerline has changed.
   Nearest bank is now on RIGHT.

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  2.24 to conserve the mass flux in the far-field!
 The correction factor is quite large because of the small ambient velocity
   relative to the strong mixing characteristics of the discharge!
   This indicates localized RECIRCULATION REGIONS and internal hydraulic JUMPS.

 Because of the strong horizontal momentum flux of this discharge, severe
   PLUME INTERACTION WITH THE OPPOSITE BANK occurs.

 Consider a different discharge design with a reduced offshore momentum flux.
 No predictive techniques available for this situation; SIMULATION ENDS.

 Surface plume centerline coincides with the mid-width of bounded channel.
   Thus, the plume interacts SIMULTANEOUSLY WITH BOTH BANKS.
-----------------------------------------------------------------------------
CORMIX1: Submerged Single Port Discharges              End of Prediction File
11111111111111111111111111111111111111111111111111111111111111111111111111111
```

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                  CORMIX: CORNELL MIXING ZONE EXPERT SYSTEM
                      CORMIX-GI Version 4.03b
SITE NAME/LABEL:                SECI SGS Outfall D-001
  DESIGN CASE:                  8.598 mgd, Low Ebb Current, 16 in discharge
  FILE NAME:                    C:\Documents and
Settings\mfeldmeyer\Desktop\Cormix Unit 3\LoEbb-AADF16.prd
Using subsystem CORMIX1:        Submerged Single Port Discharges
  Start of session:             02/03/2006--15:03:44
***************************************************************************
SUMMARY OF INPUT DATA:
---------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                        = bounded
  Width                         BS     = 1829 m
  Channel regularity            ICHREG = 2
  Ambient flowrate              QA     = 25.50 m^3/s
  Average depth                 HA     = 3.05 m
  Depth at discharge            HD     = 2.14 m
  Ambient velocity              UA     = 0.0046 m/s
  Darcy-Weisbach friction factor F     = 0.0626
    Calculated from Manning's n        = 0.034
  Wind velocity                 UW     = 2 m/s
Stratification Type             STRCND = U
  Surface density               RHOAS  = 997.5800 kg/m^3
  Bottom density                RHOAB  = 997.5800 kg/m^3
---------------------------------------------------------------------------
DISCHARGE PARAMETERS:           Submerged Single Port Discharge
  Nearest bank                         = left
  Distance to bank              DISTB  = 274.30 m
  Port diameter                 D0     = 0.4064 m
  Port cross-sectional area     A0     = 0.1297 m^2
  Discharge velocity            U0     = 2.90 m/s
  Discharge flowrate            Q0     = 0.376701 m^3/s
  Discharge port height         H0     = 0.18 m
  Vertical discharge angle      THETA  = 20 deg
  Horizontal discharge angle    SIGMA  = 290 deg
  Discharge temperature (freshwater)   = 31.78 degC
    Corresponding density       RHO0   = 995.0960 kg/m^3
  Density difference            DRHO   = 2.4840 kg/m^3
  Buoyant acceleration          GP0    = 0.0244 m/s^2
  Discharge concentration       C0     = 100 mg/l
  Surface heat exchange coeff.  KS     = 0 m/s
  Coefficient of decay          KD     = 0 /s
---------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  = 0.36 m         Lm  = 228.77 m        Lb  = 96248.73 m
  LM  = 11.15 m         Lm' = 99999 m        Lb' = 99999 m
---------------------------------------------------------------------------
NON-DIMENSIONAL PARAMETERS:
  Port densimetric Froude number FR0   = 29.15
  Velocity ratio                R      = 635.17
---------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                      = no
  Water quality standard specified     = no
  Regulatory mixing zone               = no
  Region of interest                   = 18290 m downstream
***************************************************************************
HYDRODYNAMIC CLASSIFICATION:
```

```
  *--------------------------*
  | FLOW CLASS    = H5-90 |
  *--------------------------*
  This flow configuration applies to a layer corresponding to the full water
  depth at the discharge site.
  Applicable layer depth = water depth = 2.14 m
*****************************************************************************
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

-----------------------------------------------------------------------------
X-Y-Z Coordinate system:
  Origin is located at the bottom below the port center:
    274.30 m from the left bank/shore.
  Number of display steps NSTEP = 50 per module.
-----------------------------------------------------------------------------
NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no regulatory
  implication.  However, this information may be useful for the discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at edge of NFR = 0.4846 mg/l
  Dilution at edge of NFR                = 206.4
  NFR Location:                        x = 8809.10 m
    (centerline coordinates)           y = -9194.00 m
                                       z = 2.14 m
  NFR plume dimensions:       half-width = 3861.73 m
                               thickness = 0.43 m
-----------------------------------------------------------------------------
Buoyancy assessment:
  The effluent density is less than the surrounding ambient water
  density at the discharge level.
  Therefore, the effluent is POSITIVELY BUOYANT and will tend to rise towards
  the surface.
-----------------------------------------------------------------------------
Near-field instability behavior:
  The discharge flow will experience instabilities with full vertical mixing
  in the near-field.
  There may be benthic impact of high pollutant concentrations.
-----------------------------------------------------------------------------
FAR-FIELD MIXING SUMMARY:
  Plume becomes vertically fully mixed WITHIN NEAR-FIELD at 0 m
  downstream, but RE-STRATIFIES LATER and is not mixed in the far-field.
  Plume becomes laterally fully mixed at 8809.10 m
  downstream.
-----------------------------------------------------------------------------
PLUME BANK CONTACT SUMMARY:
  Plume contacts both banks simultaneously.
  The x-coordinate for this contact is 8809.10 m.
************************ TOXIC DILUTION ZONE SUMMARY ************************
No TDZ was specified for this simulation.
********************** REGULATORY MIXING ZONE SUMMARY ***********************
No RMZ and no ambient water quality standard have been specified.
********************* FINAL DESIGN ADVICE AND COMMENTS **********************
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any known
  technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the
  CORMIX predictions on dilutions and concentrations (with associated
  plume geometries) are reliable for the majority of cases and are accurate
  to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges
  the design configuration as highly complex and uncertain for prediction.
```

```
CORMIX1 PREDICTION FILE:
11111111111111111111111111111111111111111111111111111111111111111111111111111
                      CORNELL MIXING ZONE EXPERT SYSTEM
Subsystem CORMIX1:                                          Subsystem version:
 Submerged Single Port Discharges          CORMIX-GI Version 4.03b
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:          SECI SGS Outfall D-001
 Design case:              8.598 mgd, Low Flood Current 16 in discharge
 FILE NAME:                C:\Documents and Settings\mfeldmeyer\Desktop\Cormi
 Time of Fortran run:      02/07/2006--15:40:37

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS     =   1829.00  AS     =   5578.45  QA     =      25.50  ICHREG= 2
 HA     =      3.05  HD     =      2.14
 UA     =      .005  F      =      .063  USTAR = .4043E-03
 UW     =     2.000  UWSTAR= .2198E-02
 Uniform density environment
 STRCND=  U          RHOAM =  997.5800

DISCHARGE PARAMETERS (metric units)
 BANK  =  RIGHT      DISTB =    274.30
 D0    =      .406  A0     =      .130  H0     =        .18
 THETA =     20.00  SIGMA =    110.00
 U0    =     2.904  Q0     =      .377          = .3767E+00
 RHO0  =  995.0961  DRHO0 = .2484E+01  GP0    = .2442E-01
 C0    = .1000E+03  CUNITS=  mg/l
 IPOLL =  1         KS     = .0000E+00  KD     = .0000E+00

FLUX VARIABLES (metric units)
 Q0    = .3767E+00  M0     = .1094E+01  J0     = .9198E-02  SIGNJ0=      1.0
 Associated length scales (meters)
 LQ    =       .36  LM     =     11.15  Lm     =     228.77  Lb     =  96248.73
                                        Lmp    =   99999.00  Lbp    =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =     29.15  R      =    635.17

FLOW CLASSIFICATION
 111111111111111111111111111111111111111111
 1  Flow class (CORMIX1)       =   H5-90  1
 1  Applicable layer depth HS =     2.14  1
 111111111111111111111111111111111111111111

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    = .1000E+03  CUNITS=  mg/l
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =  18290.00  XMAX  =  18290.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and below the center of the port:
       274.30 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP = 50 display intervals per module
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
BEGIN MOD101: DISCHARGE MODULE
```

COANDA ATTACHMENT immediately following the discharge.

X	Y	Z	S	C	B
.00	.00	.00	1.0	.100E+03	.29

END OF MOD101: DISCHARGE MODULE

BEGIN CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

Bottom-attached jet motion.

Profile definitions:
B = Gaussian 1/e (37%) half-width, normal to trajectory
Half wall jet, attached to bottom.
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	B
.00	.00	.00	1.0	.100E+03	.21
-.12	.32	.00	1.0	.100E+03	.24
-.24	.66	.00	1.0	.100E+03	.28
-.36	.99	.00	1.0	.100E+03	.32
-.48	1.33	.00	1.0	.955E+02	.36
-.60	1.65	.00	1.2	.865E+02	.40
-.72	1.99	.00	1.3	.786E+02	.44
-.85	2.33	.00	1.4	.721E+02	.48
-.96	2.66	.00	1.5	.668E+02	.52
-1.09	3.00	.00	1.6	.621E+02	.56
-1.20	3.32	.00	1.7	.581E+02	.59
-1.33	3.66	.00	1.8	.545E+02	.63
-1.45	4.00	.00	2.0	.513E+02	.67
-1.57	4.33	.00	2.1	.485E+02	.71
-1.69	4.67	.00	2.2	.460E+02	.75
-1.80	4.99	.00	2.3	.438E+02	.79
-1.93	5.33	.00	2.4	.417E+02	.83
-2.05	5.68	.00	2.5	.398E+02	.87
-2.17	6.00	.00	2.6	.381E+02	.90
-2.29	6.34	.00	2.7	.365E+02	.94
-2.40	6.66	.00	2.8	.351E+02	.98
-2.53	7.01	.00	3.0	.338E+02	1.02
-2.65	7.35	.00	3.1	.325E+02	1.06
-2.76	7.67	.00	3.2	.314E+02	1.10
-2.89	8.01	.00	3.3	.303E+02	1.14
-3.00	8.34	.00	3.4	.294E+02	1.18
-3.12	8.68	.00	3.5	.284E+02	1.21
-3.24	9.02	.00	3.6	.275E+02	1.25
-3.36	9.34	.00	3.7	.267E+02	1.29
-3.48	9.69	.00	3.9	.259E+02	1.33
-3.59	10.01	.00	4.0	.252E+02	1.37
-3.72	10.35	.00	4.1	.245E+02	1.41
-3.84	10.70	.00	4.2	.238E+02	1.45
-3.95	11.02	.00	4.3	.232E+02	1.49
-4.07	11.36	.00	4.4	.226E+02	1.52
-4.19	11.68	.00	4.5	.221E+02	1.56
-4.31	12.03	.00	4.6	.216E+02	1.60
-4.43	12.37	.00	4.8	.210E+02	1.64
-4.54	12.69	.00	4.9	.206E+02	1.68
-4.66	13.04	.00	5.0	.201E+02	1.72
-4.78	13.36	.00	5.1	.197E+02	1.76

-4.90	13.70	.00	5.2	.192E+02	1.79
-5.02	14.05	.00	5.3	.188E+02	1.83
-5.13	14.37	.00	5.4	.185E+02	1.87
-5.25	14.71	.00	5.5	.181E+02	1.91
-5.36	15.04	.00	5.6	.177E+02	1.95
-5.48	15.38	.00	5.8	.174E+02	1.99
-5.60	15.72	.00	5.9	.170E+02	2.03
-5.72	16.05	.00	6.0	.167E+02	2.06
-5.84	16.39	.00	6.1	.164E+02	2.10
-5.95	16.71	.00	6.2	.161E+02	2.14

Cumulative travel time = 18. sec

END OF CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

BEGIN MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

Control volume inflow:

X	Y	Z	S	C	B
-5.95	16.71	.00	6.2	.161E+02	2.14

Profile definitions:
BV = layer depth (vertically mixed)
BH = top-hat half-width, in horizontal plane normal to trajectory
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH	ZU	ZL
-8.09	14.69	2.14	6.2	.161E+02	.00	.00	2.14	2.14
-7.80	14.69	2.14	6.2	.161E+02	2.14	.60	2.14	.00
-7.52	14.69	2.14	6.2	.161E+02	2.14	.85	2.14	.00
-7.23	14.69	2.14	6.2	.161E+02	2.14	1.04	2.14	.00
-6.95	14.69	2.14	6.2	.161E+02	2.14	1.20	2.14	.00
-6.67	14.69	2.14	6.2	.161E+02	2.14	1.34	2.14	.00
-6.38	14.69	2.14	6.2	.161E+02	2.14	1.47	2.14	.00
-6.10	14.69	2.14	6.2	.161E+02	2.14	1.59	2.14	.00
-5.81	14.69	2.14	6.5	.153E+02	2.14	1.70	2.14	.00
-5.53	14.69	2.14	8.1	.124E+02	2.14	1.80	2.14	.00
-5.24	14.69	2.14	8.7	.115E+02	2.14	1.90	2.14	.00

Cumulative travel time = 31. sec

END OF MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

BEGIN MOD154: VERTICALLY MIXED PLUME IN WEAK CROSS-FLOW

Phase 1: Vertically mixed, Phase 2: Re-stratified

Phase 1: The plume is VERTICALLY FULLY MIXED over the entire layer depth.
Profile definitions:
BV = layer depth (vertically mixed)
BH = Gaussian 1/e (37%) half-width in horizontal plane normal to trajectory
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH	ZU	ZL
-5.24	14.69	2.14	8.7	.115E+02	2.14	1.65	2.14	.00

-6.05	17.18	2.14	9.3	.107E+02	2.14	1.91	2.14	.00
-6.86	19.67	2.14	9.9	.101E+02	2.14	2.16	2.14	.00
-7.65	22.16	2.14	10.5	.955E+01	2.14	2.41	2.14	.00
-8.44	24.64	2.14	11.0	.909E+01	2.14	2.66	2.14	.00
-9.23	27.13	2.14	11.5	.868E+01	2.14	2.91	2.14	.00
-10.00	29.62	2.14	12.0	.833E+01	2.14	3.16	2.14	.00
-10.78	32.11	2.14	12.5	.802E+01	2.14	3.41	2.14	.00
-11.55	34.60	2.14	12.9	.774E+01	2.14	3.66	2.14	.00
-12.31	37.08	2.14	13.4	.748E+01	2.14	3.91	2.14	.00
-13.07	39.57	2.14	13.8	.725E+01	2.14	4.16	2.14	.00
-13.83	42.06	2.14	14.2	.704E+01	2.14	4.41	2.14	.00
-14.58	44.55	2.14	14.6	.685E+01	2.14	4.66	2.14	.00
-15.32	47.04	2.14	15.0	.667E+01	2.14	4.91	2.14	.00
-16.06	49.52	2.14	15.4	.651E+01	2.14	5.16	2.14	.00
-16.80	52.01	2.14	15.7	.636E+01	2.14	5.41	2.14	.00
-17.54	54.50	2.14	16.1	.621E+01	2.14	5.66	2.14	.00
-18.27	56.99	2.14	16.4	.608E+01	2.14	5.91	2.14	.00
-18.99	59.48	2.14	16.8	.595E+01	2.14	6.16	2.14	.00
-19.72	61.96	2.14	17.1	.584E+01	2.14	6.41	2.14	.00
-20.44	64.45	2.14	17.5	.573E+01	2.14	6.66	2.14	.00
-21.15	66.94	2.14	17.8	.562E+01	2.14	6.91	2.14	.00
-21.86	69.43	2.14	18.1	.552E+01	2.14	7.16	2.14	.00
-22.57	71.92	2.14	18.4	.543E+01	2.14	7.40	2.14	.00
-23.28	74.40	2.14	18.7	.534E+01	2.14	7.65	2.14	.00
-23.98	76.89	2.14	19.0	.525E+01	2.14	7.90	2.14	.00
-24.68	79.38	2.14	19.3	.517E+01	2.14	8.15	2.14	.00
-25.38	81.87	2.14	19.6	.509E+01	2.14	8.40	2.14	.00
-26.07	84.36	2.14	19.9	.502E+01	2.14	8.64	2.14	.00
-26.76	86.84	2.14	20.2	.495E+01	2.14	8.89	2.14	.00
-27.44	89.33	2.14	20.5	.488E+01	2.14	9.14	2.14	.00
-28.13	91.82	2.14	20.8	.481E+01	2.14	9.39	2.14	.00
-28.81	94.31	2.14	21.0	.475E+01	2.14	9.63	2.14	.00
-29.49	96.79	2.14	21.3	.469E+01	2.14	9.88	2.14	.00
-30.16	99.28	2.14	21.6	.463E+01	2.14	10.13	2.14	.00
-30.83	101.77	2.14	21.9	.458E+01	2.14	10.38	2.14	.00
-31.50	104.26	2.14	22.1	.452E+01	2.14	10.62	2.14	.00
-32.17	106.75	2.14	22.4	.447E+01	2.14	10.87	2.14	.00
-32.83	109.23	2.14	22.6	.442E+01	2.14	11.12	2.14	.00
-33.49	111.72	2.14	22.9	.437E+01	2.14	11.36	2.14	.00
-34.15	114.21	2.14	23.1	.432E+01	2.14	11.61	2.14	.00
-34.81	116.70	2.14	23.4	.428E+01	2.14	11.86	2.14	.00
-35.46	119.19	2.14	23.6	.423E+01	2.14	12.10	2.14	.00
-36.11	121.67	2.14	23.9	.419E+01	2.14	12.35	2.14	.00
-36.76	124.16	2.14	24.1	.415E+01	2.14	12.60	2.14	.00
-37.40	126.65	2.14	24.3	.411E+01	2.14	12.84	2.14	.00
-38.04	129.14	2.14	24.6	.407E+01	2.14	13.09	2.14	.00
-38.68	131.63	2.14	24.8	.403E+01	2.14	13.33	2.14	.00
-39.32	134.11	2.14	25.0	.399E+01	2.14	13.58	2.14	.00
-39.95	136.60	2.14	25.3	.396E+01	2.14	13.83	2.14	.00
-40.59	139.09	2.14	25.5	.392E+01	2.14	14.07	2.14	.00

Cumulative travel time = 2984. sec

End of Phase 1:

The mixed diffuser flow has RESTRATIFIED and is now detached from the bottom or surface/interface.

Phase 2: The flow has RESTRATIFIED at the beginning of this zone.

Profile definitions:

BV = top-hat thickness, measured vertically

BH = Gaussian 1/e (37%) half-width in horizontal plane normal to trajectory

ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH	ZU	ZL
-40.59	139.09	2.14	25.5	.392E+01	2.14	14.07	2.14	.00
-81.05	320.12	2.14	38.6	.259E+01	.82	83.38	2.14	1.32
-112.84	501.15	2.14	48.2	.207E+01	.72	145.47	2.14	1.42
-137.77	682.18	2.14	56.2	.178E+01	.68	208.80	2.14	1.46
-156.85	863.21	2.14	63.2	.158E+01	.65	273.52	2.14	1.49
-170.73	1044.24	2.14	69.5	.144E+01	.63	339.52	2.14	1.51
-179.89	1225.27	2.14	75.3	.133E+01	.62	406.66	2.14	1.52
-184.70	1406.29	2.14	80.7	.124E+01	.60	474.82	2.14	1.54
-185.44	1587.32	2.14	85.7	.117E+01	.59	543.91	2.14	1.55
-182.36	1768.35	2.14	90.4	.111E+01	.58	613.85	2.14	1.56
-175.65	1949.38	2.14	94.9	.105E+01	.57	684.57	2.14	1.57
-165.49	2130.41	2.14	99.2	.101E+01	.56	756.01	2.14	1.58
-152.03	2311.44	2.14	103.4	.967E+00	.55	828.13	2.14	1.59
-135.41	2492.47	2.14	107.3	.932E+00	.55	900.87	2.14	1.59
-115.73	2673.50	2.14	111.2	.899E+00	.54	974.21	2.14	1.60
-93.10	2854.53	2.14	114.9	.871E+00	.54	1048.10	2.14	1.60
-67.62	3035.56	2.14	118.5	.844E+00	.53	1122.52	2.14	1.61
-39.38	3216.59	2.14	121.9	.820E+00	.52	1197.45	2.14	1.62
-8.45	3397.62	2.14	125.3	.798E+00	.52	1272.85	2.14	1.62
25.10	3578.65	2.14	128.6	.778E+00	.52	1348.71	2.14	1.62
61.19	3759.68	2.14	131.8	.759E+00	.51	1425.01	2.14	1.63
99.76	3940.71	2.14	135.0	.741E+00	.51	1501.73	2.14	1.63
140.76	4121.73	2.14	138.0	.725E+00	.50	1578.86	2.14	1.64
184.14	4302.76	2.14	141.0	.709E+00	.50	1656.37	2.14	1.64
229.84	4483.79	2.14	144.0	.695E+00	.50	1734.26	2.14	1.64
277.81	4664.82	2.14	146.8	.681E+00	.49	1812.51	2.14	1.65
328.01	4845.85	2.14	149.7	.668E+00	.49	1891.11	2.14	1.65
380.40	5026.88	2.14	152.4	.656E+00	.49	1970.05	2.14	1.65
434.94	5207.91	2.14	155.1	.645E+00	.48	2049.32	2.14	1.66
491.60	5388.94	2.14	157.8	.634E+00	.48	2128.91	2.14	1.66
550.32	5569.97	2.14	160.4	.623E+00	.48	2208.81	2.14	1.66
611.09	5751.00	2.14	163.0	.613E+00	.47	2289.01	2.14	1.67
673.87	5932.03	2.14	165.6	.604E+00	.47	2369.51	2.14	1.67
738.62	6113.06	2.14	168.1	.595E+00	.47	2450.29	2.14	1.67
805.33	6294.09	2.14	170.6	.586E+00	.47	2531.35	2.14	1.67
873.95	6475.12	2.14	173.0	.578E+00	.46	2612.68	2.14	1.68
944.47	6656.14	2.14	175.4	.570E+00	.46	2694.28	2.14	1.68
1016.85	6837.17	2.14	177.8	.563E+00	.46	2776.14	2.14	1.68
1091.08	7018.20	2.14	180.1	.555E+00	.46	2858.25	2.14	1.68
1167.12	7199.23	2.14	182.4	.548E+00	.45	2940.60	2.14	1.69
1244.96	7380.26	2.14	184.7	.541E+00	.45	3023.21	2.14	1.69
1324.58	7561.29	2.14	186.9	.535E+00	.45	3106.04	2.14	1.69
1405.95	7742.32	2.14	189.2	.529E+00	.45	3189.12	2.14	1.69
1489.04	7923.35	2.14	191.4	.523E+00	.44	3272.41	2.14	1.70
1573.85	8104.38	2.14	193.5	.517E+00	.44	3355.94	2.14	1.70
1660.35	8285.41	2.14	195.7	.511E+00	.44	3439.68	2.14	1.70
1748.53	8466.44	2.14	197.8	.506E+00	.44	3523.64	2.14	1.70
1838.36	8647.47	2.14	199.9	.500E+00	.44	3607.81	2.14	1.70
1929.83	8828.50	2.14	202.0	.495E+00	.44	3692.19	2.14	1.70
2022.92	9009.53	2.14	204.0	.490E+00	.43	3776.77	2.14	1.71
2117.62	9190.55	2.14	206.1	.485E+00	.43	3861.55	2.14	1.71

Cumulative travel time = 1623720. sec

END OF MOD154: VERTICALLY MIXED PLUME IN WEAK CROSS-FLOW

```
** End of NEAR-FIELD REGION (NFR) **

 Bank nearest to plume centerline has changed.
   Nearest bank is now on LEFT.

 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  2.24 to conserve the mass flux in the far-field!
 The correction factor is quite large because of the small ambient velocity
   relative to the strong mixing characteristics of the discharge!
   This indicates localized RECIRCULATION REGIONS and internal hydraulic JUMPS.

 Because of the strong horizontal momentum flux of this discharge, severe
   PLUME INTERACTION WITH THE OPPOSITE BANK occurs.

 Consider a different discharge design with a reduced offshore momentum flux.
 No predictive techniques available for this situation; SIMULATION ENDS.

 Surface plume centerline coincides with the mid-width of bounded channel.
   Thus, the plume interacts SIMULTANEOUSLY WITH BOTH BANKS.
-----------------------------------------------------------------------------
CORMIX1: Submerged Single Port Discharges            End of Prediction File
11111111111111111111111111111111111111111111111111111111111111111111111111111
```

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                  CORMIX: CORNELL MIXING ZONE EXPERT SYSTEM
                      CORMIX-GI Version 4.03b
SITE NAME/LABEL:                SECI SGS Outfall D-001
  DESIGN CASE:                  8.598 mgd, Low Flood Current 16 in discharge
  FILE NAME:                    C:\Documents and
Settings\mfeldmeyer\Desktop\Cormix Unit 3\LoFlood-AADF16.prd
Using subsystem CORMIX1:        Submerged Single Port Discharges
  Start of session:             02/07/2006--15:40:37
****************************************************************************
SUMMARY OF INPUT DATA:
----------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                             = bounded
  Width                           BS        = 1829 m
  Channel regularity              ICHREG    = 2
  Ambient flowrate                QA        = 25.50 m^3/s
  Average depth                   HA        = 3.05 m
  Depth at discharge              HD        = 2.14 m
  Ambient velocity                UA        = 0.0046 m/s
  Darcy-Weisbach friction factor  F         = 0.0626
    Calculated from Manning's n             = 0.034
  Wind velocity                   UW        = 2 m/s
Stratification Type               STRCND    = U
  Surface density                 RHOAS     = 997.5800 kg/m^3
  Bottom density                  RHOAB     = 997.5800 kg/m^3
----------------------------------------------------------------------------
DISCHARGE PARAMETERS:             Submerged Single Port Discharge
  Nearest bank                              = right
  Distance to bank                DISTB     = 274.30 m
  Port diameter                   D0        = 0.4064 m
  Port cross-sectional area       A0        = 0.1297 m^2
  Discharge velocity              U0        = 2.90 m/s
  Discharge flowrate              Q0        = 0.376701 m^3/s
  Discharge port height           H0        = 0.18 m
  Vertical discharge angle        THETA     = 20 deg
  Horizontal discharge angle      SIGMA     = 110 deg
  Discharge temperature (freshwater)        = 31.78 degC
    Corresponding density         RHO0      = 995.0960 kg/m^3
  Density difference              DRHO      = 2.4840 kg/m^3
  Buoyant acceleration            GP0       = 0.0244 m/s^2
  Discharge concentration         C0        = 100 mg/l
  Surface heat exchange coeff.    KS        = 0 m/s
  Coefficient of decay            KD        = 0 /s
----------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  = 0.36 m          Lm  = 228.77 m         Lb  = 96248.73 m
  LM  = 11.15 m         Lm' = 99999 m          Lb' = 99999 m
----------------------------------------------------------------------------
NON-DIMENSIONAL PARAMETERS:
  Port densimetric Froude number  FR0       = 29.15
  Velocity ratio                  R         = 635.17
----------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                           = no
  Water quality standard specified          = no
  Regulatory mixing zone                    = no
  Region of interest                        = 18290 m downstream
****************************************************************************
HYDRODYNAMIC CLASSIFICATION:
```

```
  *-------------------------*
  | FLOW CLASS    = H5-90 |
  *-------------------------*
  This flow configuration applies to a layer corresponding to the full water
  depth at the discharge site.
  Applicable layer depth = water depth = 2.14 m
*****************************************************************************
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

-----------------------------------------------------------------------------
X-Y-Z Coordinate system:
  Origin is located at the bottom below the port center:
    274.30 m from the right bank/shore.
  Number of display steps NSTEP = 50 per module.
-----------------------------------------------------------------------------
NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no regulatory
  implication.  However, this information may be useful for the discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at edge of NFR = 0.4852 mg/l
  Dilution at edge of NFR                = 206.1
  NFR Location:                        x = 2117.62 m
    (centerline coordinates)           y = 9190.56 m
                                       z = 2.14 m
  NFR plume dimensions:       half-width = 3861.55 m
                               thickness = 0.43 m
-----------------------------------------------------------------------------
Buoyancy assessment:
  The effluent density is less than the surrounding ambient water
  density at the discharge level.
  Therefore, the effluent is POSITIVELY BUOYANT and will tend to rise towards
  the surface.
-----------------------------------------------------------------------------
Near-field instability behavior:
  The discharge flow will experience instabilities with full vertical mixing
  in the near-field.
  There may be benthic impact of high pollutant concentrations.
-----------------------------------------------------------------------------
FAR-FIELD MIXING SUMMARY:
  Plume becomes vertically fully mixed WITHIN NEAR-FIELD at 0 m
  downstream, but RE-STRATIFIES LATER and is not mixed in the far-field.
  Plume becomes laterally fully mixed at 2117.62 m
  downstream.
-----------------------------------------------------------------------------
PLUME BANK CONTACT SUMMARY:
  Plume contacts both banks simultaneously.
  The x-coordinate for this contact is 2117.62 m.
*********************** TOXIC DILUTION ZONE SUMMARY ***********************
No TDZ was specified for this simulation.
********************* REGULATORY MIXING ZONE SUMMARY **********************
No RMZ and no ambient water quality standard have been specified.
******************** FINAL DESIGN ADVICE AND COMMENTS *********************
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any known
  technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the
  CORMIX predictions on dilutions and concentrations (with associated
  plume geometries) are reliable for the majority of cases and are accurate
  to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges
  the design configuration as highly complex and uncertain for prediction.
```

```
CORMIX1 PREDICTION FILE:
11111111111111111111111111111111111111111111111111111111111111111111111111111
                      CORNELL MIXING ZONE EXPERT SYSTEM
Subsystem CORMIX1:                                         Subsystem version:
 Submerged Single Port Discharges           CORMIX-GI Version 4.03b
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:         SECI SGS Outfall D-001
 Design case:             8.598 mgd, Median Ebb Current 16 inch discharge
 FILE NAME:               C:\Documents and Settings\mfeldmeyer\Desktop\Cormi
 Time of Fortran run:     02/07/2006--15:41:32

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS     =   1829.00  AS     =   5578.45  QA     =    142.83  ICHREG= 2
 HA     =      3.05  HD     =      2.14
 UA     =      .026  F      =      .063  USTAR = .2264E-02
 UW     =     2.000  UWSTAR= .2198E-02
 Uniform density environment
 STRCND=  U          RHOAM =  997.5800

DISCHARGE PARAMETERS (metric units)
 BANK  =  LEFT       DISTB =    274.30
 D0    =      .406   A0     =      .130  H0     =       .18
 THETA =     20.00   SIGMA =    290.00
 U0    =     2.904   Q0     =      .377         = .3767E+00
 RHO0  =  995.0961   DRHO0 = .2484E+01  GP0    = .2442E-01
 C0    = .1000E+03   CUNITS=  mg/l
 IPOLL =  1          KS    = .0000E+00  KD     = .0000E+00

FLUX VARIABLES (metric units)
 Q0    = .3767E+00  M0    = .1094E+01  J0     = .9198E-02  SIGNJ0=      1.0
 Associated length scales (meters)
 LQ    =       .36  LM    =     11.15  Lm     =     40.85  Lb     =   548.06
                                       Lmp    =  99999.00  Lbp    = 99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =     29.15  R     =    113.42

FLOW CLASSIFICATION
 111111111111111111111111111111111111111111
 1  Flow class (CORMIX1)       =    H5-90  1
 1  Applicable layer depth HS =     2.14  1
 111111111111111111111111111111111111111111

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    = .1000E+03  CUNITS=  mg/l
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =  18290.00  XMAX  =  18290.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and below the center of the port:
       274.30 m  from the LEFT  bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP = 50 display intervals per module
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
BEGIN MOD101: DISCHARGE MODULE
```

COANDA ATTACHMENT immediately following the discharge.

X	Y	Z	S	C	B
.00	.00	.00	1.0	.100E+03	.29

END OF MOD101: DISCHARGE MODULE

BEGIN CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

Bottom-attached jet motion.

Profile definitions:
B = Gaussian 1/e (37%) half-width, normal to trajectory
Half wall jet, attached to bottom.
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	B
.00	.00	.00	1.0	.100E+03	.21
.11	-.30	.00	1.0	.100E+03	.24
.23	-.62	.00	1.0	.100E+03	.28
.34	-.92	.00	1.0	.100E+03	.32
.46	-1.25	.00	1.0	.973E+02	.35
.58	-1.57	.00	1.1	.877E+02	.39
.69	-1.87	.00	1.2	.803E+02	.43
.81	-2.19	.00	1.4	.737E+02	.47
.93	-2.51	.00	1.5	.680E+02	.50
1.04	-2.81	.00	1.6	.635E+02	.54
1.17	-3.13	.00	1.7	.592E+02	.58
1.29	-3.45	.00	1.8	.555E+02	.62
1.40	-3.75	.00	1.9	.524E+02	.65
1.53	-4.07	.00	2.0	.494E+02	.69
1.65	-4.39	.00	2.1	.468E+02	.73
1.77	-4.68	.00	2.2	.445E+02	.77
1.89	-5.00	.00	2.4	.424E+02	.81
2.02	-5.32	.00	2.5	.404E+02	.85
2.14	-5.62	.00	2.6	.387E+02	.88
2.26	-5.94	.00	2.7	.370E+02	.92
2.39	-6.26	.00	2.8	.355E+02	.96
2.51	-6.55	.00	2.9	.342E+02	1.00
2.64	-6.87	.00	3.0	.329E+02	1.04
2.76	-7.17	.00	3.2	.317E+02	1.07
2.89	-7.49	.00	3.3	.306E+02	1.11
3.02	-7.80	.00	3.4	.295E+02	1.15
3.14	-8.10	.00	3.5	.286E+02	1.19
3.27	-8.42	.00	3.6	.277E+02	1.23
3.40	-8.73	.00	3.7	.268E+02	1.27
3.53	-9.03	.00	3.8	.260E+02	1.31
3.66	-9.34	.00	4.0	.252E+02	1.35
3.79	-9.66	.00	4.1	.245E+02	1.39
3.92	-9.95	.00	4.2	.238E+02	1.42
4.05	-10.27	.00	4.3	.232E+02	1.46
4.19	-10.58	.00	4.4	.225E+02	1.50
4.32	-10.88	.00	4.6	.220E+02	1.54
4.45	-11.19	.00	4.7	.214E+02	1.58
4.59	-11.51	.00	4.8	.209E+02	1.62
4.72	-11.80	.00	4.9	.204E+02	1.66
4.86	-12.12	.00	5.0	.199E+02	1.70
4.99	-12.43	.00	5.2	.194E+02	1.74

5.12	-12.72	.00	5.3	.190E+02	1.78
5.26	-13.03	.00	5.4	.185E+02	1.82
5.39	-13.33	.00	5.5	.181E+02	1.86
5.54	-13.64	.00	5.6	.177E+02	1.90
5.68	-13.95	.00	5.8	.174E+02	1.94
5.81	-14.24	.00	5.9	.170E+02	1.98
5.95	-14.55	.00	6.0	.167E+02	2.02
6.09	-14.87	.00	6.1	.163E+02	2.06
6.23	-15.16	.00	6.2	.160E+02	2.10
6.37	-15.47	.00	6.4	.157E+02	2.14

Cumulative travel time = 16. sec

END OF CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

BEGIN MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

Control volume inflow:

X	Y	Z	S	C	B
6.37	-15.47	.00	6.4	.157E+02	2.14

Profile definitions:
BV = layer depth (vertically mixed)
BH = top-hat half-width, in horizontal plane normal to trajectory
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH	ZU	ZL
4.23	-17.41	2.14	6.4	.157E+02	.00	.00	2.14	2.14
4.54	-17.41	2.14	6.4	.157E+02	2.14	.59	2.14	.00
4.84	-17.41	2.14	6.4	.157E+02	2.14	.84	2.14	.00
5.15	-17.41	2.14	6.4	.157E+02	2.14	1.03	2.14	.00
5.45	-17.41	2.14	6.4	.157E+02	2.14	1.19	2.14	.00
5.76	-17.41	2.14	6.4	.157E+02	2.14	1.33	2.14	.00
6.06	-17.41	2.14	6.4	.157E+02	2.14	1.45	2.14	.00
6.36	-17.41	2.14	6.4	.157E+02	2.14	1.57	2.14	.00
6.67	-17.41	2.14	7.3	.138E+02	2.14	1.68	2.14	.00
6.97	-17.41	2.14	8.5	.118E+02	2.14	1.78	2.14	.00
7.28	-17.41	2.14	8.9	.112E+02	2.14	1.87	2.14	.00

Cumulative travel time = 29. sec

END OF MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

BEGIN MOD154: VERTICALLY MIXED PLUME IN WEAK CROSS-FLOW

Phase 1: Vertically mixed, Phase 2: Re-stratified

Phase 1: The plume is VERTICALLY FULLY MIXED over the entire layer depth.
Profile definitions:
BV = layer depth (vertically mixed)
BH = Gaussian 1/e (37%) half-width in horizontal plane normal to trajectory
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH	ZU	ZL
7.28	-17.41	2.14	8.9	.112E+02	2.14	1.64	2.14	.00

8.73	-19.89	2.14	9.6	.105E+02	2.14	1.87	2.14	.00
10.21	-22.36	2.14	10.2	.985E+01	2.14	2.11	2.14	.00
11.73	-24.84	2.14	10.7	.933E+01	2.14	2.34	2.14	.00
13.28	-27.32	2.14	11.3	.889E+01	2.14	2.58	2.14	.00
14.87	-29.80	2.14	11.8	.850E+01	2.14	2.81	2.14	.00
16.48	-32.28	2.14	12.3	.816E+01	2.14	3.04	2.14	.00
18.12	-34.76	2.14	12.7	.786E+01	2.14	3.27	2.14	.00
19.79	-37.23	2.14	13.2	.759E+01	2.14	3.50	2.14	.00
21.49	-39.71	2.14	13.6	.734E+01	2.14	3.73	2.14	.00
23.21	-42.19	2.14	14.0	.712E+01	2.14	3.95	2.14	.00
24.95	-44.67	2.14	14.5	.692E+01	2.14	4.18	2.14	.00
26.72	-47.15	2.14	14.9	.673E+01	2.14	4.41	2.14	.00
28.52	-49.63	2.14	15.2	.656E+01	2.14	4.63	2.14	.00
30.33	-52.10	2.14	15.6	.640E+01	2.14	4.86	2.14	.00
32.17	-54.58	2.14	16.0	.625E+01	2.14	5.08	2.14	.00
34.03	-57.06	2.14	16.4	.611E+01	2.14	5.31	2.14	.00
35.92	-59.54	2.14	16.7	.598E+01	2.14	5.53	2.14	.00
37.82	-62.02	2.14	17.1	.586E+01	2.14	5.75	2.14	.00
39.74	-64.50	2.14	17.4	.574E+01	2.14	5.97	2.14	.00
41.68	-66.97	2.14	17.7	.564E+01	2.14	6.19	2.14	.00
43.65	-69.45	2.14	18.1	.553E+01	2.14	6.41	2.14	.00
45.63	-71.93	2.14	18.4	.544E+01	2.14	6.64	2.14	.00
47.63	-74.41	2.14	18.7	.534E+01	2.14	6.85	2.14	.00
49.65	-76.89	2.14	19.0	.526E+01	2.14	7.07	2.14	.00
51.69	-79.36	2.14	19.3	.517E+01	2.14	7.29	2.14	.00
53.74	-81.84	2.14	19.6	.509E+01	2.14	7.51	2.14	.00
55.82	-84.32	2.14	19.9	.502E+01	2.14	7.73	2.14	.00
57.91	-86.80	2.14	20.2	.494E+01	2.14	7.95	2.14	.00
60.02	-89.28	2.14	20.5	.488E+01	2.14	8.16	2.14	.00
62.14	-91.76	2.14	20.8	.481E+01	2.14	8.38	2.14	.00
64.28	-94.23	2.14	21.1	.474E+01	2.14	8.59	2.14	.00
66.44	-96.71	2.14	21.4	.468E+01	2.14	8.81	2.14	.00
68.62	-99.19	2.14	21.6	.462E+01	2.14	9.03	2.14	.00
70.81	-101.67	2.14	21.9	.457E+01	2.14	9.24	2.14	.00
73.01	-104.15	2.14	22.2	.451E+01	2.14	9.45	2.14	.00
75.24	-106.63	2.14	22.4	.446E+01	2.14	9.67	2.14	.00
77.47	-109.10	2.14	22.7	.441E+01	2.14	9.88	2.14	.00
79.73	-111.58	2.14	22.9	.436E+01	2.14	10.09	2.14	.00
82.00	-114.06	2.14	23.2	.431E+01	2.14	10.31	2.14	.00
84.28	-116.54	2.14	23.5	.426E+01	2.14	10.52	2.14	.00
86.58	-119.02	2.14	23.7	.422E+01	2.14	10.73	2.14	.00
88.89	-121.50	2.14	24.0	.418E+01	2.14	10.94	2.14	.00
91.22	-123.97	2.14	24.2	.413E+01	2.14	11.15	2.14	.00
93.56	-126.45	2.14	24.4	.409E+01	2.14	11.36	2.14	.00
95.92	-128.93	2.14	24.7	.405E+01	2.14	11.57	2.14	.00
98.29	-131.41	2.14	24.9	.401E+01	2.14	11.78	2.14	.00
100.67	-133.89	2.14	25.1	.398E+01	2.14	11.99	2.14	.00
103.07	-136.37	2.14	25.4	.394E+01	2.14	12.20	2.14	.00
105.48	-138.84	2.14	25.6	.390E+01	2.14	12.41	2.14	.00
107.91	-141.32	2.14	25.8	.387E+01	2.14	12.62	2.14	.00

Cumulative travel time = 2977. sec

End of Phase 1:

The mixed diffuser flow has RESTRATIFIED and is now detached from the bottom or surface/interface.

Phase 2: The flow has RESTRATIFIED at the beginning of this zone.

Profile definitions:

BV = top-hat thickness, measured vertically

BH = Gaussian 1/e (37%) half-width in horizontal plane normal to trajectory

ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH	ZU	ZL
107.91	-141.32	2.14	25.8	.387E+01	2.14	12.62	2.14	.00
110.91	-144.37	2.14	26.1	.383E+01	1.77	15.54	2.14	.37
113.94	-147.42	2.14	26.4	.379E+01	1.62	17.39	2.14	.52
116.98	-150.47	2.14	26.7	.375E+01	1.51	19.00	2.14	.63
120.04	-153.52	2.14	26.9	.371E+01	1.43	20.47	2.14	.71
123.12	-156.57	2.14	27.2	.368E+01	1.36	21.86	2.14	.78
126.23	-159.62	2.14	27.5	.364E+01	1.31	23.19	2.14	.83
129.35	-162.67	2.14	27.7	.361E+01	1.26	24.47	2.14	.88
132.49	-165.71	2.14	28.0	.357E+01	1.22	25.72	2.14	.92
135.65	-168.76	2.14	28.3	.354E+01	1.18	26.93	2.14	.96
138.82	-171.81	2.14	28.5	.351E+01	1.15	28.12	2.14	.99
142.02	-174.86	2.14	28.8	.348E+01	1.13	29.29	2.14	1.01
145.23	-177.91	2.14	29.0	.345E+01	1.10	30.44	2.14	1.04
148.47	-180.96	2.14	29.3	.342E+01	1.08	31.58	2.14	1.06
151.72	-184.01	2.14	29.5	.339E+01	1.06	32.70	2.14	1.08
154.99	-187.06	2.14	29.7	.336E+01	1.04	33.81	2.14	1.10
158.27	-190.11	2.14	30.0	.333E+01	1.02	34.90	2.14	1.12
161.58	-193.16	2.14	30.2	.331E+01	1.01	35.99	2.14	1.13
164.90	-196.20	2.14	30.5	.328E+01	.99	37.07	2.14	1.15
168.24	-199.25	2.14	30.7	.326E+01	.98	38.14	2.14	1.16
171.59	-202.30	2.14	30.9	.323E+01	.96	39.21	2.14	1.18
174.96	-205.35	2.14	31.2	.321E+01	.95	40.26	2.14	1.19
178.35	-208.40	2.14	31.4	.318E+01	.94	41.32	2.14	1.20
181.76	-211.45	2.14	31.6	.316E+01	.93	42.36	2.14	1.21
185.18	-214.50	2.14	31.9	.314E+01	.92	43.40	2.14	1.22
188.62	-217.55	2.14	32.1	.312E+01	.91	44.44	2.14	1.23
192.08	-220.60	2.14	32.3	.309E+01	.90	45.47	2.14	1.24
195.55	-223.65	2.14	32.5	.307E+01	.89	46.50	2.14	1.25
199.04	-226.70	2.14	32.8	.305E+01	.88	47.52	2.14	1.26
202.54	-229.74	2.14	33.0	.303E+01	.88	48.55	2.14	1.26
206.07	-232.79	2.14	33.2	.301E+01	.87	49.56	2.14	1.27
209.60	-235.84	2.14	33.4	.299E+01	.86	50.58	2.14	1.28
213.15	-238.89	2.14	33.6	.297E+01	.85	51.59	2.14	1.29
216.72	-241.94	2.14	33.8	.295E+01	.85	52.60	2.14	1.29
220.31	-244.99	2.14	34.1	.294E+01	.84	53.61	2.14	1.30
223.91	-248.04	2.14	34.3	.292E+01	.84	54.62	2.14	1.30
227.52	-251.09	2.14	34.5	.290E+01	.83	55.62	2.14	1.31
231.15	-254.14	2.14	34.7	.288E+01	.82	56.62	2.14	1.32
234.79	-257.19	2.14	34.9	.287E+01	.82	57.62	2.14	1.32
238.45	-260.23	2.14	35.1	.285E+01	.81	58.62	2.14	1.33
242.13	-263.28	2.14	35.3	.283E+01	.81	59.62	2.14	1.33
245.82	-266.33	2.14	35.5	.282E+01	.80	60.61	2.14	1.34
249.52	-269.38	2.14	35.7	.280E+01	.80	61.60	2.14	1.34
253.24	-272.43	2.14	35.9	.278E+01	.79	62.60	2.14	1.35
256.98	-275.48	2.14	36.1	.277E+01	.79	63.59	2.14	1.35
260.73	-278.53	2.14	36.3	.275E+01	.79	64.58	2.14	1.35
264.49	-281.58	2.14	36.5	.274E+01	.78	65.57	2.14	1.36
268.27	-284.63	2.14	36.7	.272E+01	.78	66.56	2.14	1.36
272.06	-287.68	2.14	36.9	.271E+01	.77	67.54	2.14	1.37
275.87	-290.72	2.14	37.1	.269E+01	.77	68.53	2.14	1.37
279.69	-293.77	2.14	37.3	.268E+01	.77	69.52	2.14	1.37

Cumulative travel time = 9149. sec

END OF MOD154: VERTICALLY MIXED PLUME IN WEAK CROSS-FLOW

** End of NEAR-FIELD REGION (NFR) **

The initial plume WIDTH values in the next far-field module will be
CORRECTED by a factor 2.27 to conserve the mass flux in the far-field!
The correction factor is quite large because of the small ambient velocity
relative to the strong mixing characteristics of the discharge!
This indicates localized RECIRCULATION REGIONS and internal hydraulic JUMPS.

BEGIN MOD141: BUOYANT AMBIENT SPREADING

Profile definitions:
BV = top-hat thickness, measured vertically
BH = top-hat half-width, measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)

Plume Stage 1 (not bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL
279.69	-293.77	2.14	37.3	.268E+01	1.74	157.53	2.14	.40
294.51	-293.77	2.14	38.1	.262E+01	1.64	170.60	2.14	.50
309.32	-293.77	2.14	38.9	.257E+01	1.56	183.14	2.14	.58
324.14	-293.77	2.14	39.6	.252E+01	1.49	195.21	2.14	.65
338.96	-293.77	2.14	40.3	.248E+01	1.43	206.87	2.14	.71
353.78	-293.77	2.14	41.0	.244E+01	1.38	218.16	2.14	.76
368.60	-293.77	2.14	41.6	.240E+01	1.33	229.13	2.14	.81
383.41	-293.77	2.14	42.2	.237E+01	1.29	239.79	2.14	.85
398.23	-293.77	2.14	42.8	.233E+01	1.26	250.18	2.14	.88
413.05	-293.77	2.14	43.4	.230E+01	1.22	260.32	2.14	.92
427.87	-293.77	2.14	44.0	.227E+01	1.19	270.23	2.14	.95
442.69	-293.77	2.14	44.6	.224E+01	1.17	279.92	2.14	.97
457.50	-293.77	2.14	45.2	.221E+01	1.14	289.41	2.14	1.00
472.32	-293.77	2.14	45.7	.219E+01	1.12	298.72	2.14	1.02
487.14	-293.77	2.14	46.3	.216E+01	1.10	307.84	2.14	1.04
501.96	-293.77	2.14	46.9	.213E+01	1.09	316.80	2.14	1.05
516.78	-293.77	2.14	47.4	.211E+01	1.07	325.61	2.14	1.07
531.59	-293.77	2.14	48.0	.208E+01	1.05	334.26	2.14	1.09
546.41	-293.77	2.14	48.6	.206E+01	1.04	342.78	2.14	1.10
561.23	-293.77	2.14	49.2	.203E+01	1.03	351.16	2.14	1.11
576.05	-293.77	2.14	49.8	.201E+01	1.02	359.42	2.14	1.12
590.87	-293.77	2.14	50.4	.199E+01	1.01	367.56	2.14	1.13
605.68	-293.77	2.14	51.0	.196E+01	1.00	375.58	2.14	1.14
620.50	-293.77	2.14	51.6	.194E+01	.99	383.50	2.14	1.15
635.32	-293.77	2.14	52.2	.192E+01	.98	391.31	2.14	1.16
650.14	-293.77	2.14	52.8	.189E+01	.97	399.02	2.14	1.17
664.95	-293.77	2.14	53.4	.187E+01	.96	406.64	2.14	1.18
679.77	-293.77	2.14	54.1	.185E+01	.96	414.16	2.14	1.18
694.59	-293.77	2.14	54.7	.183E+01	.95	421.60	2.14	1.19
709.41	-293.77	2.14	55.4	.181E+01	.95	428.95	2.14	1.19
724.23	-293.77	2.14	56.1	.178E+01	.94	436.22	2.14	1.20
739.04	-293.77	2.14	56.7	.176E+01	.94	443.41	2.14	1.20
753.86	-293.77	2.14	57.4	.174E+01	.94	450.53	2.14	1.20
768.68	-293.77	2.14	58.1	.172E+01	.93	457.58	2.14	1.21
783.50	-293.77	2.14	58.8	.170E+01	.93	464.55	2.14	1.21
798.32	-293.77	2.14	59.6	.168E+01	.93	471.46	2.14	1.21
813.13	-293.77	2.14	60.3	.166E+01	.93	478.30	2.14	1.21
827.95	-293.77	2.14	61.1	.164E+01	.92	485.09	2.14	1.22
842.77	-293.77	2.14	61.8	.162E+01	.92	491.81	2.14	1.22
857.59	-293.77	2.14	62.6	.160E+01	.92	498.47	2.14	1.22
872.41	-293.77	2.14	63.4	.158E+01	.92	505.08	2.14	1.22

887.22	-293.77	2.14	64.2	.156E+01	.92	511.63	2.14	1.22
902.04	-293.77	2.14	65.0	.154E+01	.92	518.12	2.14	1.22
916.86	-293.77	2.14	65.8	.152E+01	.92	524.57	2.14	1.22
931.68	-293.77	2.14	66.7	.150E+01	.92	530.97	2.14	1.22
946.50	-293.77	2.14	67.5	.148E+01	.92	537.32	2.14	1.22
961.31	-293.77	2.14	68.4	.146E+01	.92	543.62	2.14	1.22
976.13	-293.77	2.14	69.3	.144E+01	.92	549.88	2.14	1.22
990.95	-293.77	2.14	70.2	.142E+01	.93	556.09	2.14	1.21
1005.77	-293.77	2.14	71.1	.141E+01	.93	562.26	2.14	1.21
1020.59	-293.77	2.14	72.0	.139E+01	.93	568.39	2.14	1.21

Cumulative travel time = 38011. sec

Plume is ATTACHED to LEFT bank/shore.
Plume width is now determined from LEFT bank/shore.

Plume Stage 2 (bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL
1020.58	274.30	2.14	72.0	.139E+01	.93	1136.15	2.14	1.21
1062.46	274.30	2.14	74.4	.134E+01	.95	1151.31	2.14	1.19
1104.34	274.30	2.14	76.8	.130E+01	.97	1166.39	2.14	1.17
1146.21	274.30	2.14	79.2	.126E+01	.98	1181.39	2.14	1.16
1188.09	274.30	2.14	81.8	.122E+01	1.00	1196.32	2.14	1.14
1229.97	274.30	2.14	84.3	.119E+01	1.02	1211.18	2.14	1.12
1271.84	274.30	2.14	87.0	.115E+01	1.04	1225.97	2.14	1.10
1313.72	274.30	2.14	89.7	.111E+01	1.06	1240.69	2.14	1.08
1355.60	274.30	2.14	92.5	.108E+01	1.08	1255.35	2.14	1.06
1397.47	274.30	2.14	95.3	.105E+01	1.10	1269.94	2.14	1.04
1439.35	274.30	2.14	98.2	.102E+01	1.12	1284.47	2.14	1.02
1481.23	274.30	2.14	101.1	.989E+00	1.14	1298.95	2.14	1.00
1523.10	274.30	2.14	104.2	.960E+00	1.16	1313.36	2.14	.98
1564.98	274.30	2.14	107.3	.932E+00	1.18	1327.72	2.14	.96
1606.85	274.30	2.14	110.4	.906E+00	1.21	1342.03	2.14	.93
1648.73	274.30	2.14	113.6	.880E+00	1.23	1356.28	2.14	.91
1690.61	274.30	2.14	116.9	.855E+00	1.25	1370.48	2.14	.89
1732.48	274.30	2.14	120.3	.832E+00	1.27	1384.63	2.14	.87
1774.36	274.30	2.14	123.7	.809E+00	1.30	1398.73	2.14	.84
1816.24	274.30	2.14	127.2	.786E+00	1.32	1412.79	2.14	.82
1858.11	274.30	2.14	130.7	.765E+00	1.34	1426.79	2.14	.80
1899.99	274.30	2.14	134.3	.744E+00	1.37	1440.76	2.14	.77
1941.87	274.30	2.14	138.0	.725E+00	1.39	1454.67	2.14	.75
1983.74	274.30	2.14	141.8	.705E+00	1.42	1468.54	2.14	.72
2025.62	274.30	2.14	145.6	.687E+00	1.44	1482.37	2.14	.70
2067.50	274.30	2.14	149.5	.669E+00	1.47	1496.16	2.14	.67
2109.37	274.30	2.14	153.5	.652E+00	1.49	1509.91	2.14	.65
2151.25	274.30	2.14	157.5	.635E+00	1.52	1523.61	2.14	.62
2193.13	274.30	2.14	161.6	.619E+00	1.54	1537.28	2.14	.60
2235.00	274.30	2.14	165.8	.603E+00	1.57	1550.90	2.14	.57
2276.88	274.30	2.14	170.1	.588E+00	1.59	1564.49	2.14	.55
2318.75	274.30	2.14	174.4	.573E+00	1.62	1578.04	2.14	.52
2360.63	274.30	2.14	178.8	.559E+00	1.65	1591.55	2.14	.49
2402.51	274.30	2.14	183.3	.546E+00	1.67	1605.03	2.14	.47
2444.38	274.30	2.14	187.8	.532E+00	1.70	1618.47	2.14	.44
2486.26	274.30	2.14	192.5	.520E+00	1.73	1631.88	2.14	.41
2528.14	274.30	2.14	197.2	.507E+00	1.76	1645.25	2.14	.38
2570.01	274.30	2.14	201.9	.495E+00	1.79	1658.59	2.14	.35
2611.89	274.30	2.14	206.8	.484E+00	1.81	1671.89	2.14	.33
2653.77	274.30	2.14	211.7	.472E+00	1.84	1685.16	2.14	.30
2695.64	274.30	2.14	216.7	.461E+00	1.87	1698.40	2.14	.27
2737.52	274.30	2.14	221.8	.451E+00	1.90	1711.60	2.14	.24
2779.40	274.30	2.14	227.0	.441E+00	1.93	1724.78	2.14	.21

2821.27	274.30	2.14	232.2	.431E+00	1.96	1737.92	2.14	.18
2863.15	274.30	2.14	237.5	.421E+00	1.99	1751.03	2.14	.15
2905.02	274.30	2.14	242.9	.412E+00	2.02	1764.11	2.14	.12
2946.90	274.30	2.14	248.4	.403E+00	2.05	1777.16	2.14	.09
2988.78	274.30	2.14	254.0	.394E+00	2.08	1790.18	2.14	.06
3030.65	274.30	2.14	259.6	.385E+00	2.11	1803.17	2.14	.03
3072.53	274.30	2.14	265.3	.377E+00	2.14	1816.14	2.14	.00
3114.41	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00

Cumulative travel time = 119575. sec
Plume is LATERALLY FULLY MIXED at the end of the buoyant spreading regime.

END OF MOD141: BUOYANT AMBIENT SPREADING

Due to the attachment or proximity of the plume to the bottom, the bottom coordinate for the FAR-FIELD differs from the ambient depth, ZFB = 0 m.
In a subsequent analysis set "depth at discharge" equal to "ambient depth".

BEGIN MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = .120E-02 m^2/s
Horizontal diffusivity (initial value) = .301E-02 m^2/s

The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

Profile definitions:
BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
= or equal to layer depth, if fully mixed
BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

Plume Stage 2 (bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL
3114.40	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
3417.92	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00

Effluent is FULLY MIXED over the entire channel cross-section.
Except for possible far-field decay or reaction processes, there are NO FURTHER CHANGES with downstream direction.

3721.43	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
4024.94	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
4328.45	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
4631.96	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
4935.48	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
5238.99	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
5542.50	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
5846.01	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
6149.52	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
6453.03	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
6756.55	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
7060.06	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
7363.57	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
7667.08	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
7970.59	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
8274.10	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
8577.62	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
8881.13	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
9184.64	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
9488.15	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00

9791.66	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
10095.17	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
10398.69	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
10702.20	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
11005.71	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
11309.22	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
11612.73	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
11916.25	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
12219.76	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
12523.27	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
12826.78	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
13130.29	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
13433.80	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
13737.32	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
14040.83	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
14344.34	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
14647.85	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
14951.36	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
15254.87	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
15558.39	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
15861.90	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
16165.41	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
16468.92	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
16772.43	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
17075.95	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
17379.46	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
17682.97	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
17986.48	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00
18289.99	274.30	2.14	271.1	.369E+00	2.14	1829.00	2.14	.00

Cumulative travel time = 710739. sec

Simulation limit based on maximum specified distance = 18290.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

CORMIX1: Submerged Single Port Discharges End of Prediction File

1111111111111111111111111111111111111111111111111111111111111111111111111111111

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                  CORMIX: CORNELL MIXING ZONE EXPERT SYSTEM
                      CORMIX-GI Version 4.03b
SITE NAME/LABEL:                SECI SGS Outfall D-001
  DESIGN CASE:                  8.598 mgd, Median Ebb Current 16 inch discharge
  FILE NAME:                    C:\Documents and
Settings\mfeldmeyer\Desktop\Cormix Unit 3\MidEbb-AADF16.prd
Using subsystem CORMIX1:        Submerged Single Port Discharges
  Start of session:             02/07/2006--15:41:32
*****************************************************************************
SUMMARY OF INPUT DATA:
-----------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                          = bounded
  Width                          BS      = 1829 m
  Channel regularity             ICHREG  = 2
  Ambient flowrate               QA      = 142.83 m^3/s
  Average depth                  HA      = 3.05 m
  Depth at discharge             HD      = 2.14 m
  Ambient velocity               UA      = 0.0256 m/s
  Darcy-Weisbach friction factor F       = 0.0626
    Calculated from Manning's n          = 0.034
  Wind velocity                  UW      = 2 m/s
Stratification Type              STRCND  = U
  Surface density                RHOAS   = 997.5800 kg/m^3
  Bottom density                 RHOAB   = 997.5800 kg/m^3
-----------------------------------------------------------------------------
DISCHARGE PARAMETERS:            Submerged Single Port Discharge
  Nearest bank                           = left
  Distance to bank               DISTB   = 274.30 m
  Port diameter                  D0      = 0.4064 m
  Port cross-sectional area      A0      = 0.1297 m^2
  Discharge velocity             U0      = 2.90 m/s
  Discharge flowrate             Q0      = 0.376701 m^3/s
  Discharge port height          H0      = 0.18 m
  Vertical discharge angle       THETA   = 20 deg
  Horizontal discharge angle     SIGMA   = 290 deg
  Discharge temperature (freshwater)     = 31.78 degC
    Corresponding density        RHO0    = 995.0960 kg/m^3
  Density difference             DRHO    = 2.4840 kg/m^3
  Buoyant acceleration           GP0     = 0.0244 m/s^2
  Discharge concentration        C0      = 100 mg/l
  Surface heat exchange coeff.   KS      = 0 m/s
  Coefficient of decay           KD      = 0 /s
-----------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  = 0.36 m         Lm  = 40.85 m         Lb  = 548.06 m
  LM  = 11.15 m        Lm' = 99999 m         Lb' = 99999 m
-----------------------------------------------------------------------------
NON-DIMENSIONAL PARAMETERS:
  Port densimetric Froude number FR0     = 29.15
  Velocity ratio                 R       = 113.42
-----------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                        = no
  Water quality standard specified       = no
  Regulatory mixing zone                 = no
  Region of interest                     = 18290 m downstream
*****************************************************************************
HYDRODYNAMIC CLASSIFICATION:
```

```
*------------------------*
| FLOW CLASS    = H5-90 |
*------------------------*
This flow configuration applies to a layer corresponding to the full water
depth at the discharge site.
Applicable layer depth = water depth = 2.14 m
*****************************************************************************
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

-----------------------------------------------------------------------------
X-Y-Z Coordinate system:
  Origin is located at the bottom below the port center:
    274.30 m from the left bank/shore.
  Number of display steps NSTEP = 50 per module.
-----------------------------------------------------------------------------
NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no regulatory
  implication.  However, this information may be useful for the discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at edge of NFR = 2.6807 mg/l
  Dilution at edge of NFR                = 37.3
  NFR Location:                        x = 279.69 m
    (centerline coordinates)           y = -293.77 m
                                       z = 2.14 m
  NFR plume dimensions:       half-width = 69.52 m
                               thickness = 0.77 m
-----------------------------------------------------------------------------
Buoyancy assessment:
  The effluent density is less than the surrounding ambient water
  density at the discharge level.
  Therefore, the effluent is POSITIVELY BUOYANT and will tend to rise towards
  the surface.
-----------------------------------------------------------------------------
Near-field instability behavior:
  The discharge flow will experience instabilities with full vertical mixing
  in the near-field.
  There may be benthic impact of high pollutant concentrations.
-----------------------------------------------------------------------------
FAR-FIELD MIXING SUMMARY:
  Plume is vertically fully mixed WITHIN NEAR-FIELD (or a fraction thereof),
  but RE-STRATIFIES LATER.
  Plume becomes vertically fully mixed again at 3114.40 m downstream.
-----------------------------------------------------------------------------
PLUME BANK CONTACT SUMMARY:
  Plume in bounded section contacts nearest bank at 1020.58 m downstream.
  Plume contacts second bank at 3114.41 m downstream.
************************ TOXIC DILUTION ZONE SUMMARY ***********************
No TDZ was specified for this simulation.
********************* REGULATORY MIXING ZONE SUMMARY **********************
No RMZ and no ambient water quality standard have been specified.
******************** FINAL DESIGN ADVICE AND COMMENTS *********************
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any known
  technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the
  CORMIX predictions on dilutions and concentrations (with associated
  plume geometries) are reliable for the majority of cases and are accurate
  to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges
  the design configuration as highly complex and uncertain for prediction.
```

```
CORMIX1 PREDICTION FILE:
111111111111111111111111111111111111111111111111111111111111111111111111111
                      CORNELL MIXING ZONE EXPERT SYSTEM
Subsystem CORMIX1:                                        Subsystem version:
 Submerged Single Port Discharges           CORMIX-GI Version 4.03b
---------------------------------------------------------------------------
---------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:          SECI SGS Outfall D-001
 Design case:              8.598 mgd, Median Flood Current 16 inch discharge
 FILE NAME:                C:\Documents and Settings\mfeldmeyer\Desktop\Cormi
 Time of Fortran run:      02/07/2006--15:42:40

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =   1829.00  AS    =   5578.45  QA    =     142.83  ICHREG= 2
 HA    =      3.05  HD    =      2.14
 UA    =      .026  F     =      .063  USTAR = .2264E-02
 UW    =     2.000  UWSTAR= .2198E-02
 Uniform density environment
 STRCND=  U         RHOAM =  997.5800

DISCHARGE PARAMETERS (metric units)
 BANK  =  RIGHT     DISTB =    274.30
 D0    =      .406  A0    =      .130  H0    =        .18
 THETA =     20.00  SIGMA =    110.00
 U0    =     2.904  Q0    =      .377        = .3767E+00
 RHO0  =  995.0961  DRHO0 = .2484E+01  GP0   = .2442E-01
 C0    = .1000E+03  CUNITS=  mg/l
 IPOLL =  1         KS    = .0000E+00  KD    = .0000E+00

FLUX VARIABLES (metric units)
 Q0    = .3767E+00  M0    = .1094E+01  J0    = .9198E-02  SIGNJ0=      1.0
 Associated length scales (meters)
 LQ    =       .36  LM    =     11.15  Lm    =      40.85  Lb    =    548.06
                                       Lmp   =   99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =     29.15  R     =    113.42

FLOW CLASSIFICATION
 111111111111111111111111111111111111111111
 1  Flow class (CORMIX1)      =    H5-90  1
 1  Applicable layer depth HS =     2.14  1
 111111111111111111111111111111111111111111

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    = .1000E+03  CUNITS=  mg/l
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =  18290.00  XMAX  =  18290.00

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and below the center of the port:
       274.30 m  from the RIGHT bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP = 50 display intervals per module
---------------------------------------------------------------------------
---------------------------------------------------------------------------
BEGIN MOD101: DISCHARGE MODULE
```

COANDA ATTACHMENT immediately following the discharge.

X	Y	Z	S	C	B
.00	.00	.00	1.0	.100E+03	.29

END OF MOD101: DISCHARGE MODULE

BEGIN CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

Bottom-attached jet motion.

Profile definitions:
B = Gaussian 1/e (37%) half-width, normal to trajectory
Half wall jet, attached to bottom.
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	B
.00	.00	.00	1.0	.100E+03	.21
-.12	.34	.00	1.0	.100E+03	.25
-.25	.68	.00	1.0	.100E+03	.28
-.37	1.03	.00	1.0	.100E+03	.32
-.49	1.37	.00	1.1	.949E+02	.36
-.62	1.71	.00	1.2	.856E+02	.40
-.74	2.08	.00	1.3	.777E+02	.44
-.86	2.42	.00	1.4	.714E+02	.48
-.98	2.76	.00	1.5	.661E+02	.52
-1.10	3.11	.00	1.6	.615E+02	.56
-1.22	3.45	.00	1.7	.575E+02	.60
-1.35	3.81	.00	1.9	.538E+02	.64
-1.47	4.16	.00	2.0	.508E+02	.68
-1.58	4.50	.00	2.1	.481E+02	.72
-1.70	4.85	.00	2.2	.456E+02	.76
-1.82	5.19	.00	2.3	.434E+02	.80
-1.94	5.56	.00	2.4	.413E+02	.84
-2.05	5.90	.00	2.5	.395E+02	.88
-2.17	6.25	.00	2.6	.379E+02	.92
-2.28	6.59	.00	2.8	.363E+02	.96
-2.39	6.94	.00	2.9	.349E+02	.99
-2.51	7.31	.00	3.0	.336E+02	1.03
-2.62	7.65	.00	3.1	.324E+02	1.07
-2.73	8.00	.00	3.2	.313E+02	1.11
-2.84	8.34	.00	3.3	.303E+02	1.15
-2.95	8.69	.00	3.4	.293E+02	1.19
-3.07	9.06	.00	3.5	.283E+02	1.23
-3.18	9.41	.00	3.6	.275E+02	1.27
-3.29	9.75	.00	3.7	.267E+02	1.30
-3.39	10.10	.00	3.9	.259E+02	1.34
-3.50	10.45	.00	4.0	.252E+02	1.38
-3.61	10.80	.00	4.1	.246E+02	1.42
-3.72	11.17	.00	4.2	.239E+02	1.46
-3.82	11.51	.00	4.3	.233E+02	1.50
-3.93	11.86	.00	4.4	.227E+02	1.53
-4.03	12.21	.00	4.5	.222E+02	1.57
-4.13	12.56	.00	4.6	.217E+02	1.61
-4.24	12.93	.00	4.7	.212E+02	1.65
-4.34	13.28	.00	4.8	.207E+02	1.69
-4.44	13.63	.00	4.9	.203E+02	1.73
-4.54	13.98	.00	5.0	.198E+02	1.76

```
    -4.64     14.33      .00      5.1  .194E+02   1.80
    -4.75     14.70      .00      5.3  .190E+02   1.84
    -4.84     15.05      .00      5.4  .186E+02   1.88
    -4.94     15.40      .00      5.5  .183E+02   1.91
    -5.04     15.75      .00      5.6  .179E+02   1.95
    -5.13     16.10      .00      5.7  .176E+02   1.99
    -5.23     16.47      .00      5.8  .173E+02   2.03
    -5.33     16.83      .00      5.9  .170E+02   2.07
    -5.42     17.18      .00      6.0  .167E+02   2.10
    -5.52     17.53      .00      6.1  .164E+02   2.14
 Cumulative travel time =          18. sec

END OF CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
BEGIN MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

  Control volume inflow:
       X         Y         Z         S         C         B
    -5.52     17.53      .00      6.1  .164E+02   2.14

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)

       X         Y         Z         S         C        BV        BH        ZU        ZL
    -7.66     15.46     2.14      6.1  .164E+02      .00       .00      2.14      2.14
    -7.39     15.46     2.14      6.1  .164E+02     2.14       .59      2.14       .00
    -7.12     15.46     2.14      6.1  .164E+02     2.14       .84      2.14       .00
    -6.85     15.46     2.14      6.1  .164E+02     2.14      1.03      2.14       .00
    -6.58     15.46     2.14      6.1  .164E+02     2.14      1.18      2.14       .00
    -6.31     15.46     2.14      6.1  .164E+02     2.14      1.32      2.14       .00
    -6.04     15.46     2.14      6.1  .164E+02     2.14      1.45      2.14       .00
    -5.78     15.46     2.14      6.1  .164E+02     2.14      1.57      2.14       .00
    -5.51     15.46     2.14      6.1  .164E+02     2.14      1.67      2.14       .00
    -5.24     15.46     2.14      7.7  .130E+02     2.14      1.78      2.14       .00
    -4.97     15.46     2.14      8.5  .117E+02     2.14      1.87      2.14       .00
 Cumulative travel time =          32. sec

END OF MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
BEGIN MOD154: VERTICALLY MIXED PLUME IN WEAK CROSS-FLOW

 Phase 1: Vertically mixed, Phase 2: Re-stratified

 Phase 1: The plume is VERTICALLY FULLY MIXED over the entire layer depth.
 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = Gaussian 1/e (37%) half-width in horizontal plane normal to trajectory
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)

       X         Y         Z         S         C        BV        BH        ZU        ZL
    -4.97     15.46     2.14      8.5  .117E+02     2.14      1.53      2.14       .00
```

-5.35	17.96	2.14	9.2	.109E+02	2.14	1.77	2.14	.00
-5.68	20.46	2.14	9.8	.102E+02	2.14	2.00	2.14	.00
-5.98	22.96	2.14	10.4	.962E+01	2.14	2.24	2.14	.00
-6.25	25.46	2.14	10.9	.913E+01	2.14	2.48	2.14	.00
-6.49	27.96	2.14	11.5	.872E+01	2.14	2.71	2.14	.00
-6.69	30.47	2.14	12.0	.835E+01	2.14	2.94	2.14	.00
-6.87	32.97	2.14	12.4	.803E+01	2.14	3.18	2.14	.00
-7.01	35.47	2.14	12.9	.775E+01	2.14	3.41	2.14	.00
-7.13	37.97	2.14	13.4	.749E+01	2.14	3.64	2.14	.00
-7.23	40.47	2.14	13.8	.725E+01	2.14	3.87	2.14	.00
-7.29	42.97	2.14	14.2	.704E+01	2.14	4.10	2.14	.00
-7.34	45.47	2.14	14.6	.684E+01	2.14	4.33	2.14	.00
-7.36	47.97	2.14	15.0	.666E+01	2.14	4.55	2.14	.00
-7.35	50.47	2.14	15.4	.650E+01	2.14	4.78	2.14	.00
-7.32	52.97	2.14	15.8	.634E+01	2.14	5.01	2.14	.00
-7.27	55.48	2.14	16.1	.620E+01	2.14	5.23	2.14	.00
-7.20	57.98	2.14	16.5	.606E+01	2.14	5.46	2.14	.00
-7.11	60.48	2.14	16.8	.594E+01	2.14	5.68	2.14	.00
-6.99	62.98	2.14	17.2	.582E+01	2.14	5.91	2.14	.00
-6.86	65.48	2.14	17.5	.571E+01	2.14	6.13	2.14	.00
-6.70	67.98	2.14	17.9	.560E+01	2.14	6.35	2.14	.00
-6.53	70.48	2.14	18.2	.550E+01	2.14	6.57	2.14	.00
-6.34	72.98	2.14	18.5	.541E+01	2.14	6.80	2.14	.00
-6.12	75.48	2.14	18.8	.532E+01	2.14	7.02	2.14	.00
-5.89	77.98	2.14	19.1	.523E+01	2.14	7.24	2.14	.00
-5.64	80.49	2.14	19.4	.515E+01	2.14	7.46	2.14	.00
-5.37	82.99	2.14	19.7	.507E+01	2.14	7.68	2.14	.00
-5.09	85.49	2.14	20.0	.500E+01	2.14	7.90	2.14	.00
-4.78	87.99	2.14	20.3	.492E+01	2.14	8.11	2.14	.00
-4.46	90.49	2.14	20.6	.486E+01	2.14	8.33	2.14	.00
-4.12	92.99	2.14	20.9	.479E+01	2.14	8.55	2.14	.00
-3.77	95.49	2.14	21.2	.473E+01	2.14	8.77	2.14	.00
-3.40	97.99	2.14	21.4	.467E+01	2.14	8.98	2.14	.00
-3.01	100.49	2.14	21.7	.461E+01	2.14	9.20	2.14	.00
-2.61	102.99	2.14	22.0	.455E+01	2.14	9.42	2.14	.00
-2.19	105.50	2.14	22.2	.450E+01	2.14	9.63	2.14	.00
-1.75	108.00	2.14	22.5	.445E+01	2.14	9.85	2.14	.00
-1.30	110.50	2.14	22.8	.440E+01	2.14	10.06	2.14	.00
-.83	113.00	2.14	23.0	.435E+01	2.14	10.28	2.14	.00
-.35	115.50	2.14	23.3	.430E+01	2.14	10.49	2.14	.00
.15	118.00	2.14	23.5	.425E+01	2.14	10.70	2.14	.00
.66	120.50	2.14	23.8	.421E+01	2.14	10.92	2.14	.00
1.19	123.00	2.14	24.0	.417E+01	2.14	11.13	2.14	.00
1.73	125.50	2.14	24.2	.412E+01	2.14	11.34	2.14	.00
2.29	128.00	2.14	24.5	.408E+01	2.14	11.55	2.14	.00
2.86	130.51	2.14	24.7	.404E+01	2.14	11.77	2.14	.00
3.45	133.01	2.14	25.0	.401E+01	2.14	11.98	2.14	.00
4.05	135.51	2.14	25.2	.397E+01	2.14	12.19	2.14	.00
4.66	138.01	2.14	25.4	.393E+01	2.14	12.40	2.14	.00
5.29	140.51	2.14	25.7	.390E+01	2.14	12.61	2.14	.00

Cumulative travel time = 2992. sec

End of Phase 1:

The mixed diffuser flow has RESTRATIFIED and is now detached from the bottom or surface/interface.

Phase 2: The flow has RESTRATIFIED at the beginning of this zone.

Profile definitions:

BV = top-hat thickness, measured vertically

BH = Gaussian 1/e (37%) half-width in horizontal plane normal to trajectory

ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH	ZU	ZL
5.29	140.51	2.14	25.7	.390E+01	2.14	12.61	2.14	.00
6.07	143.56	2.14	25.9	.386E+01	1.77	15.53	2.14	.37
6.87	146.61	2.14	26.2	.382E+01	1.62	17.38	2.14	.52
7.70	149.66	2.14	26.5	.378E+01	1.51	18.98	2.14	.63
8.54	152.71	2.14	26.7	.374E+01	1.43	20.46	2.14	.71
9.40	155.75	2.14	27.0	.370E+01	1.36	21.85	2.14	.78
10.29	158.80	2.14	27.3	.367E+01	1.31	23.18	2.14	.83
11.19	161.85	2.14	27.5	.363E+01	1.26	24.46	2.14	.88
12.11	164.90	2.14	27.8	.360E+01	1.22	25.70	2.14	.92
13.05	167.95	2.14	28.0	.357E+01	1.18	26.92	2.14	.96
14.00	171.00	2.14	28.3	.353E+01	1.15	28.11	2.14	.99
14.98	174.05	2.14	28.5	.350E+01	1.13	29.28	2.14	1.01
15.98	177.10	2.14	28.8	.347E+01	1.10	30.43	2.14	1.04
16.99	180.15	2.14	29.0	.344E+01	1.08	31.56	2.14	1.06
18.02	183.20	2.14	29.3	.341E+01	1.06	32.68	2.14	1.08
19.07	186.25	2.14	29.5	.339E+01	1.04	33.79	2.14	1.10
20.14	189.29	2.14	29.8	.336E+01	1.02	34.89	2.14	1.12
21.22	192.34	2.14	30.0	.333E+01	1.00	35.97	2.14	1.14
22.32	195.39	2.14	30.2	.331E+01	.99	37.05	2.14	1.15
23.44	198.44	2.14	30.5	.328E+01	.98	38.12	2.14	1.16
24.58	201.49	2.14	30.7	.326E+01	.96	39.19	2.14	1.18
25.73	204.54	2.14	30.9	.323E+01	.95	40.24	2.14	1.19
26.90	207.59	2.14	31.2	.321E+01	.94	41.30	2.14	1.20
28.09	210.64	2.14	31.4	.318E+01	.93	42.34	2.14	1.21
29.29	213.69	2.14	31.6	.316E+01	.92	43.38	2.14	1.22
30.51	216.74	2.14	31.9	.314E+01	.91	44.42	2.14	1.23
31.75	219.78	2.14	32.1	.312E+01	.90	45.45	2.14	1.24
33.00	222.83	2.14	32.3	.310E+01	.89	46.48	2.14	1.25
34.27	225.88	2.14	32.5	.308E+01	.88	47.50	2.14	1.26
35.55	228.93	2.14	32.7	.305E+01	.87	48.52	2.14	1.27
36.86	231.98	2.14	33.0	.303E+01	.87	49.54	2.14	1.27
38.17	235.03	2.14	33.2	.301E+01	.86	50.56	2.14	1.28
39.51	238.08	2.14	33.4	.300E+01	.85	51.57	2.14	1.29
40.85	241.13	2.14	33.6	.298E+01	.85	52.58	2.14	1.29
42.22	244.18	2.14	33.8	.296E+01	.84	53.59	2.14	1.30
43.60	247.23	2.14	34.0	.294E+01	.83	54.59	2.14	1.31
44.99	250.27	2.14	34.2	.292E+01	.83	55.59	2.14	1.31
46.40	253.32	2.14	34.4	.290E+01	.82	56.59	2.14	1.32
47.83	256.37	2.14	34.6	.289E+01	.82	57.59	2.14	1.32
49.27	259.42	2.14	34.8	.287E+01	.81	58.59	2.14	1.33
50.72	262.47	2.14	35.1	.285E+01	.81	59.59	2.14	1.33
52.20	265.52	2.14	35.3	.284E+01	.80	60.58	2.14	1.34
53.68	268.57	2.14	35.5	.282E+01	.80	61.58	2.14	1.34
55.18	271.62	2.14	35.7	.280E+01	.79	62.57	2.14	1.35
56.70	274.67	2.14	35.9	.279E+01	.79	63.56	2.14	1.35
58.23	277.72	2.14	36.1	.277E+01	.79	64.55	2.14	1.35
59.77	280.77	2.14	36.3	.276E+01	.78	65.54	2.14	1.36
61.33	283.81	2.14	36.4	.274E+01	.78	66.53	2.14	1.36
62.90	286.86	2.14	36.6	.273E+01	.77	67.51	2.14	1.37
64.49	289.91	2.14	36.8	.271E+01	.77	68.50	2.14	1.37
66.09	292.96	2.14	37.0	.270E+01	.77	69.48	2.14	1.37

Cumulative travel time = 9165. sec

END OF MOD154: VERTICALLY MIXED PLUME IN WEAK CROSS-FLOW

** End of NEAR-FIELD REGION (NFR) **

The initial plume WIDTH values in the next far-field module will be
CORRECTED by a factor 2.26 to conserve the mass flux in the far-field!
The correction factor is quite large because of the small ambient velocity
relative to the strong mixing characteristics of the discharge!
This indicates localized RECIRCULATION REGIONS and internal hydraulic JUMPS.

BEGIN MOD141: BUOYANT AMBIENT SPREADING

Profile definitions:
BV = top-hat thickness, measured vertically
BH = top-hat half-width, measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)

Plume Stage 1 (not bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL
66.09	292.96	2.14	37.0	.270E+01	1.73	156.98	2.14	.41
80.88	292.96	2.14	37.9	.264E+01	1.63	170.05	2.14	.51
95.68	292.96	2.14	38.6	.259E+01	1.55	182.59	2.14	.59
110.48	292.96	2.14	39.3	.254E+01	1.48	194.66	2.14	.66
125.27	292.96	2.14	40.0	.250E+01	1.42	206.32	2.14	.72
140.07	292.96	2.14	40.7	.246E+01	1.37	217.61	2.14	.77
154.86	292.96	2.14	41.3	.242E+01	1.33	228.57	2.14	.81
169.66	292.96	2.14	41.9	.238E+01	1.29	239.23	2.14	.85
184.45	292.96	2.14	42.5	.235E+01	1.25	249.62	2.14	.89
199.25	292.96	2.14	43.1	.232E+01	1.22	259.75	2.14	.92
214.05	292.96	2.14	43.7	.229E+01	1.19	269.66	2.14	.95
228.84	292.96	2.14	44.3	.226E+01	1.16	279.34	2.14	.98
243.64	292.96	2.14	44.8	.223E+01	1.14	288.83	2.14	1.00
258.43	292.96	2.14	45.4	.220E+01	1.12	298.12	2.14	1.02
273.23	292.96	2.14	46.0	.218E+01	1.10	307.24	2.14	1.04
288.02	292.96	2.14	46.5	.215E+01	1.08	316.19	2.14	1.06
302.82	292.96	2.14	47.1	.212E+01	1.06	324.99	2.14	1.08
317.62	292.96	2.14	47.7	.210E+01	1.05	333.64	2.14	1.09
332.41	292.96	2.14	48.3	.207E+01	1.03	342.15	2.14	1.11
347.21	292.96	2.14	48.8	.205E+01	1.02	350.53	2.14	1.12
362.00	292.96	2.14	49.4	.202E+01	1.01	358.78	2.14	1.13
376.80	292.96	2.14	50.0	.200E+01	1.00	366.91	2.14	1.14
391.59	292.96	2.14	50.6	.198E+01	.99	374.92	2.14	1.15
406.39	292.96	2.14	51.2	.195E+01	.98	382.83	2.14	1.16
421.19	292.96	2.14	51.8	.193E+01	.97	390.64	2.14	1.17
435.98	292.96	2.14	52.4	.191E+01	.97	398.34	2.14	1.17
450.78	292.96	2.14	53.1	.188E+01	.96	405.95	2.14	1.18
465.57	292.96	2.14	53.7	.186E+01	.95	413.46	2.14	1.19
480.37	292.96	2.14	54.4	.184E+01	.95	420.89	2.14	1.19
495.16	292.96	2.14	55.0	.182E+01	.94	428.24	2.14	1.20
509.96	292.96	2.14	55.7	.180E+01	.94	435.50	2.14	1.20
524.76	292.96	2.14	56.4	.177E+01	.93	442.68	2.14	1.21
539.55	292.96	2.14	57.0	.175E+01	.93	449.79	2.14	1.21
554.35	292.96	2.14	57.7	.173E+01	.93	456.83	2.14	1.21
569.14	292.96	2.14	58.5	.171E+01	.92	463.80	2.14	1.22
583.94	292.96	2.14	59.2	.169E+01	.92	470.70	2.14	1.22
598.73	292.96	2.14	59.9	.167E+01	.92	477.54	2.14	1.22
613.53	292.96	2.14	60.7	.165E+01	.92	484.31	2.14	1.22
628.33	292.96	2.14	61.4	.163E+01	.92	491.02	2.14	1.22
643.12	292.96	2.14	62.2	.161E+01	.92	497.68	2.14	1.22
657.92	292.96	2.14	63.0	.159E+01	.92	504.28	2.14	1.22

672.71	292.96	2.14	63.8	.157E+01	.92	510.82	2.14	1.22
687.51	292.96	2.14	64.6	.155E+01	.92	517.31	2.14	1.22
702.30	292.96	2.14	65.4	.153E+01	.92	523.75	2.14	1.22
717.10	292.96	2.14	66.2	.151E+01	.92	530.14	2.14	1.22
731.90	292.96	2.14	67.1	.149E+01	.92	536.48	2.14	1.22
746.69	292.96	2.14	68.0	.147E+01	.92	542.78	2.14	1.22
761.49	292.96	2.14	68.8	.145E+01	.92	549.03	2.14	1.22
776.28	292.96	2.14	69.7	.143E+01	.92	555.23	2.14	1.22
791.08	292.96	2.14	70.6	.142E+01	.92	561.39	2.14	1.22
805.87	292.96	2.14	71.6	.140E+01	.93	567.51	2.14	1.21

Cumulative travel time = 37983. sec

Plume is ATTACHED to RIGHT bank/shore.
Plume width is now determined from RIGHT bank/shore.

Plume Stage 2 (bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL
805.87	-274.30	2.14	71.6	.140E+01	.93	1134.52	2.14	1.21
847.85	-274.30	2.14	73.9	.135E+01	.94	1149.72	2.14	1.20
889.82	-274.30	2.14	76.3	.131E+01	.96	1164.84	2.14	1.18
931.80	-274.30	2.14	78.8	.127E+01	.98	1179.88	2.14	1.16
973.77	-274.30	2.14	81.3	.123E+01	1.00	1194.84	2.14	1.14
1015.74	-274.30	2.14	83.9	.119E+01	1.02	1209.73	2.14	1.12
1057.72	-274.30	2.14	86.5	.116E+01	1.04	1224.56	2.14	1.10
1099.69	-274.30	2.14	89.2	.112E+01	1.06	1239.31	2.14	1.08
1141.67	-274.30	2.14	92.0	.109E+01	1.08	1254.00	2.14	1.06
1183.64	-274.30	2.14	94.8	.105E+01	1.10	1268.63	2.14	1.04
1225.61	-274.30	2.14	97.7	.102E+01	1.12	1283.20	2.14	1.02
1267.59	-274.30	2.14	100.7	.993E+00	1.14	1297.70	2.14	1.00
1309.56	-274.30	2.14	103.7	.964E+00	1.16	1312.15	2.14	.98
1351.54	-274.30	2.14	106.8	.936E+00	1.18	1326.54	2.14	.96
1393.51	-274.30	2.14	109.9	.910E+00	1.20	1340.88	2.14	.94
1435.49	-274.30	2.14	113.2	.884E+00	1.22	1355.17	2.14	.92
1477.46	-274.30	2.14	116.5	.859E+00	1.25	1369.40	2.14	.89
1519.43	-274.30	2.14	119.8	.835E+00	1.27	1383.59	2.14	.87
1561.41	-274.30	2.14	123.2	.812E+00	1.29	1397.72	2.14	.85
1603.38	-274.30	2.14	126.7	.789E+00	1.32	1411.81	2.14	.82
1645.36	-274.30	2.14	130.3	.768E+00	1.34	1425.84	2.14	.80
1687.33	-274.30	2.14	133.9	.747E+00	1.36	1439.84	2.14	.78
1729.30	-274.30	2.14	137.6	.727E+00	1.39	1453.78	2.14	.75
1771.28	-274.30	2.14	141.3	.708E+00	1.41	1467.69	2.14	.73
1813.25	-274.30	2.14	145.2	.689E+00	1.44	1481.55	2.14	.70
1855.23	-274.30	2.14	149.1	.671E+00	1.46	1495.37	2.14	.68
1897.20	-274.30	2.14	153.0	.653E+00	1.49	1509.15	2.14	.65
1939.17	-274.30	2.14	157.1	.637E+00	1.51	1522.88	2.14	.63
1981.15	-274.30	2.14	161.2	.620E+00	1.54	1536.58	2.14	.60
2023.12	-274.30	2.14	165.4	.605E+00	1.56	1550.24	2.14	.58
2065.10	-274.30	2.14	169.7	.589E+00	1.59	1563.86	2.14	.55
2107.07	-274.30	2.14	174.0	.575E+00	1.62	1577.44	2.14	.52
2149.05	-274.30	2.14	178.4	.561E+00	1.64	1590.98	2.14	.50
2191.02	-274.30	2.14	182.9	.547E+00	1.67	1604.49	2.14	.47
2232.99	-274.30	2.14	187.5	.533E+00	1.70	1617.96	2.14	.44
2274.97	-274.30	2.14	192.1	.521E+00	1.73	1631.40	2.14	.41
2316.94	-274.30	2.14	196.8	.508E+00	1.75	1644.80	2.14	.39
2358.92	-274.30	2.14	201.6	.496E+00	1.78	1658.17	2.14	.36
2400.89	-274.30	2.14	206.4	.484E+00	1.81	1671.50	2.14	.33
2442.86	-274.30	2.14	211.4	.473E+00	1.84	1684.80	2.14	.30
2484.84	-274.30	2.14	216.4	.462E+00	1.87	1698.07	2.14	.27
2526.81	-274.30	2.14	221.5	.451E+00	1.90	1711.31	2.14	.24
2568.79	-274.30	2.14	226.7	.441E+00	1.93	1724.51	2.14	.21

2610.76	-274.30	2.14	231.9	.431E+00	1.96	1737.68	2.14	.18
2652.73	-274.30	2.14	237.2	.422E+00	1.99	1750.82	2.14	.15
2694.71	-274.30	2.14	242.6	.412E+00	2.02	1763.93	2.14	.12
2736.68	-274.30	2.14	248.1	.403E+00	2.05	1777.01	2.14	.09
2778.66	-274.30	2.14	253.7	.394E+00	2.08	1790.06	2.14	.06
2820.63	-274.30	2.14	259.4	.386E+00	2.11	1803.08	2.14	.03
2862.61	-274.30	2.14	265.1	.377E+00	2.14	1816.08	2.14	.00
2904.58	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00

Cumulative travel time = 119737. sec
Plume is LATERALLY FULLY MIXED at the end of the buoyant spreading regime.

END OF MOD141: BUOYANT AMBIENT SPREADING

Due to the attachment or proximity of the plume to the bottom, the bottom coordinate for the FAR-FIELD differs from the ambient depth, ZFB = 0 m.
In a subsequent analysis set "depth at discharge" equal to "ambient depth".

BEGIN MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = .120E-02 m^2/s
Horizontal diffusivity (initial value) = .301E-02 m^2/s

The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

Profile definitions:
BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
= or equal to layer depth, if fully mixed
BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

Plume Stage 2 (bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL
2904.58	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
3212.29	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00

Effluent is FULLY MIXED over the entire channel cross-section.
Except for possible far-field decay or reaction processes, there are NO FURTHER CHANGES with downstream direction.

3519.99	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
3827.70	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
4135.41	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
4443.12	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
4750.83	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
5058.54	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
5366.24	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
5673.95	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
5981.66	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
6289.37	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
6597.08	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
6904.79	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
7212.50	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
7520.20	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
7827.91	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
8135.62	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
8443.33	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
8751.04	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
9058.75	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
9366.45	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00

9674.16	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
9981.87	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
10289.58	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
10597.29	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
10904.99	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
11212.70	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
11520.41	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
11828.12	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
12135.83	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
12443.53	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
12751.24	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
13058.95	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
13366.66	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
13674.37	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
13982.07	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
14289.78	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
14597.49	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
14905.20	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
15212.91	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
15520.61	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
15828.32	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
16136.03	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
16443.74	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
16751.45	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
17059.16	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
17366.87	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
17674.57	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
17982.28	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00
18289.99	-274.30	2.14	270.9	.369E+00	2.14	1829.00	2.14	.00

Cumulative travel time = 719075. sec

Simulation limit based on maximum specified distance = 18290.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

CORMIX1: Submerged Single Port Discharges End of Prediction File

1111111111111111111111111111111111111111111111111111111111111111111111111111

```
CORMIX SESSION REPORT:
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
                  CORMIX: CORNELL MIXING ZONE EXPERT SYSTEM
                      CORMIX-GI Version 4.03b
SITE NAME/LABEL:                SECI SGS Outfall D-001
  DESIGN CASE:                  8.598 mgd, Median Flood Current 16 inch discharge
  FILE NAME:                    C:\Documents and
Settings\mfeldmeyer\Desktop\Cormix Unit 3\MidFlood-AADF16.prd
Using subsystem CORMIX1:        Submerged Single Port Discharges
  Start of session:             02/07/2006--15:42:40
***************************************************************************
SUMMARY OF INPUT DATA:
---------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                          = bounded
  Width                         BS       = 1829 m
  Channel regularity            ICHREG = 2
  Ambient flowrate              QA       = 142.83 m^3/s
  Average depth                 HA       = 3.05 m
  Depth at discharge            HD       = 2.14 m
  Ambient velocity              UA       = 0.0256 m/s
  Darcy-Weisbach friction factor F       = 0.0626
    Calculated from Manning's n          = 0.034
  Wind velocity                 UW       = 2 m/s
Stratification Type             STRCND = U
  Surface density               RHOAS  = 997.5800 kg/m^3
  Bottom density                RHOAB  = 997.5800 kg/m^3
---------------------------------------------------------------------------
DISCHARGE PARAMETERS:           Submerged Single Port Discharge
  Nearest bank                           = right
  Distance to bank              DISTB  = 274.30 m
  Port diameter                 D0       = 0.4064 m
  Port cross-sectional area     A0       = 0.1297 m^2
  Discharge velocity            U0       = 2.90 m/s
  Discharge flowrate            Q0       = 0.376701 m^3/s
  Discharge port height         H0       = 0.18 m
  Vertical discharge angle      THETA  = 20 deg
  Horizontal discharge angle    SIGMA  = 110 deg
  Discharge temperature (freshwater)     = 31.78 degC
    Corresponding density       RHO0     = 995.0960 kg/m^3
  Density difference            DRHO     = 2.4840 kg/m^3
  Buoyant acceleration          GP0      = 0.0244 m/s^2
  Discharge concentration       C0       = 100 mg/l
  Surface heat exchange coeff.  KS       = 0 m/s
  Coefficient of decay          KD       = 0 /s
---------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  = 0.36 m         Lm  = 40.85 m         Lb  = 548.06 m
  LM  = 11.15 m        Lm' = 99999 m         Lb' = 99999 m
---------------------------------------------------------------------------
NON-DIMENSIONAL PARAMETERS:
  Port densimetric Froude number FR0     = 29.15
  Velocity ratio                R        = 113.42
---------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                        = no
  Water quality standard specified       = no
  Regulatory mixing zone                 = no
  Region of interest                     = 18290 m downstream
***************************************************************************
HYDRODYNAMIC CLASSIFICATION:
```

```
  *------------------------*
  | FLOW CLASS    = H5-90 |
  *------------------------*
  This flow configuration applies to a layer corresponding to the full water
  depth at the discharge site.
  Applicable layer depth = water depth = 2.14 m
*****************************************************************************
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

-----------------------------------------------------------------------------
X-Y-Z Coordinate system:
  Origin is located at the bottom below the port center:
    274.30 m from the right bank/shore.
  Number of display steps NSTEP = 50 per module.
-----------------------------------------------------------------------------
NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no regulatory
  implication.  However, this information may be useful for the discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at edge of NFR = 2.7004 mg/l
  Dilution at edge of NFR                = 37.0
  NFR Location:                        x = 66.09 m
    (centerline coordinates)           y = 292.96 m
                                       z = 2.14 m
  NFR plume dimensions:       half-width = 69.48 m
                               thickness = 0.77 m
-----------------------------------------------------------------------------
Buoyancy assessment:
  The effluent density is less than the surrounding ambient water
  density at the discharge level.
  Therefore, the effluent is POSITIVELY BUOYANT and will tend to rise towards
  the surface.
-----------------------------------------------------------------------------
Near-field instability behavior:
  The discharge flow will experience instabilities with full vertical mixing
  in the near-field.
  There may be benthic impact of high pollutant concentrations.
-----------------------------------------------------------------------------
FAR-FIELD MIXING SUMMARY:
  Plume is vertically fully mixed WITHIN NEAR-FIELD (or a fraction thereof),
  but RE-STRATIFIES LATER.
  Plume becomes vertically fully mixed again at 2904.58 m downstream.
-----------------------------------------------------------------------------
PLUME BANK CONTACT SUMMARY:
  Plume in bounded section contacts nearest bank at 805.87 m downstream.
  Plume contacts second bank at 2904.58 m downstream.
************************ TOXIC DILUTION ZONE SUMMARY ************************
No TDZ was specified for this simulation.
********************** REGULATORY MIXING ZONE SUMMARY **********************
No RMZ and no ambient water quality standard have been specified.
********************* FINAL DESIGN ADVICE AND COMMENTS *********************
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any known
  technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the
  CORMIX predictions on dilutions and concentrations (with associated
  plume geometries) are reliable for the majority of cases and are accurate
  to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges
  the design configuration as highly complex and uncertain for prediction.
```

10.1.3 Hazardous Waste Disposal Application

This application is not required for SGS Unit 3.

10.1.4 Section 10 or 404 Application/Nationwide Permit Application

The following section contains the ERP Permit Application which will be submitted to the Army Corps of Engineers.

SECTION A

FOR AGENCY USE ONLY	
ACOE Application #	DEP/WMD Application #
Date Application Received	Date Application Received
Proposed Project Lat.	Fee Received $
Proposed Project Long.	Fee Receipt #

PART 1:

Are any of the activities described in this application proposed to occur in, on, or over wetlands or other surface waters?
☒ yes ☐ no

Is this application being filed by or on behalf of a government entity or drainage district? ☐yes ☒no

PART 2:

A. Type of Environmental Resource Permit Requested (check at least one). See Attachment 2 for thresholds and descriptions.

- ☐ Noticed General - include information requested in Section B.
- ☐ Standard General (Single Family Dwelling) - include information requested in Sections C and D.
- ☐ Standard General (all other Standard General projects) - include information requested in Sections C and E.
- ☐ Individual (Single Family Dwelling) - include information requested in Sections C and D.
- ☒ Individual (all other Individual projects) - include information requested in Sections C and E.
- ☐ Conceptual - include information requested in Sections C and E.
- ☐ Mitigation Bank Permit (construction) - include information requested in Sections C and F. (If the proposed mitigation bank involves the construction of a surface water management system requiring another permit defined above, check the appropriate box and submit the information requested by the applicable section.)
- ☐ Mitigation Bank (conceptual) - include information requested in Sections C and F.

B. Type of activity for which you are applying (check at least one)

- ☐ Construction or operation of a new system, other than a solid waste facility, including dredging or filling in, on or over wetlands and other surface waters.
- ☐ Construction, expansion or modification of a solid waste facility.
- ☐ Alteration or operation of an existing system which was not previously permitted by a WMD or DEP.
- ☒ Modification of a system previously permitted by a WMD or DEP.
  Provide previous permit numbers:PA 78-10

☐ Alteration of a system	☐ Extension of permit duration
☐ Abandonment of a system	☒ Construction of additional phases of a system
☐ Removal of a system	

C. Are you requesting authorization to use Sovereign Submerged Lands?
☐yes ☒no

(See Section G and Attachment 5 for more information before answering this question.)

D. For activities in, on,or over wetlands or other surface waters, check type of federal dredge and fill permit requested:

☐Individual	☐Programmatic General	☐General
☒Nationwide	☐Not Applicable	

E. Are you claiming to qualify for an exemption? ☐yes ☒no
If yes, provide rule number if known. ___

PART 3: **A. OWNER(S) OF LAND**	**B. ENTITY TO RECEIVE PERMIT (IF OTHER THAN OWNER)**
Name James R. Frauen	Name
Title and Company Manager, Environmental Affairs, Seminole Electric Cooperative, Inc.	Title and Company
Address 16313 N. Dale Mabry Highway	Address
City, State, Zip Tampa, FL 33618	City, State, Zip
Telephone and Fax 813-963-0994	Telephone and Fax
C. AGENT AUTHORIZED TO SECURE PERMIT	**D. CONSULTANT (IF DIFFERENT FROM AGENT)**
Name Karl Bullock	Name
Title and Company Environmental Scientist, Golder Associates Inc.	Title and Company
Address 6241 NW 23rd Street, Suite 500	Address
City, State, Zip Gainesville, FL 32653	City, State, Zip
Telephone and Fax 352-336-5600; 352-336-6603	Telephone and Fax

PART 4: (Please provide metric equivalent for federally funded projects):

A. Name of Project, including phase if applicable: Seminole Generating Station Unit 3 Expansion Project

B. Is this application for part of a multi-phase project?
☐yes ☒no

C. Total applicant-owned area contiguous to the project?
1,978 ac.; ____ ha.

D. Total area served by the system: 228 ac.; ___ ha.

E. Impervious area for which a permit is sought: 0 ac.; ___ ha.

Refer to Stormwater Management Plan, Appendix 10.8

F. Volume of water that the system is capable of impounding:
0 ac. ft.; 0 m

Refer to Stormwater Management Plan, Appendix 10.8

G. What is the total area of work in, on, or over wetlands or other surface waters?
0.97 ac.; 0.39 ha.; 42,253 sq. ft.; 3,925 sq. m

H. Total volume of material to be dredged: 0 yd; 0 m

I. Number of new boat slips proposed: 0 wet slips; 0 dry slips

PART 5:

Project location (use additional sheets if needed):
County(ies)Putnam

Section(s) 6,7,8,18	Township 9 South	Range 27 East
Section(s)	Township	Range
Section(s)	Township	Range

Land Grant name, if applicable:

Tax Parcel Identification Number:

Street Address Road or other location: Six miles north of Palatka - County Road 209 and U. S. Highway 17 S

City, Zip Code, if applicable: Palatka, Florida

PART 6: Describe in general terms the proposed project, system, or activity.

Expansion of the existing Seminole Generating Station (SGS) through construction of a supercritical pulverized coal generating unit equipped with state of the art emission control systems (SGS Unit 3). The addition of SGS Unit 3 will enhance reliability, maintain a diverse generation portfolio, allow Seminole to provide adequate electricity at a reasonable cost, and allow Seminole's Member Systems to offer competitive and stable prices for electric service.

Avoidance and minimization efforts have reduced wetland impacts to 0.47 acres of permanent and 0.50 acres of temporary impact. Permanent impacts on the Site are limited to a 0.46-acre isolated willow shrub marsh to be filled for the construction of the Unit 3 fuel storage and conveyance system and an upland-cut stormwater conveyance ditch. The isolated willow marsh proposed to be filled is of low ecological quality, does not provide critical wildlife habitat, and is surrounded by existing coal storage facilities and access roads. The stormwater conveyance ditch is part of an actively maintained stormwater system which provides drainage within the open grassed field adjacent to the existing Units 1 and 2, and does not provide quality aquatic habitat. Permanent wetland impacts associated with the installation of a new intake pipeline and duct bank between Unit 3 and the existing intake structure on the St. Johns River are limited to 0.01 acres for placement of the 36" intake pipe upon the river bottom. The new pipe will be placed on the river bottom adjacent to the existing pipeline without trenching, thereby minimizing impacts.

Temporary wetland impacts associated with trenching and backfilling to install the new intake pipeline and duct bank include 0.13 acres of a disturbed wet prairie, 0.26 acres of wet pine flatwoods, 0.05 acres of mixed wetland hardwoods, 0.03 acres of mixed wetland hardwoods associated with an unnamed creek, and 0.03 acres along the St. Johns River bank. Areas along the pipeline easement will be backfilled and restored to grade following installation of the pipeline and duct bank. Connection between the on-shore pump station and the existing intake structure will involve temporary impact to a 0.03-acre area of the St. Johns River shoreline currently devoid of riparian vegetation and stabilized with cement. The area of the shoreline will be isolated from the river, backfilled, and the cement stabilization replaced at grade. The impacts to aquatic and wetland systems associated with the Project will be negligible, and no adverse ecological impacts are anticipated.

PART 7:

A. If there have been any pre-application meetings, including on-site meetings, with regulatory staff, please list the date(s), location(s), and names of key staff and project representatives.

B. Please identify by number any MSSW/Wetland Resource/ERP/ACOE Permits pending, issued or denied for projects at the location, and any related enforcement actions.

Agency	Date	No.\Type of Application	Action Taken
___	___	___	___
___	___	___	___

C. Note: The following information is required for projects proposed to occur in, on or over wetlands that need a federal dredge and fill permit or an authorization to use state owned submerged lands. Please provide the names, addresses and zip codes of property owners whose property directly adjoins the project (excluding application) and/or (for proprietary authorizations) is located within a 500 ft. radius of the applicant's land. Please attach a plan view showing the owner's names and adjoining property lines. Attach additional sheets if necessary.

Frank V. Oliver, Jr.
201 W. River Road
Palatka, Florida 32177-8612
386-325-5433

Ruey Hodapp, Jr.
3490 South Dixie Drive
Dayton, Ohio 45439
937-298-8190

Bernita Driggers Armstrong
211 West River Road
32177-2177

5.

6.

7.

8.

PART 8:

A. By signing this application form, I am applying, or I am applying on behalf of the applicant, for the permit and any proprietary authorizations identified above, according to the supporting data and other incidental information filed with this application. I am familiar with the information contained in this application and represent that such information is true, complete and accurate. I understand this is an application and not a permit, and that work prior to approval is a violation. I understand that this application and any permit issued or proprietary authorization issued pursuant thereto, does not relive me of any obligation for obtaining any other required federal, state, water management district or local permit prior to commencement of construction. I agree, or I agree on behalf of the applicant, to operate and maintain the permitted system unless the permitting agency authorizes transfer of the permit to a responsible operation entity. I understand that knowingly making any false statement or representation in this application is a violation of Section 373.430, F.S. and 18 U.S.C. Section 1001.

James R. Frauen, Manager, Environmental Affairs
Typed/Printed Name of Applicant (If no Agent is used) or Agent (If one is so authorized below)

James R. Frauen (signature) 3-3-06
Signature of Applicant/Agent Date

(Corporate Title if applicable)

AN AGENT MAY SIGN ABOVE ONLY IF THE APPLICANT COMPLETES THE FOLLOWING:

B. I hereby designate and authorize the agent listed above to act on my behalf, or on behalf of my corporation, as the agent in the processing of this application for the permit and/or proprietary authorization indicated above; and to furnish, on request, supplemental information in support of the application. In addition, I authorize the above-listed agent to bind me, or my corporation, to perform any requirements which may be necessary to procure the permit or authorization indicated above. I understand that knowingly making any false statement or representation in this application is a violation of Section 373.430, F.S. and 18 U.S.C. Section 1001.

Typed/Printed Name of Applicant	Signature of Applicant	Date

(Corporate Title if applicable)

Please note: The applicant's original signature (not a copy) is required above.

PERSON AUTHORIZING ACCESS TO THE PROPERTY MUST COMPLETE THE FOLLOWING:

C. I either own the property described in this application or I have legal authority to allow access to the property, and I consent, after receiving prior notification, to any site visit on the property by agents or personnel from the Department of Environmental Protection, the Water Management District and the U.S. Army Corps of Engineers necessary for the review and inspection of the proposed project specified in this application. I authorize these agents or personnel to enter the property as many times as may be necessary to make such review and inspection. Further, I agree to provide entry to the project site for such agents or personnel to monitor permitted work if a permit is granted.

James R. Frauen	James R. Frauen (signature)	3-3-06
Typed/Printed Name of Applicant	Signature of Applicant	Date

Manager, Environmental Affairs
(Corporate Title if applicable)

SECTION C

Environmental Resource Permit Notice of Receipt of Application

Note: this form does not need to be submitted for noticed general permits.
This information is required in addition to that required in other sections of the application. Please submit five copies of this notice of receipt of application and all attachments with the other required information. Please submit all information on 8 1/2" x 11" paper.

Project Name	Seminole Generating Station Unit 3
County	Putnam
Owner	Seminole Electric Cooperative, Inc.
Applicant:	James R. Frauen, Manager, Environmental Affairs
Applicant's Address:	16313 N. Dale Mabry Highway, Tampa, FL 33618

1. Indicate the project boundaries on a USGS quadrangle map. Attach a location map showing the boundary of the proposed activity. The map should also contain a north arrow and a graphic scale; show Section(s), Township(s), and Range(s); and must be of sufficient detail to allow a person unfamiliar with the site to find it.

See Attachment A, Site Location and Description, Figure 1 – USGS Map.

2. Provide the names of all wetlands, or other surface waters that would be dredged, filled, impounded, diverted, drained, or would receive discharge (either directly or indirectly), or would otherwise be impacted by the proposed activity, and specify if they are in an Outstanding Florida Water or Aquatic Preserve:

No named wetlands or surface waters will be dredged or filled; however, the new 36" intake pipe will be placed upon the bottom of the St Johns River adjacent to the existing pipeline, and connection with the on-shore pump station will involve temporary impact along the shore of the St. Johns River. An existing cement bank stabilization area will be removed and replaced with no permanent impacts.

3. Attach a depiction (plan and section views), which clearly shows the works or other facilities proposed to be constructed. Use multiple sheets, if necessary. Use a scale sufficient to show the location and type of works.

See Attachment B – Site Layout

4. Briefly describe the proposed project (such as "construct dock with boat shelter", "replace two existing culverts", "construct surface water management system to serve 150 acre residential development"):

Expansion of the existing Seminole Generating Station (SGS) through construction of a 750-MW supercritical pulverized coal generating unit equipped with state of the art emission control systems (SGS Unit 3). The addition of SGS Unit 3 will enhance reliability, maintain a diverse generation portfolio, allow Seminole to provide adequate electricity at a reasonable cost, and allow Seminole's Member Systems to offer competitive and stable prices for electric service.

5. Specify the acreage of wetlands or other surface waters, if any, that are proposed to be filled, excavated, or otherwise disturbed or impacted by the proposed activity:

filled 0.47 ac.; ___ excavated ac.;

other impacts 0.50 ac. (clearing associated with trenching/backfilling pipeline and duct bank)

6. Provide a brief statement describing any proposed mitigation for impacts to wetlands and other surface waters (attach additional sheets if necessary):

The project has been designed to avoid and/or minimize wetland impacts; the total acreage of wetland impacts (temporary and permanent) associated with the Project is 0.97 acres. At the SGS facility, permanent wetland impacts are limited to a 0.46-acre isolated willow shrub marsh to be filled. Along the existing pipeline easement, permanent wetland impacts are limited to 0.01 acres for placement of the intake pipe upon the river bottom, while temporary wetland impacts associated with installation of a new intake pipeline and duct bank between the plant site and the intake pump station include 0.13 acres of

disturbed wet prairie, 0.26 acres of wet pine flatwoods, 0.05 acres of mixed wetland hardwoods, an additional 0.03 acres of mixed wetland hardwoods associated the floodplain of an unnamed creek, and 0.03 acres of St. Johns River shoreline for connection between the intake structure and the pump station.

Wetlands within the pipeline easement will be temporarily impacted during installation of the intake pipeline and duct bank via open trench, in accordance with the Noticed General Permit for Installation, Maintenance, Repair, and Removal of Underground Cable, Conduit, or Pipeline (Section 62-341.453, F.A.C.) and ACOE Nationwide Permit # 12, Utility Line Activities. The areas will be restored to pre-construction contours and elevation, therefore no mitigation is proposed. Forested wetland areas within the pipeline easement will be impacted through clearing, converting from forested to herbaceous wetland habitats. The only permanent impact associated with the pipeline is 0.01 acres of river bottom covered by the placement of the new intake pipe adjacent to the existing pipe. At the SGS facility, the only permanent wetland impacts are associated with a 0.46-acre isolated willow shrub wetland adjacent to the existing SGS coal pile; no mitigation is proposed to offset the willow shrub wetland due to its small size, isolated nature, and low ecological quality.

FOR AGENCY USE ONLY

Application Name:
Application Number:
Office where the application can be inspected:

Note to Notice recipient: The information in this notice has been submitted by the applicant, and has not been verified by the agency. It may be incorrect, incomplete or may be subject to change.

SECTION E

INFORMATION REQUESTED FOR STANDARD GENERAL, INDIVIDUAL AND CONCEPTUAL ENVIRONMENTAL RESOURCE PERMIT APPLICATIONS NOT RELATED TO A SINGLE FAMILY DWELLING UNIT

Please provide the information requested below if the proposed project requires either a standard general, individual, or conceptual approval environmental resource permit and is not related to an individual, single family dwelling unit, duplex or quadruplex. The information listed below represents the level of information that is usually required to evaluate an application. The level of information required for a specific project will vary depending on the nature and location of the site and the activity proposed. Conceptual approvals generally do not require the same level of detail as a construction permit. However, providing a greater level of detail will reduce the need to submit additional information at a later date. If an item does not apply to your project, proceed to the next item. Please submit all information that is required by the Department on either 8 1/2 in. X 11 in. paper or 11 in. X 17 in. paper. Larger drawings may be submitted to supplement but not replace these smaller drawings.

I. Site Information

A. Provide a map(s) of the project area and vicinity delineating USDA/SCS soil types.

See Attachment A, Site Location and Description , Figure 2 – Soil Survey

B. Provide recent aerials, legible for photo interpretation with a scale of 1" = 400 ft, or more detailed, with project boundaries delineated on the aerial.

See Attachment A, Site Location and Description, Figure 3 – Aerial photograph with Project and Wetland Boundaries

C. Identify the seasonal high water or mean high tide elevation and normal pool or mean low tide elevation for each on site wetland or surface water, including receiving waters into which runoff will be discharged. Include dates, datum, and methods used to determine these elevations.

The seasonal high water table at areas of proposed stormwater ponds and the SGS entrance road swale was determined on February 22, 2006 through excavation via backhoe and examination of hydric soil features (oxidized rhizospheres, redox conditions, gleyed/stripped matrix in sandy soils) on February 22, 2006.

Stormwater Pond #1 (northeast of existing cooling towers): 4.0 feet below surface

Stormwater Pond #2 (southwest of existing cooling towers): 1.8 feet below surface

Stormwater Pond #2 (second measurement towards northwest edge of proposed pond): 2.7 feet below surface

Stormwater Pond #3 (east of pipeline easement): 2.3 feet below surface

Entrance road swale – At culvert just east of SR 17:
Approximately 8 inches to high water mark within culvert;
Approximately 1 foot from bottom of ditch to seasonal high groundwater on west side of ditch
Entrance road swale – At wooden bridge:
Approximately 2 inches of water in ditch; seasonal high groundwater approximately 1.8 feet above bottom of ditch
Entrace road swale - Across from LaFarge building:
No standing water in ditch; seasonal high groundwater approximately 2 inches above bottom of ditch

D. Identify the wet season high water tables at the locations representative of the entire project site. Include dates, datum, and methods used to determine these elevations.

See response E-I-C above; locations identified previously are representative of the entire Project site.

II. Environmental Considerations

A. Provide results of any wildlife surveys that have been conducted on the site, and provide any comments pertaining to the project from the Florida Game and Fresh Water Fish Commission and the U.S. Fish and Wildlife Service.

The entire Site was traversed by pedestrian and vehicular transects during September 2005 and February 2006 and all wildlife observations were recorded, including direct sightings, calls, tracks, scat, burrows, and nests. The Site is an active industrial site, which is unsuitable habitat for most species due to the amount and frequency of human activity; however, forested parcels, wetlands, and ditches within the Project Site do provide suitable wildlife habitat for species common to north Florida. A summary of wildlife surveys conducted in conjunction with the 1978 SCA for the existing units are summarized below, as well as any additional species observed during field reconnaissance conducted in 2005 and 2006.

Common mammalian species observed on the Site include feral hog (*Sus scrofa*), whitetail deer (*Odocoileus virginianus*), bobcat (*Lynx rufus*), gray fox (*Urocyon cinereoargenteus*), raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), armadillo (*Dasypus novemcinctus*), cottontail rabbit (*Sylvilagus floridanus*), eastern gray squirrel (*Scirurus carolinensis*), cotton mouse (*Peromyscus gossypinus*), and eastern mole (*Scalopus aquaticus*).

Avian species include the mockingbird (*Mimus polyglottis*), American crow (*Corvus brachyrhynchos*), blue jay (*Cyanocitta cristata*), turkey vulture (*Cathartes aura*), red-tailed hawk (*Buteo jamaicense*), screech owl (*Otus asio*), barred owl (*Strix varia*), bobwhite (*Colinus virginianus*), wild turkey (*Meleagris gallopavo*), pine warbler (*Dendroica pinus*), mourning dove (*Zenadia macrocoura*), ground dove (*Columbina passerine*), eastern kingbird (*Tyrannus tyrannus*), white-throated sparrow (*Zonotrichia albiocollis*), savannah sparrow (*Passerculus sandwichensis*), field sparrow (*Spizella pusilla*), and loggerhead shrike (*Lanius ludovicianus*).

Amphibians and reptiles observed on the Site include the American toad (*Bufo americanus*), southern toad (*Bufo terrestris*), southern fence lizard (*Sceloporus undulatus*), ground skink (*Scincella lateralis*), green anole (*Anolis carolinensis*), gopher tortoise (*Gopherus polyphemus*), and southern black racer (*Coluber constrictor*).

Avian species associated with forested wetland habitats on the Site include yellow-rumped warbler (*Dendroica coronata*), black-and-white warbler (*Mniotilta varia*), brown thrasher (*Toxostoma rufum*), cardinal (*Cardinalis cardinalis*), white-eyed vireo (*Vireo griseus*), rufous-sided towhee (*Pipilo erythrophthalmus*), chuck-will's widow (*Caprimulgus carolinensis*), and pileated woodpecker (*Dryocopus pileatus*). None of the forested wetland areas on the Site include standing water of sufficient hydroperiod to support utilization by wading birds, although the ditches on the Site may occasionally be utilized by common species such as white ibis (*Eudocimus albus*), little blue heron (*Egretta caerulea*), great blue heron (*Ardea herodias*), and great egret (*Casmerodius albus*).

Amphibian and reptile species associated with wetland habitats on the site include the southern leopard frog (*Rana utricularia*), squirrel treefrog (*Hyla squirella*), little grass frog (*Lemnaoedus ocularis*), slimy salamander (*Plethodon glutinosus*), and dwarf salamander (*Eurycea quadridigitata*).

There are a number of federally and/or state listed animals that are associated or potentially associated with the Site. A number of wetland dependent animal species (e.g., wading birds) have the potential to use the drainage canals and borrow ponds for foraging, including the little blue heron, tricolor heron, white ibis, snowy egret, and wood stork. These species are common to the area and use other similar habitats that are found throughout the surrounding region.

The USFWS and FFWCC were consulted to solicit input regarding the Project's potential impact to listed species and recommendations to avoid and/or minimize adverse impacts. In addition, a Site-specific element occurrence report from FNAI was requested, which identifies the results of a database search of documented occurrences of listed species within a one-mile radius of the Site.

During the field reconnaissance conducted in September 2005 and February 2006, as well as during studies conducted in association with the 1978 Site Certification Application, the only listed species observed was the gopher tortoise (*Gopherus polyphemus*), which is not listed federally by the USFWS but is classified as a species of special concern by the FFWCC. Gopher tortoise habitat is located within the dry pine flatwoods located to the north/northeast of the existing cooling towers. Gopher tortoises are listed as a species of special concern in the State of Florida due to loss of preferred habitat, which includes xeric upland areas that are prime parcels for development, as well as due to historical capture for food. Several species utilize the burrows of gopher tortoises as refugia. These "commensal" species include the federally and state-threatened Eastern indigo snake (*Drymarchon couperi*) as well as the gopher frog (*Rana capito*), which is classified by the FFWCC as a species of special concern but is not listed federally by the USFWS. Neither of these species has been observed at the Project Site.

The FFWCC's bald eagle nest locator database (http://wld.fwc.state.fl.us/eagle/eaglenests/Default.asp#criterialocator) was queried and resulted in no known bald eagle nests on or adjacent to the Project Site. According to the FFWCC database, the closest known active nests are each located approximately four miles from the Site. Seminole personnel have identified an additional eagle nest located approximately ½ mile to the north of the existing landfill; a distance greater than the recommended primary and secondary protection zones for eagle nests. The FFWCC nest identification numbers and location information are given below:

Nest ID	Longitude	Latitude	S-T-R
PU003	81° 38.38"	29° 37.42"	18-10S-27E
SJ004	81° 31.08"	29° 47.54"	19-08S-28E
SJ005	81° 34.47"	29° 52.18"	27-07S-27E
SJ012	81° 31.16"	29° 44.49"	06-09S-28E
SJ014	81° 33.01"	29° 49.25"	38-08S-27E
CL005	81° 37.74"	29° 54.54"	08-07S-27E
CL012	81° 37.48"	29° 52.89"	20-07S-27E

Correspondence from the USFWS (Attachment D, Agency Correspondence) indicated that the proposed Project is not likely to adversely affect any resources protected by the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.), provided the standard protection measures for eastern indigo snakes are incorporated in the project design. The FNAI element occurrence report (Attachment D) indicated no documented occurrences of listed species of animals within the Project boundary.

B. Provide a description of how water quantity, quality, hydroperiod, and habitat will be maintained in on-site wetlands and other surface waters that will be preserved or will remain undisturbed.

Water quality and habitat will be maintained in on-site wetlands and other surface waters that will remain undisturbed through use of silt fences to avoid turbidity impacts. No changes in water quantity or hydroperiod are anticipated as a result of construction and operation of Unit 3.

C. Provide a narrative description of any proposed mitigation plans, including purpose, maintenance, monitoring, and construction sequence and techniques, and estimated costs.

No mitigation plans are proposed. The only permanent wetland impacts on the Site are associated with a 0.46-acre isolated willow shrub wetland adjacent to the existing SGS coal pile; no mitigation is proposed to offset this wetland due to its small size, isolated nature, and low ecological quality. Wetlands within the pipeline easement will be temporarily impacted in accordance with the Noticed General Permit for Installation, Maintenance, Repair, and Removal of Underground Cable, Conduit, or Pipeline (Section 62-341.453, F.A.C.) and ACOE Nationwide Permit # 12, Utility Line Activities. The areas will be restored to pre-construction contours and elevation, and only 0.01 acres river bottom will be permanently impacted due to placement of the new intake pipe adjacent to the existing pipe; therefore no mitigation is proposed.

D. Describe how boundaries of wetlands or other surface waters were determined. If there has ever been a jurisdictional declaratory statement, a formal wetland determination, a formal determination, a validated informal determination, or a revalidated jurisdictional determination, provide the identifying number.

Wetlands were delineated in accordance with applicable federal and state wetland criteria as set forth by the US Army Corps of Engineers (ACOE) and Florida Department of Environmental Protection (FDEP) requirements. Specifically, the site was examined for the presence of hydrophytic vegetation, hydric soils, and hydrologic indicators, by which the landward extent of wetlands were determined and marked in the field as well as on aerial maps of the project site. Wetland boundaries were flagged with high visibility, sequentially numbered flagging tape.

E. Impact Summary Tables:

1. For all projects, complete Tables 1, 2 and 3 as applicable.

See Attached Tables 1 and 2

2. For docking facilities or other structures constructed over wetlands or other surface waters, provide the information requested in Table 4.

N/A

3. For shoreline stabilization projects, provide the information requested in Table 5.

N/A

III. Plans

Provide clear, detailed plans for the system including specifications, plan (overhead) views, cross sections (with the locations of the cross sections shown on the corresponding plan view), and profile (longitudinal) views of the proposed project. The plans must be signed and sealed by a an appropriate registered professional as required by law. Plans must include a scale and a north arrow. These plans should show the following:

A. Project area boundary and total land area, including distances and orientation from roads or other land marks;

See Attachment A, Site Location and Description, Figure 4 - Boundary Survey

B. Existing land use and land cover (acreage and percentages), and on-site natural communities, including wetlands and other surface waters, aquatic communities, and uplands. Use the Florida Land Use Cover & Classification System (FLUCCS)(Level 3) for projects proposed in the South Florida Water Management District, the St. Johns River Water Management District, and the Suwannee River Water Management District and use the National Wetlands Inventory (NWI) for projects proposed in the Southwest Florida Water Management District. Also identify each community with a unique identification number which must be consistent in all exhibits.

See Attachment A, Site Location and Description, Figure 5 – FLUCFCS Map

The majority of the Project Area has been historically cleared of vegetation and graded in association with development of the existing Seminole Units 1 and 2. Areas surrounding the plant facilities include mowed and maintained grass fields classified as improved pasture (FLUCFCS Code 211), upland pine flatwoods (FLUCFCS Code 411), live oak hammock (FLUCFCS Code 427), ditches (FLUCFCS Code 511), mixed wetland hardwood forest (FLUCFCS 617), willow shrub wetlands (FLUCFCS Code 618), wetland conifer forest (FLUCFCS Code 620), cypress (FLUCFCS 621), wetland hardwood/conifer forest (FLUCFCS Code 630), and freshwater marsh (FLUCFCS Code 641).

C. The existing topography extending at least 100 feet off the project area, and including adjacent wetlands and other surface waters. All topography shall include the location and a description of known benchmarks, referenced to NGVD. For systems waterward of the mean high water (MHW) or seasonal high water lines, show water depths, referenced to mean low water (MLW) in tidal areas or seasonal low water in non-tidal areas, and list the range between MHW and MLW. For docking facilities, indicate the distance to, location of, and depths of the nearest navigational channel and access routes to the channel.

See Attachment A, Site Location and Description, Figure 6 - Existing Site Topography

D. If the project is in the known flood plain of a stream or other water course, identify the following: 1) the flood plain boundary and approximate flooding elevations; and 2) the 100-year flood elevation and floodplain boundary of any lake, stream or other watercourse located on or adjacent to the site;

N/A

E. The boundaries of wetlands and other surface waters within the project area. Distinguish those wetlands and other surface waters that have been delineated by any binding jurisdictional determination;

The boundaries of jurisdictional wetland areas are identified in Attachment A, Site Location and Description, Figure 3 – Aerial photograph with Project and Wetland Boundaries

F. Proposed land use, land cover and natural communities (acreage and percentages), including wetlands and other surface waters, undisturbed uplands, aquatic communities, impervious surfaces, and water management areas. Use the same classification system and community identification number used in III (B) above.

The Unit 3 Project will result in an expansion of the electric generation facility (FLUCFCS 831), while maintaining large areas of undeveloped forested areas and avoiding all wetland areas with the exception of 0.46 acres of isolated willow marsh, 0.01 acres of river bottom, and 0.50 acres of temporary impacts along the pipeline easement. Following construction, the primary project facilities and their approximate areas are:

SGS Unit 3 Facilities

Power Block	18 acres
Cooling Tower	5 acres
Construction Laydown, Parking and Trailers	132 acres
Stormwater Ponds	21 acres
Wastewater Equalization Basin	6 acres
Coal Pile Runoff Pond	3 acres
Coal Handling Facilities	24 acres
Entrance Road	3 acres
Zero Liquid Discharge System	1 acre
Substation Expansion Area	2 acres
Borrow Pit	13 acres
SGS Unit 3 TOTAL	**228 acres**

G. Proposed impacts to wetlands and other surface waters, and any proposed connections/outfalls to other surface waters or wetlands;

The expansion project will require filling of 0.46 of isolated willow shrub marsh wetlands adjacent to the existing coal pile and 0.01 acres of river bottom for connection of to the existing intake structure. Installation of the intake pipeline and new duct bank will require temporary wetland impacts to 0.13 acres of wet prairie and 0.03 acres of St. John's River shoreline currently stabilized with cement. Additional impact through conversion of forested wetland habitat to herbaceous wetland habitat will occur within 0.26 acres of wet pine flatwoods, 0.05 acres of mixed wetland hardwoods, and 0.03 acres of mixed wetland hardwoods associated with an unnamed creek.

H. Proposed buffer zones;

Silt fences will be installed along the perimeter of the Project area to prevent impacts from construction activities, such as sedimentation or turbid surface runoff, from entering any wetlands or surface waters to remain undisturbed.

I. Pre- and post-development drainage patterns and basin boundaries showing the direction of flows, including any off-site runoff being routed through or around the system; and connections between wetlands and other surface waters;

See Appendix 10.9 – Stormwater Management Plan

J. Location of all water management areas with details of size, side slopes, and designed water depths;

See Appendix 10.9 – Stormwater Management Plan

K. Location and details of all water control structures, control elevations, any seasonal water level regulation schedules; and the location and description of benchmarks (minimum of one benchmark per structure);

See Appendix 10.9 – Stormwater Management Plan

L. Location, dimensions and elevations of all proposed structures, including docks, seawalls, utility lines, roads, and buildings;

See Attachment B, Site Layout

M. Location, size, and design capacity of the internal water management facilities;

See Appendix 10.9 – Stormwater Management Plan

N. Rights-of-way and easements for the system, including all on-site and off-site areas to be reserved for water management purposes, and rights-of-way and easements for the existing drainage system, if any;

See Appendix 10.9 – Stormwater Management Plan

O. Receiving waters or surface water management systems into which runoff from the developed site will be discharged;

Runoff will be contained in onsite stormwater ponds (See Appendix 10.9 – Stormwater Management Plan).

P. Location and details of the erosion, sediment and turbidity control measures to be implemented during each phase of construction and all permanent control measures to be implemented in post-development conditions;

Silt fences will be placed to prevent impacts from construction activities alongside wetlands or surface waters to remain undisturbed.

Q. Location, grading, design water levels, and planting details of all mitigation areas;

N/A

R. Site grading details, including perimeter site grading;

See Attachment B – Site Layout

S. Disposal site for any excavated material, including temporary and permanent disposal sites;

N/A

T. Dewatering plan details;

N/A

U. For marina facilities, locations of any sewage pumpout facilities, fueling facilities, boat repair and maintenance facilities, and fish cleaning stations;

N/A

V. Location and description of any nearby existing offsite features which might be affected by the proposed construction or development such as stormwater management ponds, buildings or other structures, wetlands or other surface waters.

N/A

W. For phased projects, provide a master development plan.

N/A

IV. Construction Schedule and Techniques

Provide a construction schedule, and a description of construction techniques, sequencing and equipment. This information should specifically include the following:

A. Method for installing any pilings or seawall slabs;

N/A

B. Schedule of implementation of temporary or permanent erosion and turbidity control measures;

Silt fencing will be installed prior to clearing associated with trench/backfilling activities for installation of the pipeline and duct bank. At the St. Johns River, the area of cement shoreline to be removed will be isolated from the surrounding waters prior to removal to reduce turbidity impacts.

C. For projects that involve dredging or excavation in wetlands or other surface waters, describe the method of excavation, and the type of material to be excavated;

N/A

D. For projects that involve fill in wetlands or other surface waters, describe the source and type of fill material to be used. For shoreline stabilization projects that involve the installation of riprap, state how these materials are to be placed, (i.e., individually or with heavy equipment) and whether the rocks will be underlain with filter cloth;

The willow shrub wetland will be cleared and graded with clean fill material prior to construction of the coal handling/conveyance system. The area of cement shoreline stabilization will be replaced identical to the existing conditions.

E. If dewatering is required, detail the dewatering proposal including the methods that are proposed to contain the discharge, methods of isolating dewatering areas, and indicate the period dewatering structures will be in place (Note: a consumptive use or water use permit may by required);

F. Methods for transporting equipment and materials to and from the work site. If barges are required for access, provide the low water depths and draft of the fully loaded barge;

Equipment and materials to and from the work site will be via trucks on existing access roadways.

G. Demolition plan for any existing structures to be removed; and

N/A

H. Identify the schedule and party responsible for completing monitoring, record drawings, and as-built certifications for the project when completed.

Burns and McDonnell Engineering

V. Drainage Information

See Appendix 10.9 – Stormwater Management Plan

A. Provide pre-development and post-development drainage calculations, signed and sealed by an appropriate registered professional, as follows:

1. Runoff characteristics, including area, runoff curve number or runoff coefficient, and time of concentration for each drainage basin;

2. Water table elevations (normal and seasonal high) including aerial extent and magnitude of any proposed water table draw down;

3. Receiving water elevations (normal, wet season, design storm);

4. Design storms used including rainfall depth, duration, frequency, and distribution;

5. Runoff hydrograph(s) for each drainage basin, for all required design storm event(s);

6. Stage-storage computations for any area such as a reservoir, close basin, detention area, or channel, used in storage routing;

7. Stage-discharge computations for any storage areas at a selected control point, such as control structure or natural restriction;

8. Flood routings through on-site conveyance and storage areas;

9. Water surface profiles in the primary drainage system for each required design storm event(s);

10. Runoff peak rates and volumes discharged from the system for each required design storm event(s);

11. Tail water history and justification (time and elevation); and

12. Pump specifications and operating curves for range of possible operating conditions (if used in system).

B. Provide the results of any percolation tests, where appropriate, and soil borings that are representative of the actual site conditions;

C. Provide the acreage, and percentages of the total project, of the following:

1. Impervious surfaces, excluding wetlands;

2. Pervious surfaces (green areas, not including wetlands);

3. Lakes, canals, retention areas, other open water areas; and

4. Wetlands.

D. Provide an engineering analysis of floodplain storage and conveyance (if applicable), including:

1. Hydraulic calculations for all proposed traversing works;

2. Backwater water surface profiles showing upstream impact of traversing works;

3. Location and volume of encroachment within regulated floodplain(s); and

4. Plan for compensating floodplain storage, if necessary, and calculations required for determining minimum building and road flood elevations.

E. Provide an analysis of the water quality treatment system including:

1. A description of the proposed stormwater treatment methodology that addresses the type of treatment, pollution abatement volumes, and recovery analysis; and

2. Construction plans and calculations that address stage-storage and design elevations, which demonstrate compliance with the appropriate water quality treatment criteria.

F. Provide a description of the engineering methodology, assumptions and references for the parameters listed above, and a copy of all such computations, engineering plans, and specifications used to analyze the system. If a computer program is used for the analysis, provide the name of the program, a description of the program, input and output data, two diskette copies, if available, and justification for model selection.

VI. Operation and Maintenance and Legal Documentation

A. Describe the overall maintenance and operation schedule for the proposed system.

Expansion of existing electric generation facility – maintenance and operation is year-round.

B. Identify the entity that will be responsible for operating and maintaining the system in perpetuity if different than the permittee, a draft document enumerating the enforceable affirmative obligations on the entity to properly operate and maintain the system for its expected life, and documentation of the entity's financial responsibility for long-term maintenance. If the proposed operation and maintenance entity is not a property owner's association, provide proof of the existence of an entity, or the future acceptance of the system by an entity which will operate and maintain the system. If a property owner's association is the proposed operation and maintenance entity, provide copies of the articles of incorporation for the association and copies of the declaration, restrictive covenants, deed restrictions, or other operational documents that assign responsibility for the operation and maintenance of the system. Provide information ensuring the continued adequate access to the system for maintenance purposes. Before transfer of the system to the operating entity will be approved, the permittee must document that the transferee will be bound by all terms and conditions of the permit.

N/A

C. Provide copies of all proposed conservation easements, storm water management system easements, property owner's association documents, and plats for the property containing the proposed system.

N/A – contained within existing facility boundaries/easements.

D. Provide indication of how water and waste water service will be supplied. Letters of commitment from off-site suppliers must be included.

No change from existing service is required.

E. Provide a copy of the boundary survey and/or legal description and acreage of the total land area of contiguous property owned/controlled by the applicant.

See Attachment E – Legal Description

VII. Water Use

A. Will the surface water system be used for water supply, including landscape irrigation, or recreation. - **No**

B. If a Consumptive Use or Water Use permit has been issued for the project, state the permit number. **Authorization provided by Condition of Certification No. PA78-10**

C. If no Consumptive Use or Water Use permit has been issued for the project, indicate if such a permit will be required and when the application for a permit will be submitted.

N/A

D. Indicate how any existing wells located within the project site will be utilized or abandoned.

N/A

TABLE 1

Project Impact Summary

WL & SW ID	WL & SW TYPE (FLUCFCS)	WL & SW SIZE (ac.) ON SITE	WL & SW ACRES NOT IMPACTED	PERMANENT IMPACTS TO WL & SW		TEMPORARY IMPACTS TO WL & SW		MITIGATION ID
				IMPACT SIZE (acres)	IMPACT CODE	IMPACT SIZE (acres)	IMPACT CODE	
Isolated Willow Marsh	**618**	**0.46**	**0**	**0.46**	**F**			**N/A**
Pipeline EasementWet Prairie	**643**	**0.13**	**0**	**0**		**0.13**	**O**	**N/A**
Pipeline Easement Wet Pine Flatwoods	**620**	**0.26**	**0**	**0.26**	**C**			**N/A**
Pipeline Easement Mixed Wetland Hardwood	**617**	**0.05**	**0**	**0.05**	**C**			**N/A**
Pipeline Easement Creek Floodplain Mixed Wetland Hardwood	**617**	**0.03**	**0**	**0.03**	**C**			**N/A**
Pipeline Easement S.J. River bottom	**510**	**-**	**-**	**0.01**	**F (pipe laid upon bottom)**			**N/A**
Pipeline Easement S.J. River Shoreline	**510**	**0.03**	**0**	**0**		**0.03**	**O**	**N/A**

WL = Wetland; **SW** = Surface water; **ID** = Identification number, letter, etc.
Wetland Type: Use an established wetland classification system and, in the comments section below, indicate which classification system is being used.
Impact Code (Type): D = dredge; F = fill; H = change hydrology; S = shading; C = clearing; O = other. Indicate the final impact if more than one impact type is proposed in a given area. For example, show F only for an area that will first be demucked and then backfilled.

Comments: **"O" = temporary impact through open trench installation of intake pipeline and duct bank – backfilled and restored to grade**
"C" = Clearing of minimal amount of canopy, conversion from forested to herbaceous wetland habitat.

TABLE 2
ON-SITE MITIGATION SUMMARY

MITIGATION ID	CREATION		RESTORATION		ENHANCEMENT		WETLAND PRESERVE		UPLAND PRESERVE		OTHER	
	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE
PROJECT TOTALS:												

CODES (multiple entries per cell not allowed): Target Type or Type = target or existing habitat type from an established wetland classification system or land use classification for non-wetland mitigation

COMMENTS:.

TABLE 3
OFF-SITE MITIGATION SUMMARY

MITIGATION ID	CREATION		RESTORATION		ENHANCEMENT		WETLAND PRESERVE		UPLAND PRESERVE		OTHER	
	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE
PROJECT TOTALS:												

CODES (multiple entries per cell not allowed):

Target Type=target or existing habitat type from an established wetland classification system or land use classification for non-wetland mitigation

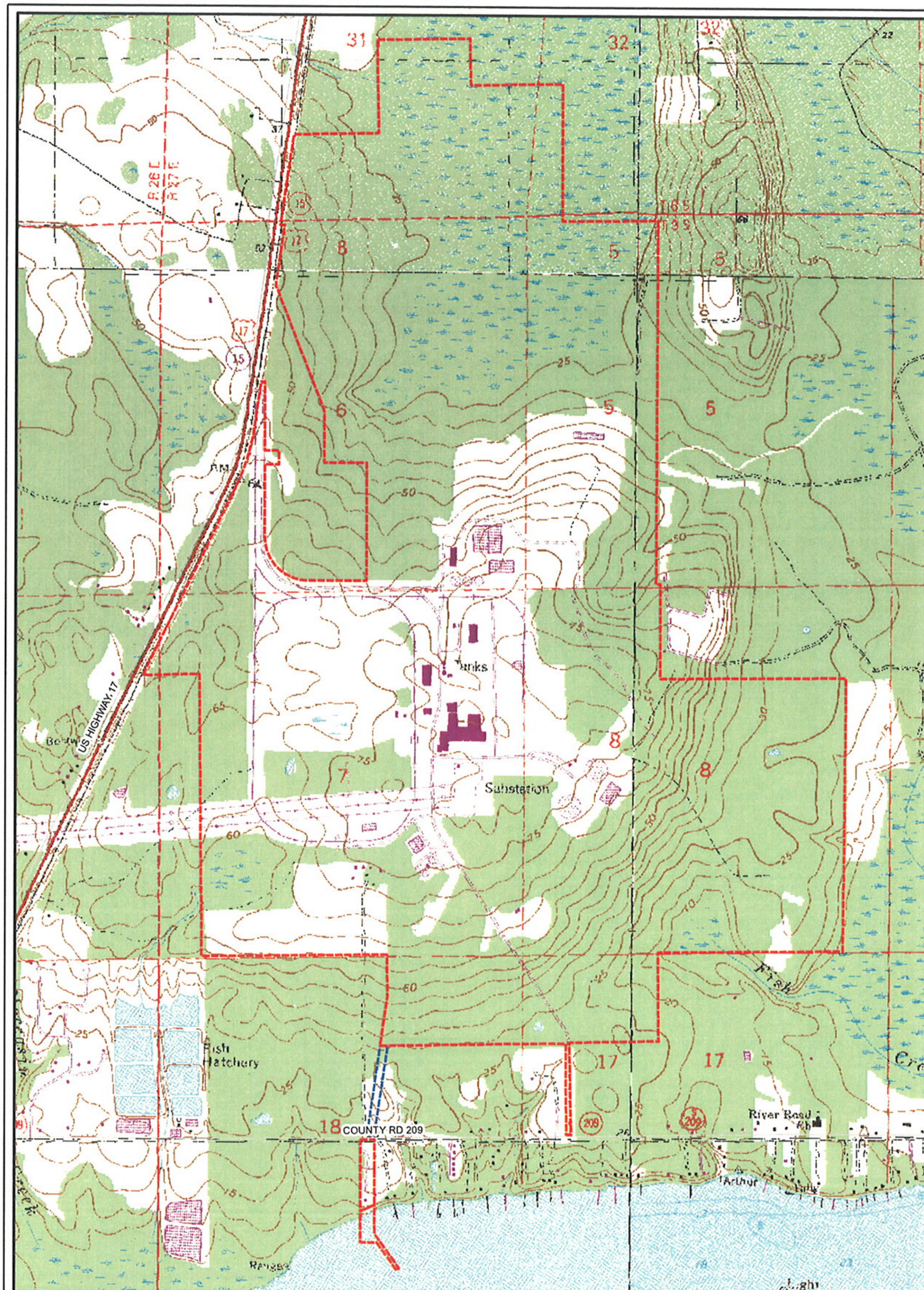
COMMENTS:

ATTACHMENT B
SITE LAYOUT

See Figure 3.2.0-3 of SCA (Volume I)

ATTACHMENT A

SITE LOCATION AND DESCRIPTION



0 0.25 0.5 Miles

N

LEGEND

Easment

Property Boundary

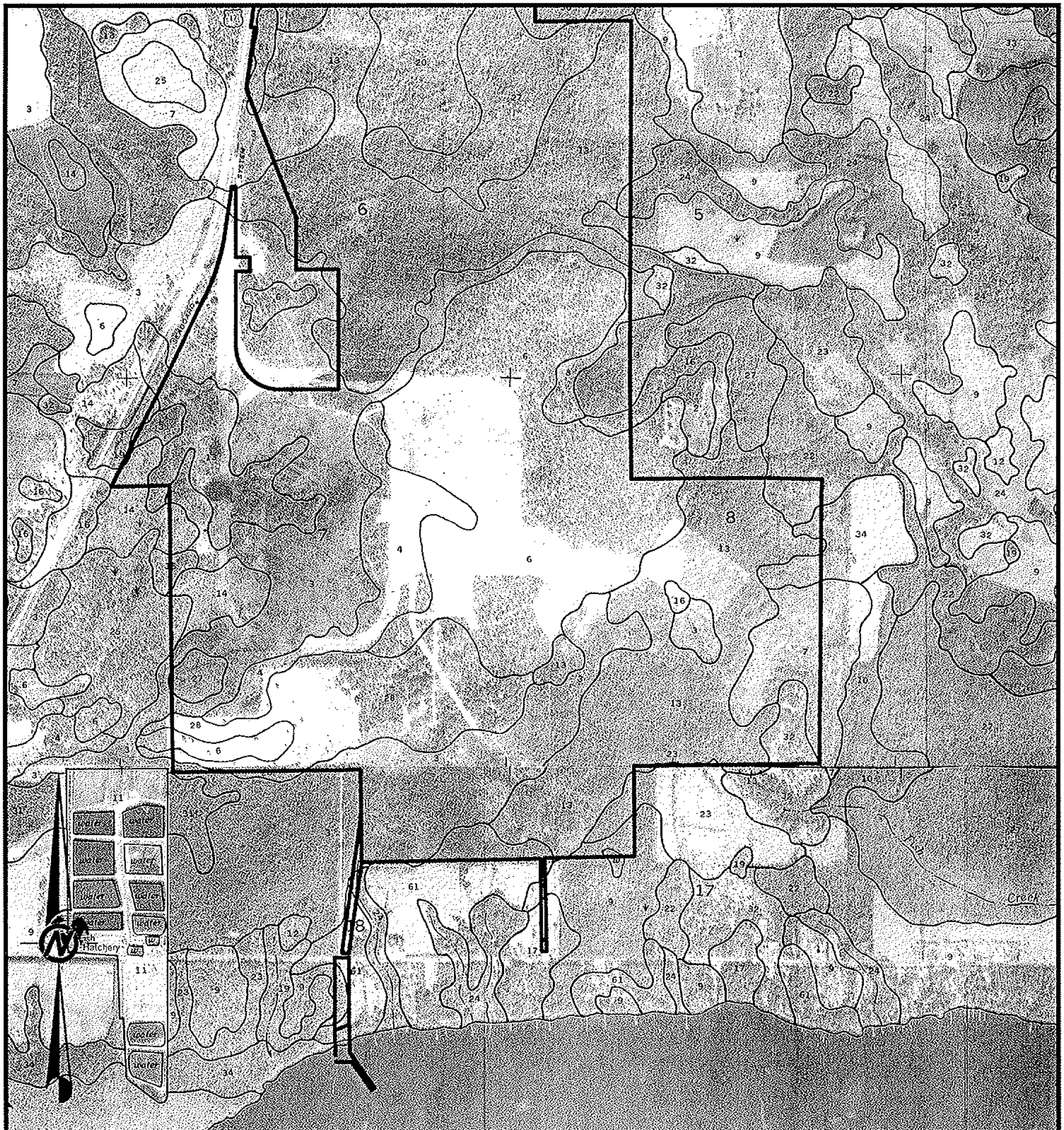
REFERENCE

1.) Property parcel, Putnam County parcel data set and property legal description
2.) USGS Digital Raster Graphic (DRG) Florida Topographic Quadrangles (Bostwick, Hastings, Palatka, Riverdale), LABINS

PROJECT	SEMINOLE ELECTRIC COOPERATIVE INC. SGS UNIT 3 PUTNUM COUNTY, FL
TITLE	**SITE LOCATION**

Golder Associates
Tampa, Florida

PROJECT No. 053-9540			SCALE AS SHOWN	REV. 0
DESIGN	JWT	11/28/2005	**Figure 1**	
GIS	JWT	2/21/2006		
CHECK	MM	2/20/2006		
REVIEW	RAZ	2/20/2006		



2,000 0 2,000

1" TO 2,000' FEET

PROJECT
SEMINOLE ELECTRIC COOPERATIVE INC.
SGS UNIT 3
PUTNAM COUNTY, FLORIDA

TITLE
USDA SOIL SURVEY

REFERENCES

1.) USDA SOIL SURVEY OF PUTNAM COUNTY AREA, FLORIDA, 1990

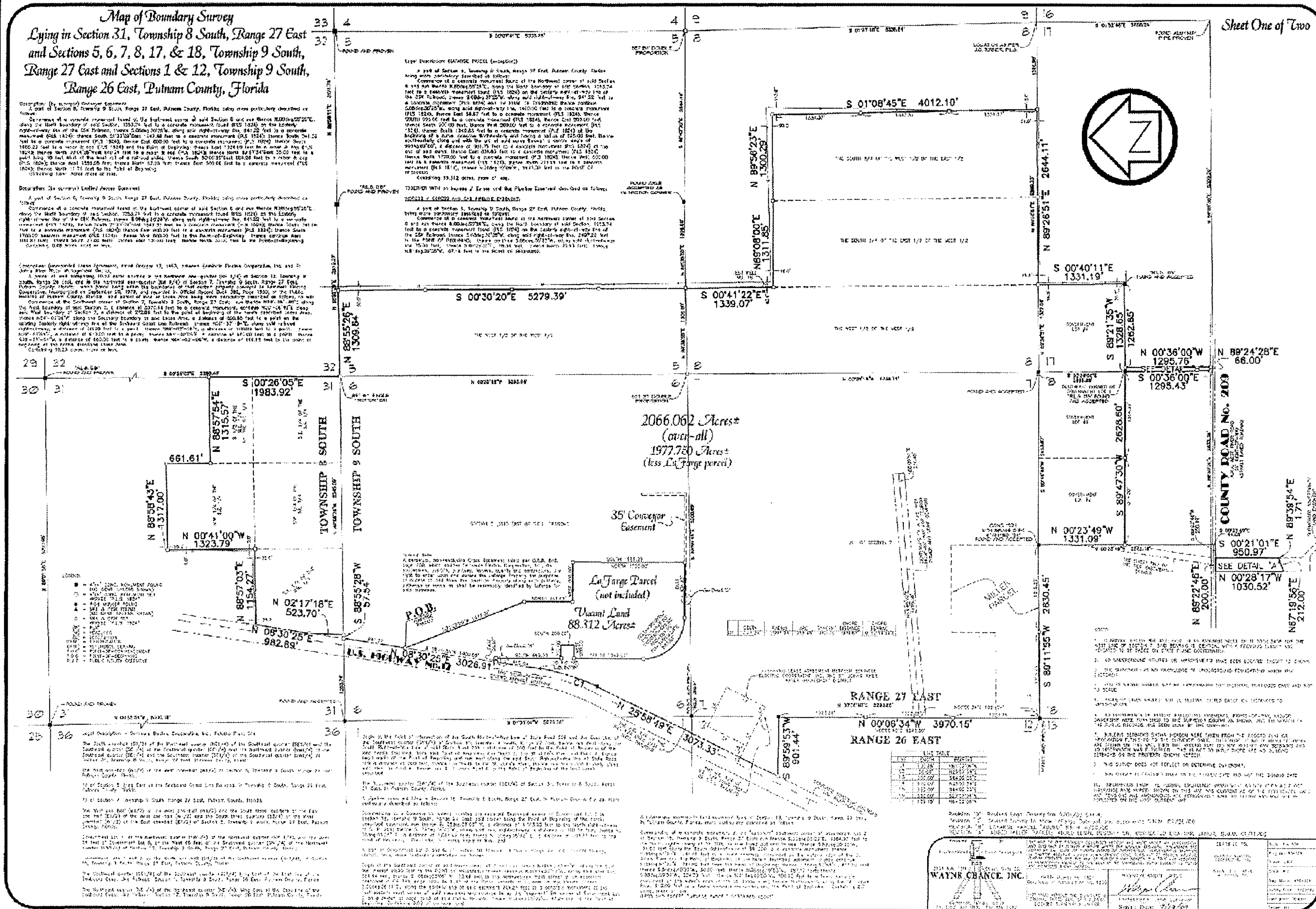
Golder Associates
Tampa, Florida

PROJECT No.		053-9540	FILE No.	0539540B035
DESIGN	KB	03/07/06	SCALE AS SHOWN	REV. 0
CADD	MEF	03/070/06	**FIGURE 2**	
CHECK	MM	03/07/06		
REVIEW	MM	03/07/06		

Drawing file: 0539540B035.dwg Mar 07, 2006 - 2:53pm

PROJECT	SEMINOLE ELECTRIC COOPERATIVE INC. SGS UNIT 3 PUTNAM COUNTY, FLORIDA			
TITLE	AERIAL MAP WITH WETLANDS			
Golder Associates, Tampa, Florida	PROJECT No.	053-9540	FILE No. 0539540B037.dwg	
	DESIGN KB	11/29/05	SCALE AS SHOWN	REV. 0
	CADD MEF	11/30/05	FIGURE 3	
	CHECK MM	03/07/06		
	REVIEW MM	03/070/06		

Drawing file: F:\PROJECTS\2005 PROJ\053-9558\wblocks\0539540B037.dwg Mar 07, 2006 - 1:55pm



PROJECT
SEMINOLE ELECTRIC COOPERATIVE INC.
SGS UNIT 3
PUTNAM COUNTY, FL

TITLE
BOUNDARY SURVEY

Golder Associates
Tampa, Florida

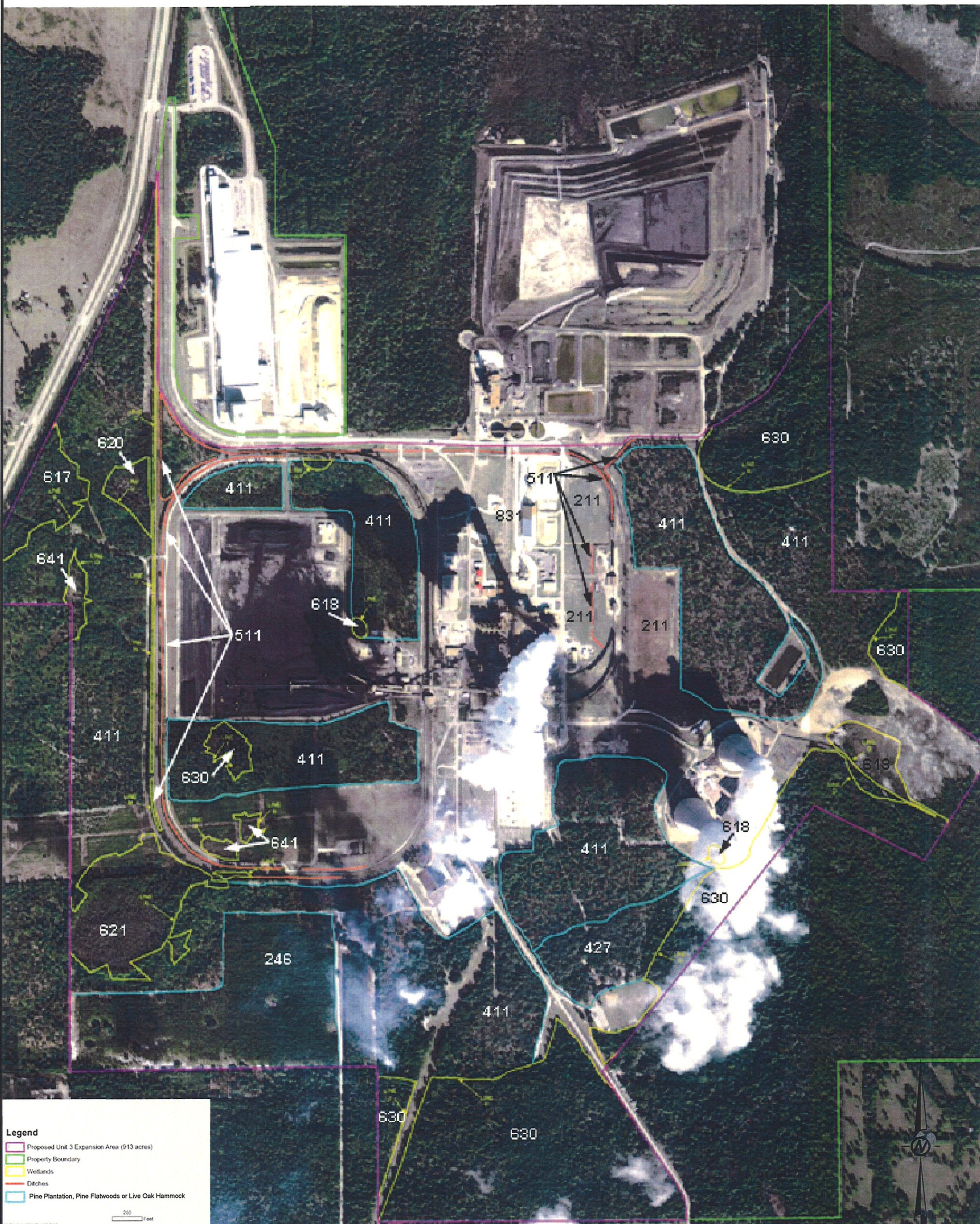
PROJECT No. 053-9540			
DESIGN	JWT	11/28/2005	
GIS	JWT	11/28/2005	
CHECK			
REVIEW			

SCALE AS SHOWN | REV. 0

FIGURE 4

REFERENCE

1.) Boundary Survey, Wayne Chance Inc. 1999



211 - Grassed Lawn
246 - Pine Plantation
411 - Pine Flatwoods
427 - Live Oak Hammock
511 - Ditches
617 - Mixed Wetland Hardwood Forest
618 - Shrub Marsh
620 - Wetland Coniferous Forest
621 - Cypress
630 - Wetland Hardwood/Conifer Forest
641 - Freshwater Marsh
831 - Electric Utilities

PROJECT
SEMINOLE ELECTRIC COOPERATIVE INC.
SGS UNIT 3
PUTNAM COUNTY, FLORIDA

TITLE
VEGETATION/LAND USE MAP USING FLORIDA LAND USE COVER AND FORMS CLASSIFICATION SYSTEM (FLUCFCS)

Golder Associates
Tampa, Florida

PROJECT No.		053-9540	FILE No. 0539540B036.dwg	
DESIGN	KB	11/29/05	SCALE AS SHOWN	REV. 0
CADD	MEF	11/30/05	FIGURE 5	
CHECK	MM	03/07/06		
REVIEW	MM	03/070/06		

Drawing file: F:\PROJECTS\2005 PROJ\053-9558\wblocks\0539540B036.dwg Mar 07, 2006 - 1:42pm

700 0 700 1,400
1" = 700' FEET

PROJECT
SEMINOLE ELECTRIC COOPERATIVE INC
SGS UNIT 3
PUTNAM COUNTY, FL

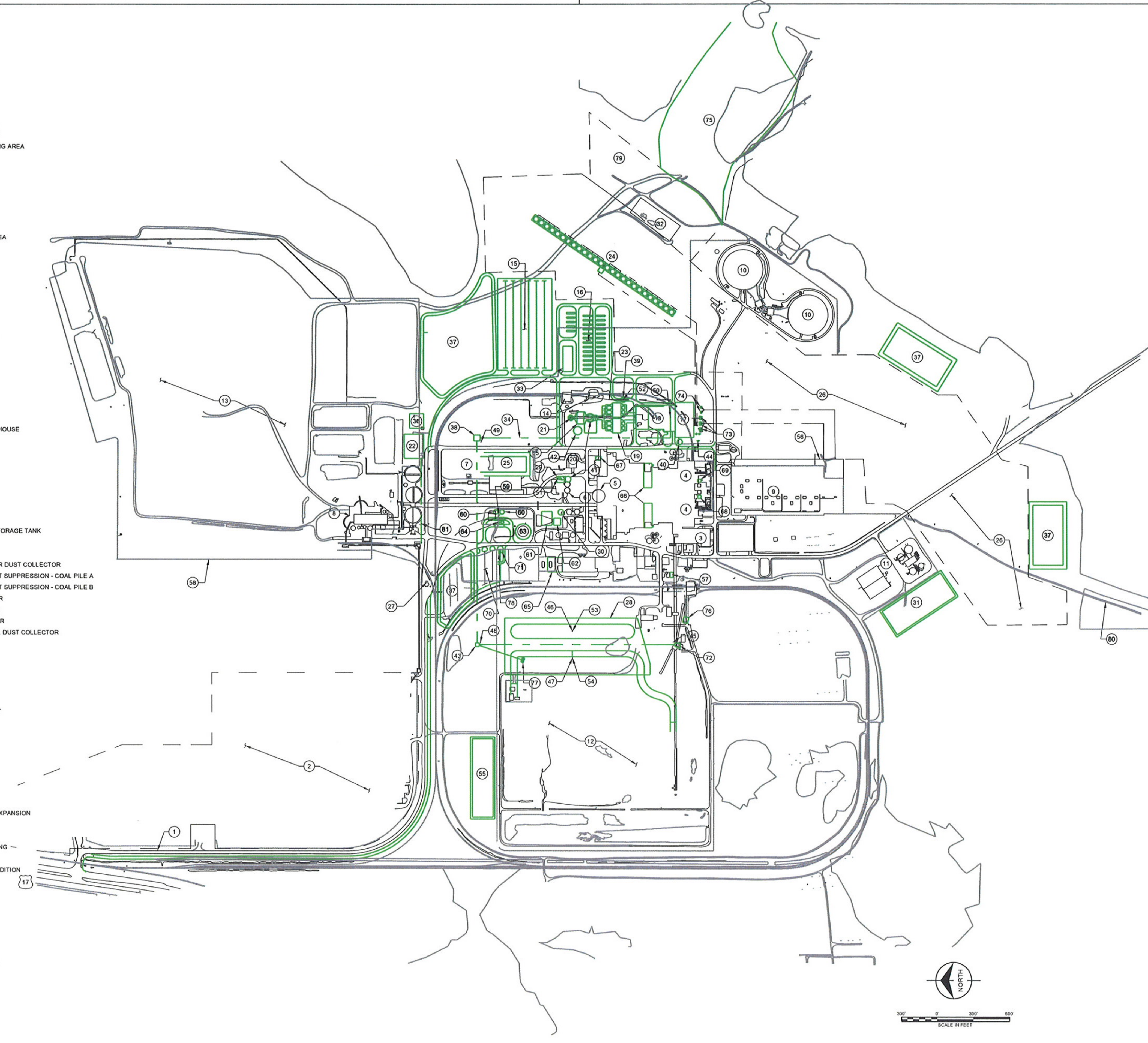
TITLE

TOPOGRAPHIC SURVEY

Golder Associates
Jacksonville, Florida

PROJECT No.		053-9540	FILE No.	0539540B022
DESIGN	MEF	02/20/06	SCALE AS SHOWN	REV. 0
CADD	MEF	02/20/06	FIGURE 6	
CHECK				
REVIEW				

ATTACHMENT B
SITE LAYOUT



KEY NOTES:

1. PLANT ENTRANCE ROAD
2. LAFARGE PROPERTY
3. EXISTING SERVICE BLDG
4. EXISTING TURBINE BLDG
5. EXISTING STACK
6. EXISTING LIMESTONE PREPARATION
7. EXISTING LIMESTONE STORAGE PILE
8. EXISTING FGD EFFLUENT PROCESSING AREA
9. EXISTING SWITCHYARD
10. EXISTING COOLING TOWER
11. EXISTING WASTE TREATMENT AREA
12. EXISTING COAL YARD
13. EXISTING LANDFILL
14. EXISTING RAILCAR REPAIR
15. CONSTRUCTION PARKING
16. CONSTRUCTION OFFICE TRAILER AREA
17. UNIT 3 TURBINE BLDG.
18. UNIT 3 BOILER
19. UNIT 3 PRECIPITATOR
20. UNIT 3 WET FGD
21. UNIT 3 STACK
22. UNIT 3 EFFLUENT PROCESSING
23. UNIT 3 HOUSE SPUR
24. UNIT 3 COOLING TOWER
25. UNIT 3 LIMESTONE PILE EXPANSION
26. UNIT 3 CONSTRUCTION LAYDOWN
27. EXISTING GUARD HOUSE
28. UNIT 3 COAL PILE LINER LIMIT
29. UNIT 3 LIMESTONE PREPARATION
30. UNIT 3 FUEL OIL STORAGE TANK
31. WASTE WATER SURGE POND
32. EXISTING PERCOLATION POND
33. TEMPORARY CONSTRUCTION WAREHOUSE
34. COAL CONVEYOR
35. UNIT 3 WET ESP
36. ZERO LIQUID DISCHARGE SYSTEM
37. STORMWATER RUNOFF POND
38. UNIT 3 CRUSHER HOUSE
39. FLY ASH SILO
40. CONDENSATE STORAGE TANK
41. LIMESTONE SLURRY TANK
42. LIMESTONE SLURRY EMERGENCY STORAGE TANK
43. COAL TRANSFER TOWER
44. EMERGENCY DIESEL GENERATOR
45. EXISTING TRANSFER SAMPLE TOWER DUST COLLECTOR
46. STACKER RECLAIMER W/SPRAY DUST SUPPRESSION - COAL PILE A
47. STACKER RECLAIMER W/SPRAY DUST SUPPRESSION - COAL PILE B
48. TRANSFER TOWER DUST COLLECTOR
49. CRUSHER TOWER DUST COLLECTOR
50. UNIT FEED SYSTEM DUST COLLECTOR
51. LIMESTONE TRANSFER TO BALL MILL DUST COLLECTOR
52. FLY ASH SILO BIN VENT
53. COAL PILE A
54. COAL PILE B
55. COAL PILE RUNOFF POND
56. SWITCHYARD EXPANSION
57. SEWAGE TREATMENT PLANT
58. EXISTING PERMITTED LANDFILL LIMIT
59. UREA DISSOLVER TANK
60. UREA REACTION FEED TANK
61. CBO PLANT
62. CBO CONTROL ROOM
63. CBO STORAGE DOME
64. CBO LOADOUT SILO
65. WAREHOUSE EXPANSION
66. SCR
67. OXIDATION AIR BLOWER BUILDING EXPANSION
68. UNIT 1 AUXILIARY TRANSFORMER
69. UNIT 2 AUXILIARY TRANSFORMER
70. UNIT 1 AND 2 CONSTRUCTION PARKING
71. CAR RINSE
72. AS-RECEIVED TRANSFER TOWER ADDITION
73. UNIT 3 STEP-UP TRANSFORMER
74. UNIT 3 START-UP TRANSFORMER
75. EXISTING BORROW PIT AREA
76. AS-RECEIVED SAMPLING SYSTEM
77. UNIT 3 RECLAIM HOPPERS
78. OIL WATER SEPARATOR
79. BORROW PIT AREA EXPANSION
80. UNIT 3 PLANT MAKE-UP WATER LINE
81. GYPSUM CONVEYOR

Burns & McDonnell
SINCE 1898

date: AUGUST 29, 2005
detailed:
designed: R. SEDLACEK
checked:

Seminole Electric Cooperative, Inc.
IN PARTNERSHIP WITH THOSE WE SERVE

SEMINOLE GENERATING STATION
UNIT 3

SITE PLAN

project | contract

drawing: ATTACHMENT B-1 rev.

sheet of sheets

ATTACHMENT C

STORMWATER MANAGEMENT PLAN

See Appendix 10.9

ATTACHMENT D
AGENCY CORRESPONDENCE

FNAI Element Occurrence Report
See Appendix 10.6.3

USFWS Letter
See Appendix 10.6.3

ATTACHMENT E

LEGAL DESCRIPTION

See Appendix 10.3

10.1.5 Prevention of Significant Deterioration

The following section contains a copy of the Prevention of Significant Deterioration (PSD) permit application for SGS Unit 3 submitted in accordance with the Federal Clean Air Act.

Golder Associates Inc.

3730 Chamblee Tucker Road
Atlanta, GA USA 30341
Telephone (770) 496-1893
Fax (770) 934-9476

Golder Associates

AIR PERMIT APPLICATION AND PREVENTION OF SIGNIFICANT DETERIORATION ANALYSIS FOR SEMINOLE ELECTRIC COOPERATIVE, INC., PALATKA GENERATING STATION UNIT 3 PROJECT PUTNAM COUNTY, FLORIDA

Prepared For:
Seminole Electric Cooperative, Inc.
16313 North Dale Mabry Highway
Tampa, Florida 33609

Prepared By:
Golder Associates Inc.
5100 West Lemon Street
Suite 114
Tampa, Florida 33609

March 2006

053-9540

LIST OF TABLES

LIST OF FIGURES

Application for Permit

LIST OF APPENDICES

1.0 INTRODUCTION

Seminole has determined that the best alternative to meet its customer needs in 2012 and beyond is a modern, self-built, supercritical pulverized coal-generating unit equipped with state-of-the-art emission control systems (the Project). The term "supercritical" in the context of a boiler refers to higher steam operating pressures than conventional (subcritical) boiler designs and results in much greater efficiency. The new coal unit would be constructed at Seminole's existing Seminole Generating Station (SGS) in Palatka, Putnam County and would be designated as SGS Unit 3 (Figure 1-1). Seminole anticipates Unit 3 will begin commercial operation in May 2012. The addition of SGS Unit 3 will increase the total output capability of the SGS by almost 60 percent.

SGS is a 1,917-acre site that contains two existing nominal 650 MW class coal electric generating units (Units 1 and 2) (See Figure 1-2). Both Units 1 and 2 are coal-fired and also are permitted to burn up to a 30 percent petroleum coke (petcoke) to coal blend. The site contains all facilities for the operation of the existing units, including coal unloading and storage facilities, pollution control equipment, and solid waste disposal areas for flyash and other solid waste materials. Both units are equipped with electrostatic precipitators and wet flue gas desulfurization (FGD) systems for particulate and sulfur dioxide (SO_2) removal. FGD sludge is processed into wallboard-grade synthetic gypsum and transported to a wallboard facility located on a parcel of land adjacent to the SGS. The design of SGS Unit 3 will maximize the co-use of existing site facilities to the greatest extent possible. Existing plant systems currently planned for co-use include: the coal unloading and storage facilities, and the limestone storage and processing system.

SGS Unit 3 will use advanced supercritical pulverized coal technology with state-of-the-art emission controls. The electric generator associated with the steam turbine is capable of converting the steam input rate into about 820-MW gross electrical power output. A portion of this output will be utilized to operate the plant, resulting in the nominal net output of approximately 750 MW. The air pollution control equipment will consist of a wet FGD for SO_2 removal, selective catalytic reduction (SCR) for control of nitrogen oxides (NO_X), an electrostatic precipitator (ESP) for collection and removal of fine particles, a wet ESP (WESP) for control of sulfuric acid mist (SAM), and mercury removal through application of the above technologies. Fuel (coal and petroleum coke) for SGS Unit 3 will be delivered by rail. The existing coal storage area has adequate capacity for the addition of SGS Unit 3.

Mechanical draft cooling towers will provide condensate cooling. Most process wastewater streams will be treated and recycled as make-up water to the FGD scrubber system. Wastewater will be treated in a new zero liquid discharge (ZLD) system which will remove dissolved solids from the wastewater and create a solid waste material. The only plant water proposed to be discharged to the St. Johns River, once the ZLD system is installed, will be cooling tower blowdown.

In a separate application, filed on February 13, 2006, Seminole also proposed upgrades to Units 1 and 2. Specifically, Seminole is now proposing to add new emission control technologies, as well as upgrade existing control equipment, as follows:

- Replace the existing low-NO_X burners and modify the existing overfire air system;
- Add SCR systems for NO_X removal;,
- Upgrade the existing FGD system for improved SO_2 control;
- Add an alkali injection system to reduce SO_3 emissions and negate opacity effects that are expected to be caused by the new SCR systems,
- Install a carbon burn out (CBO) unit to reburn fly ash generated by SGS, minimizing the onsite landfilling of this fly ash, recovering its available heating value, and providing a partial replacement to Portland cement. The CBO will also assist in minimizing adverse effects of the SCR systems and burner upgrades, such as elevated ammonia and carbon content in the fly ash, and
- Upgrade the existing Units 1 and 2 steam turbines to increase the efficient use of the existing steam, as well as utilize the heat generated by the CBO process, resulting in approximately 21.3 additional MWs of generation per unit. This increased generation will be achieved with no increase in heat input.

These proposed activities will accomplish substantial environmental goals, namely: (1) comply with the new Acid Rain program NO_X limitation, effective for Seminole in 2008, (2) allow for the reduction of NO_X and SO_2 emissions to meet the expected allowance allocations under the Clean Air Interstate Rule (CAIR), effective in 2009 and 2010, (3) allow for the reduction of mercury emissions to meet the expected allowance allocations under the Clean Air Mercury Rule (CAMR), effective in 2010, (4) reduce SO_3 emissions, which increases as a consequence of operating the SCRs, resulting in no increase in H_2SO_4 emissions, (5) allow for the further reduction of NO_X, SO_2, H_2SO_4 (SAM) and mercury emissions to levels needed to offset the construction and operation of a new Unit 3, which is described in detail in this PSD permit application and PPSA modification package, (6) lower the heat rate via more efficient use of steam, meaning more megawatts (MWs) can be produced with the same amount of heat input to Units 1 and 2, and (7) maximize the reuse of fly ash, and thereby minimize the landfilling of this material.

As part of this application package, Seminole proposes to formally offset potential NO_X, SO_2 and SAM emissions from Unit 3 by accepting licensing conditions that incorporate the use of the Units 1 and 2 control system upgrades and additions described above. Seminole also proposes a facility-wide mercury limit after Unit 3 comes online at a level below historic baseline. Accordingly, Seminole will add a new Unit 3 while decreasing facility-wide emissions of SO_2, NO_X, SAM, and mercury.

The permitting of the Project requires an Air Construction Permit and Prevention of Significant Deterioration (PSD) review. PSD review requires air quality assessments for determining the facility's compliance with state and federal new source review (NSR) regulations. The critical aspects of these assessments include the air quality impact analyses performed using appropriate air dispersion models and the Best Available Control Technology (BACT) analyses performed to evaluate the selected emission control technology.

The Project will involve the addition of a new major air pollution unit at an existing source that will result in net increases in certain air emissions. The U.S. Environmental Protection Agency (EPA) has implemented regulations requiring a PSD review for new units that increase air emissions above certain threshold amounts. Emissions from the Project will exceed these thresholds for certain pollutants, and the Project is subject to PSD review. EPA's PSD regulations are promulgated under 40 Code of Federal Regulations (CFR) Part 51.166. Florida's PSD regulations are codified in Rule 62-212.400, Florida Administrative Code (F.A.C.), and have been approved by EPA. These Florida PSD regulations incorporate the requirements of EPA's PSD regulations.

Based on the emissions from the facility for each regulated pollutant, PSD review is required for each of the following pollutants:

- Particulate matter (PM) as total suspended particulate matter (TSP) [PM(TSP)];
- Particulate matter with aerodynamic diameter of 10 microns or less (PM_{10});
- Carbon monoxide (CO);

- Volatile organic compounds (VOCs); and
- Fluorides.

As stated earlier, Seminole proposes to offset potential NO_X, SO_2 , mercury and SAM emissions from Unit 3 by accepting licensing conditions that incorporate the use of the Units 1 and 2 control system upgrades and additions. Potential mercury emissions from Unit 3 are less than the 0.1 ton per year NSR applicability threshold and, combined with additional reductions from Units 1 and 2, there will be an overall decrease in mercury emissions compared to current conditions. Therefore, the proposed Unit 3 project will not be subject to PSD review for NO_X, SO_2, mercury and SAM.

Putnam County has been designated as an attainment area for all criteria pollutants [i.e., attainment: ozone (O_3), PM_{10}, SO_2, CO, and NO_2; unclassifiable: lead] and is a PSD Class II area for PM_{10}, SO_2, and NO_2; therefore, the PSD review will follow the NSR applicable to attainment areas.

The air permit application is divided into seven major sections:

- Section 2.0 presents a description of the Project, including air emissions and stack parameters;
- Section 3.0 provides a review of the PSD and nonattainment requirements applicable to the Project;
- Section 4.0 includes the control technology review with discussions on BACT;
- Section 5.0 discusses the ambient air monitoring analysis (pre-construction monitoring) required by PSD regulations;
- Section 6.0 presents a summary of the air modeling approach and results used in assessing compliance of the facility with ambient air quality standards (AAQS), and PSD increments; and
- Section 7.0 provides the additional impact analyses for soils, vegetation, and visibility.

2.0 PROJECT DESCRIPTION

2.1 Site layout and Description

The Project will be located on the existing 1,917-acre Site, with the power block, and fuel and limestone handling facilities. Figure 2-1 presents the Site location and boundary. Figures 1-1 and 1-2, presented previously, provide a site plan of the proposed Unit 3 Project and a site plan for the existing facility, respectively. Within the SGS Site, approximately 21 acres will be utilized for the Unit 3 power block containing the supercritical boiler, steam turbine/electric generator, cooling towers, and other facilities.

2.2 Fuels

The primary fuel will be eastern U.S. bituminous coals, and petroleum coke, delivered to the plant by rail. Unit 3 will co-fire up to 30 percent by weight petroleum coke with coals. Typical ultimate and proximate analyses of coals and petroleum coke representative of the types of fuels proposed for the Project are shown in Table 2-1. The amounts and qualities of each type and shipment of fuel will vary depending upon availability and economics, and design values are shown for coals from northern and central Appalachia, Illinois-Western Kentucky, Illinois-Indiana, and the co-firing of 30 percent petroleum coke with coal. No. 2 oil will be used for startup and flame stabilization.

The maximum annual fuel usage is estimated to be about 2.8 million tons/year (TPY) based on a 100-percent capacity factor. A conservative capacity factor for the proposed Unit 3 is expected to be about 90 percent. The coal storage area will maintain sufficient fuel for a targeted 40 to 60 days of operation, with a potential for 90 days of operation.

It is the intention of Seminole to utilize the same fuel blends in all three units. Burning the same fuel in Unit 3 as is burned in Units 1 and 2 maximizes the co-use of existing coal handling areas and equipment (for example, rail lines, unloading facilities, storage areas, conveyor systems, etc.), avoiding the need to construct separate facilities dedicated solely to Unit 3, and avoids the substantially increased costs associated with purchasing and transporting lower sulfur coals from other mines.

The existing Units 1 and 2 are burning coal with a sulfur content that typically ranges up to 3.8 percent, although individual shipments can exceed this value. As the Unit 3 Project is not subject to BACT for SO_2 and, in fact, is demonstrating a net decrease in facility SO_2 emissions, there is no regulatory restriction on fuel sulfur content. Nonetheless, Seminole is committed to achieving the proposed 0.165 lb/MMBtu SO_2 limit regardless of the fuel sulfur content. For informational purposes, the incremental cost to reduce the fuel sulfur content of the coal from 3 percent to 2 percent is roughly \$38,000 per ton of SO_2 reduced for Unit 3 alone. This is based on a projected 70 percent blend of coal on an annual basis (i.e., about 43.8 trillion Btu/yr), a potential reduction of 810 tons per year of SO_2, and projected costs in 2012 of \$3.24/MMBtu and \$2.53/MMBtu for the 3 percent and 2 percent sulfur coals, respectively. Also, the existing units are currently utilizing 0.5 percent sulfur oil and, to maximize the co-use of existing equipment, Seminole proposes the same fuel choice for the Unit 3 Project.

2.3 Source Emissions and Stack Parameters

The types and sources of air emissions associated with the Unit 3 Project consist of a supercritical boiler, a mechanical draft-cooling tower, an emergency generator, a spray dryer associated with the zero liquid discharge (ZLD) system, and material handing facilities. Figure 1-1 presents the location of the air emission sources.

State-of-the-art air pollution control equipment will be installed on the Unit 3 Project to minimize air emissions. Within the boiler, combustion controls will minimize the formation of NO_X and the formation of CO and VOCs by combustor design. After the economizer, further NO_X reduction will be achieved by SCR. PM emissions will be controlled using an ESP. Sulfur oxides (SO_X) will be controlled using a wet limestone FGD followed by a wet ESP (WESP). The combination of these techniques are proposed for the Project and have been determined to represent BACT on previous projects based on an evaluation of economic, energy, and environmental impacts. Table 2-2 presents the performance and maximum estimated emission rates of regulated pollutants for the proposed nominal 820 MW gross (750 MW net) supercritical unit. The design parameters are provided in Table 2-2 for operating loads of 100, 75, and 50 percent. The maximum estimated emission rates were determined using the air pollution control equipment proposed for the Project.

Emissions of pollutants classified as hazardous air pollutants (HAPs) will result from metals found in trace amounts in coal and petroleum coke. Certain trace metals can also be volatilized in the combustion process. These trace metals either remain in the gas phase or condense to form small PM. The fraction that condenses is dependent upon the specific trace metal and the flue gas temperature. Some trace metals condense onto other PM in the gas stream and may be collected in the particulate control system. The amount of condensation depends upon the volatilization properties of the trace metals and the temperature prior to the particulate control device. The combination of controls that include an ESP, wet FGD, and WESP will reduce the emissions of these pollutants by a minimum of 95 percent to over 99 percent depending upon pollutant.

Mercury emissions from Unit 3 are effectively reduced through the use of the SCR, ESP, FGD and WESP. Removal is enhanced by the SCR where elemental mercury is oxidized into a form that can be readily collected by the wet FGD system. Coupled with the WESP, removal efficiency of 90 percent or more is expected based on preliminary U.S. Environmental Protection Agency (EPA) evaluations. Due to the proposed controls/upgrades to Units 1 and 2, the facility-wide mercury emissions will decrease, even after Unit 3 comes online. In fact, Seminole is voluntarily proposing a facility-wide limit that equates to 90 percent removal from all three units.

Organic HAP emissions are controlled by boiler design features and combustion air feed rates. The boilers will be designed and operated for high-combustion efficiency, which will inherently minimize the production of organic HAP emissions.

Tables 2-3 through 2-6 present the HAP emissions for the Project based on AP-42 emission factors and conservative assumptions on fuel quality. For metals, AP-42 emission factors were used along with data available from the U.S. Geological Survey (USGS) on coal quality. The use of AP-42 emission factors for HAPs is considered to provide conservative estimates of emissions.

Table 2-7 presents the potential PM/PM_{10} emissions from the mechanical draft-cooling tower associated with the proposed 820 MW unit. PM emissions are emitted from a mechanical draft-cooling tower in the form of drift. Drift is water aerosols emitted from the cooling tower containing dissolved minerals from the water circulating in the cooling tower. The dissolved minerals become PM, including PM_{10}, when the water in the drift is evaporated. Cooling tower drift will be controlled through the use of mist eliminators that will be designed to limit drift to 0.0005 percent of the circulating water rate of the cooling tower. The information presented in Table 2-7 is for the proposed cooling tower design that represents worst case emissions and flow characteristics.

PM emissions will also be generated by material handling operations that include fuel handling and storage, limestone handling and storage, and by-product handling and storage. The latter includes bottom and fly ash and FGD by-product. This application only addresses the incremental change in material handling operations as a result of the proposed Unit 3 project. Table 2-8 presents a summary of emissions from material handling operations.

Fuel (coals and petroleum coke) will be transported to the SGS Site by rail, resulting in PM emissions. Less than one train per day will deliver fuel to the SGS Site. Fuel will be unloaded in a rotary dumper that pneumatically pulls cars for unloading. Train engine operation is minimal during the unloading operation. From the rotary dumper, the fuel will be transferred to a transfer tower where fuel is unloaded into the active and inactive storage areas using telescoping chutes. The coal storage area will maintain sufficient fuel for a targeted 40 to 60 days of operation, with a potential for 90 days of operation.

Fuel (coal and petroleum coke) will be transported to the SGS Site by rail. The existing SGS coal handling system for the SGS Unit 3 project is designed to handle bituminous coal with a density of 50 pounds per cubic foot and petroleum coke with a density of 45 pounds per cubic foot. The existing Units 1 and 2 rotary dumper and stackout system has adequate capacity (approximately 3,000 tons per hour) to handle SGS Unit 3 fuel. The addition of SGS Unit 3 will increase coal deliveries to approximately 1.6 unit trains per day (550 trains per year). The existing coal storage has a total area of approximately 60 acres (1,225,000 tons) and provides adequate capacity for all three units.

The existing As-Received Transfer Sampling Tower will be modified by adding a new diverter gate and belt feeder. The belt feeder will transfer coal to a new yard belt which will stack out or reclaim coal via a new trencher type stacker/reclaimer. Three days of reclaimable storage for Unit 3 will be provided. Coal from the yard belt is directed through a new enclosed crusher tower and to a new tower adjacent to Unit 3. The Unit 3 tower will be provided with a surge bin and variable speed belt feeders which will provide coal to the Unit 3 traveling tripper conveyors.

Dust control for the new coal handling system appurtenances described in the preceding paragraph will be provided by a dry baghouse type collection system to limit particulate emissions in accordance with local, state, and federal regulations. Section 3.0 of the SCA (Figure 3.9.4-1) presents a flow diagram of the coal handling system.

Limestone used in the wet FGD system will be transported to the SGS Site by truck. The limestone will be transferred from the existing truck unloading system to a storage facility utilizing the existing limestone handling system. Section 3.0 of the SCA (Figure 3.9.5-1) presents a flow diagram of the limestone handling system.

A new chain conveyor system will be used to collect and transport the Unit 3 bottom ash to a new truck loading area. Bottom ash will be sold to concrete and concrete block manufacturers. A fly ash silo with a storage capacity of three days will be installed. Fly ash will be blended for use in the CBO unit if necessary or trucked or hauled by rail from the storage silo for offsite sales to the maximum extent feasible. Waste slurry from the plant's Unit 3 FGD system will be pumped to the existing Units 1 and 2 effluent processing system where it will be treated and dewatered to produce gypsum for use in the production of wallboard. Section 3.0 of the SCA (Figure 3.9.6-1 and 3.9.6-2) presents a flow diagram of the fly ash and bottom ash handling systems, respectively.

Fugitive emission factors for the various material handling operations were estimated in accordance with current EPA techniques as presented in AP-42 (EPA, 1995), fugitive dust background document (EPA, 1992), historical EPA emission factors, and equipment design information. Fugitive emissions were estimated for batch drop operations, wind erosion, coal pile maintenance, and dust collection systems.

For batch drop operations, the total suspended particulate matter [PM(TSP)] and PM_{10} emission factors for batch drop operations are defined in Section 13.2.4 of AP-42 by the equation:

$$E = k(0.0032)\,(U/5)^{1.3}/(M/2)^{1.4}\ \text{lb/ton}$$

where: E = emission factor, lb/ton;

k = particle size multiplier;

U = mean wind speed [miles per hour (mph)]; and

M = material moisture content (percent).

The particle size multiplier, k, was based on the recommended multipliers of 0.74 and 0.35 in developing the PM(TSP) and PM_{10} emission estimates, respectively. Mean and maximum daily wind speeds were obtained from the Local Climatological Data and hourly data from Jacksonville International Airport (JIA). The mean annual wind speed used to calculate emissions was 9.7 mph and the maximum daily wind speed used was 17 mph. Moisture contents for fuel, limestone, fly and bottom ash, and gypsum used to calculate emissions were 6.4, 0.5, 20, and 10 percent, respectively. The moisture content for fuel was obtained from the fuel analyses of the representative fuels proposed for the Project. AP-42 was used as the moisture content for limestone. Fly ash that is transported to the by-product storage will contain moisture from the pug mill. Bottom ash is collected in a submerged conveyor. Gypsum, from the FGD system, has a high moisture content.

For emissions from wind erosion of active (frequently disturbed) storage piles, the PM(TSP) and PM_{10} emission factors from continuously active piles, derived from Section 2.3.1.3.3 in EPA's fugitive dust background document, are:

$$E = k(1.7)(s/1.5)[(365-p)/365](f/15) \text{ (lb/day/acre)}$$

where: E = emission factor (lb/day/acre),

k = particle size multiplier,

s = silt content of aggregate (percent),

p = number of days with at least 0.01 inch of precipitation per year, and

f = percent of time that unobstructed wind speed exceeds 12 mph at the mean pile height.

The particle size multiplier, k, was based on the recommended multipliers of 1.0 and 0.50 in developing the PM(TSP) and PM_{10} emission estimates, respectively. The silt content was assumed to be 3 percent, based on typical silt contents associated with coal-fired power generation sources identified in Table 13.2.4-1 of AP-42; the mean silt content is 2.2. The silt content used is therefore conservative. For annual average emissions, the number of days with at least 0.01 inch of precipitation per year was 136, based on data collected at JIA. The annual frequency of wind speed greater than 12 mph [5.4 meters per second (m/s)] was 35 percent based on an evaluation of hourly meteorological data from JIA.

The PM(TSP) and PM_{10} emission factors for active coal pile maintenance, derived from Section 13.2.2 in AP-42, are:

$$E = k(5.9)(s/12)^a (W/3)^b [(365-p)/365](lb/vehicle mile traveled)$$

where: E = emission factor (lb/vehicle mile traveled);,

k = particle size multiplier,

a,b = particle size exponents,

s = silt content of surface material (percent),

W = mean vehicle weight (ton), and

P = number of days with at least 0.01 inch of precipitation per year.

The particle size multiplier, k, was based on the recommended multipliers of 4.9 and 1.5 in developing the PM(TSP) and PM_{10} emission estimates, respectively. The particle size exponents, a and b, were based on the recommended multipliers. For exponent a, the exponents were 0.7 and 0.9 in developing the PM(TSP) and PM_{10} emission estimates, respectively. For b, the exponent was 0.45. The silt content was assumed to be 3 percent, which is based on a conservative silt content for coal-fired power generation sources identified in Table 13.2.4-1, AP-42.

A control efficiency for each source was based on EPA's fugitive dust background document (EPA, 1992), information about the source and historical fugitive emission factors.

For dust collection systems with fabric filters, an emission rate of 0.01 grain per standard cubic foot (g/scf) was assumed. This is a typical guarantee for fabric filters. Annual and maximum daily emissions for these sources were based on their operation (i.e., loading rates and coal usage).

Table 2-8 presents a summary of emissions from material handling operations. Appendix A presents detailed calculations on emissions from the material handling and cooling tower operations.

Three ZLD spray dryers will be installed to supply heat for the ZLD system. These dryers are not, by definition, a boiler or a process heater. Table 2-9 presents performance and emissions information for the ZLD spray dryer firing No. 2 distillate oil. Annual emissions for the spray dryers are conservatively based on 8,760 hours per year of operation.

The proposed Unit 3 will be equipped with a 100-percent capability, 1,825-kilowatt (kW) emergency generator. This emergency generator will be used when electric power cannot be transmitted into the Seminole transmission system and is unavailable to the SGS Site. This primarily would occur during catastrophic events such as hurricanes. At a maximum expected operation of 160 hours per year, the emissions of any regulated air pollutant will not exceed 5 TPY. At this emission rate, the emergency generator is an exempt emission unit and can be considered an insignificant activity for air permitting purposes.

Table 2-10 contains emissions and manufacturer's information for the emergency generator. Normally, the emergency generator would be operated one to two hours per month for maintenance and reliability testing. Note that the estimated annual emissions provide a worst-case estimate and are not representative of normal annual operation. For maintenance and reliability testing, the emergency generator will normally be operated about 1 to 2 hours per month or approximately 12 to 24 hours per year.

A summary of the maximum total potential annual emissions estimated for the Unit 3 Project is presented in Table 2-11.

2.4 Structures and Stack Sampling Facilities

The dimensions of the buildings and structures used to analyze the Good Engineering Practice stack height are presented in Section 6.0. Stack sampling facilities will be constructed and maintained in accordance with Rule 62-297.310(6) F.A.C.

2.5 Excess Emissions

The startup and shutdown of Unit 3 will follow an established startup and shutdown procedure, to be submitted with the Title V application, similar to the procedure that was submitted as part of the Units 1 and 2 Title V air permit application and is referenced in Specific Condition A.20 of the existing site Title V permit. This procedure will be incorporated into Unit 3 operating procedures. Emissions during startup of the proposed unit will be minimized by the use of existing onsite steam and the use of No. 2 distillate oil igniters in the boiler to warm the boiler and steam turbine.

The use of No. 2 fuel, along with the operation of the WESP and wet FGD systems will minimize emissions of those pollutants associated with contaminants in the fuel (PM and SO_2). Because the ignitors and the boiler will be operating at low load conditions and the SCR will not be operating, excess emissions for combustion products, such as CO, VOC, and NO_X, may occur. However, the potential emissions for these pollutants will not be greater than the mass emission values provided in Table 2-2 for Unit 3. Mass emissions during startup will remain low due to the operation at low loads during the startup process. In addition, the potential emissions for Unit 3 are based on 100 percent capacity factor, which is greater than the actual operation (typically 90 percent or less).

3.0 AIR QUALITY REVIEW REQUIREMENTS AND APPLICABILITY

The following discussion pertains to the federal, state, and local air regulatory requirements and their applicability to the Project. These regulations must be satisfied before the facility can begin operation.

3.1 National, State, and Local AAQS

The existing applicable national, State of Florida, and local AAQS are presented in Table 3-1. Primary national AAQS were promulgated to protect the public health, and secondary national AAQS were promulgated to protect the public welfare from any known or anticipated adverse effects associated with the presence of pollutants in the ambient air. Areas of the country in violation of AAQS are designated as nonattainment areas; and new sources to be located in or near these areas may be subject to more stringent air permitting requirements.

3.2 PSD requirements

3.2.1 General Requirements

Under federal and State of Florida PSD review requirements, all major new or modified sources of air pollutants regulated under the Clean Air Act (CAA) must be reviewed and a pre-construction permit issued. Florida's State Implementation Plan (SIP), which contains PSD regulations, has been approved by EPAA "major facility" is defined as any 1 of 28 named source categories that have the potential to emit 100 TPY or more or any other stationary facility that has the potential to emit 250 TPY or more of any pollutant regulated under CAA. "Potential to emit" means the capability, at maximum design capacity, to emit a pollutant after the application of control equipment.

A "major modification" is defined under PSD regulations as a change at an existing major facility that increases emissions by greater than significant amounts. PSD significant emission rates are shown in Table 3-2.

EPA has promulgated regulations addressing certain increases above air quality baseline concentration levels of SO_2, PM_{10}, and NO_2 that would constitute significant deterioration (i.e., PSD increments). These regulations specify the quantity of this increment depending on the classification of the area: Class I areas include international parks, national wilderness areas and memorial parks greater than 5000 acres, and have the most stringent increments; Class II areas are all other areas not designated as Class I; and states can designate certain areas as Class III if specific requirements are met. The EPA class designations and allowable PSD increments are presented in Table 3-1. The State of Florida has adopted the EPA class designations and allowable PSD increments for SO_2, PM_{10}, and NO_2.

PSD review is used to determine whether significant air quality deterioration will result from the new or modified facility. Federal PSD requirements are contained in 40 CFR 51.166, *Prevention of Significant Deterioration of Air Quality*. The State of Florida's PSD regulations are found in Rule 62-212.400, F.A.C. Major facilities and major modifications are required to undergo the following analysis related to PSD for each pollutant emitted in significant amounts:

1. Control technology review,
2. Source impact analysis,
3. Air quality analysis (monitoring),
4. Source information, and
5. Additional impact analyses.

In addition to these analyses, a new facility also must be reviewed with respect to good engineering practice (GEP) stack height regulations. Discussions concerning each of these requirements are presented in the following sections.

3.2.2 Control Technology Review

The control technology review requirements of the federal and state PSD regulations require that all applicable federal and state emission-limiting standards be met, and that BACT be applied to control emissions from the source (Rule 62-212.400, F.A.C.). The BACT requirements are applicable to all regulated pollutants for which the increase in emissions from the facility or modification exceeds the significant emission rate (see Table 3-2).

BACT is defined in Rule 62-210.200(38), F.A.C., as *(a) An emissions limitation, including a visible emission standard, based on the maximum degree of reduction of each pollutant emitted which the Department on a case-by-case basis, taking into account:*

> *1. Energy, environmental, and economic impacts, and other costs;*
>
> *2. All scientific, engineering, and technical material and other information available to the Department; and*
>
> *3. The emission limiting standards or BACT determinations of Florida and any other state;*

determines is achievable through application of production processes and available methods, systems, and techniques (including fuel cleaning or treatment or innovative fuel combustion techniques) for control of such pollutant.

> *(b) If the Department determines that technological or economic limitations on the application of measurement methodology to a particular part of a source or facility would make the imposition of an emission standard infeasible, a design, equipment, work practice, operational standard or combination thereof, may be prescribed instead to satisfy the requirement for the application of BACT. Such standard shall, to the degree possible, set forth the emissions reductions achievable by implementation of such design, equipment, work practice, or operation.*
>
> *(c) Each BACT determination shall include applicable test methods or shall provide for determining compliance with the standard(s) by means which achieve equivalent results.*
>
> *(d) In no event shall the application of Best Available Control Technology result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard of 40 CFR Parts 60, 61, and 63.*

BACT was promulgated within the framework of the PSD requirements in the 1977 amendments of the CAA [Public Law 95-95; Part C, Section 165(a)(4)]. The primary purpose of BACT is to optimize consumption of PSD air quality increments and thereby enlarge the potential for future economic growth without significantly degrading air quality (EPA, 1978; 1980). Guidelines for the evaluation of BACT can be found in *Guidelines for Determining Best Available Control Technology (BACT)* (EPA, 1978) and in the *PSD Workshop Manual* (EPA, 1980). These guidelines were promulgated by EPA to provide a consistent approach to BACT and to ensure that the impacts of alternative emission control systems are measured by the same set of parameters. In addition, through implementation of these guidelines, BACT in one area may not be identical to BACT in another area. According to EPA (1980), "BACT analyses for the same types of emissions unit and the same pollutants in different locations or situations may determine that different control strategies should be applied to the different sites, depending on site-specific factors. Therefore, BACT analyses must be conducted on a case-by-case basis."

The BACT requirements are intended to ensure that the control systems incorporated in the design of a facility reflect the latest in control technologies used in a particular industry and take into consideration existing and future air quality in the vicinity of the facility. BACT must, as a minimum, demonstrate compliance with new source performance standards (NSPS) for a source (if applicable). An evaluation of the air pollution control techniques and systems, including a cost-benefit analysis of alternative control technologies capable of achieving a higher degree of emission reduction than the proposed control technology, is required. The cost-benefit analysis requires the documentation of the materials, energy, and economic penalties associated with the proposed and alternative control systems, as well as the environmental benefits derived from these systems. A decision on BACT is to be based on sound judgment, balancing environmental benefits with energy, economic, and other impacts (EPA, 1978).

Historically, a "bottom-up" approach consistent with the BACT Guidelines and the PSD Workshop Manual was used. With this approach, an initial control level, which is usually NSPS, is evaluated against successively more stringent controls until a BACT level is selected. However, EPA developed a concern that the bottom-up approach was not providing the level of BACT decisions originally intended. As a result, in December 1987, the EPA Assistant Administrator for Air and Radiation mandated changes in the implementation of the PSD program, including the adoption of a new "top-down" approach to BACT decision-making.

The top-down BACT approach essentially starts with the most stringent (or top) technology and emission limits that have been applied elsewhere to the same or a similar source category. The applicant must next provide a basis for rejecting this technology in favor of the next most stringent technology or propose using it. Rejection of control alternatives may be based on technical or economic infeasibility. Such decisions are made on the basis of physical differences (e.g., fuel and boiler type), locational differences (e.g., availability of water), or significant differences that may exist in the environmental, economic, or energy impacts. The differences between the proposed facility and the facility for which the control technique was applied previously must be justified. EPA has issued a draft guidance document on the top-down approach entitled, *Top-Down Best Available Control Technology Guidance Document* (EPA, 1990).

3.2.3 Source Impact Analysis

A source impact analysis must be performed for a major source subject to PSD review for each pollutant for which the increase in emissions exceeds the significant emission rate (Table 3-2). The PSD regulations specifically provide for the use of atmospheric dispersion models in performing impact analyses, estimating baseline and future air quality levels, and determining compliance with AAQS and allowable PSD increments. Designated EPA models normally must be used in performing the impact analysis. Specific applications for other than EPA-approved models require EPA's consultation and prior approval. Guidance for the use and application of dispersion models is presented in the EPA publication *Guideline on Air Quality Models (Revised).* The source impact analysis for criteria pollutants to address compliance with AAQS and PSD Class II increments may be limited to the new or modified source if the net increase in impacts as a result of the new or modified source is below significance levels, as presented in Table 3-1.

The EPA has proposed significant impact levels for Class I areas. The levels are as follows:

Pollutant	Averaging Time	Proposed EPA PSD Class I Significant Impact Levels ($\mu g/m^3$)
SO_2	3-hour	1
	24-hour	0.2
	Annual	0.1
PM_{10}	24-hour	0.3
	Annual	0.2
NO_2	Annual	0.1

Note: $\mu g/m^3$ = micrograms per cubic meter.

Although these levels have not been officially promulgated as part of the PSD review process and may not be binding for states in performing PSD reviews, the proposed levels serve as a guideline in assessing a source's impact in a Class I area. The EPA action to incorporate Class I significant impact levels in the PSD process is part of implementing NSR provisions of the 1990 CAA Amendments. Because the process of developing the regulations will be lengthy, EPA believes that the proposed rules concerning the significant impact levels is appropriate to assist states in implementing the PSD permit process. The FDEP has accepted the use of these significant impact levels. Source impact analyses for PSD Class I Areas are required to be performed if the source is within 200 kilometers of the Class I Area.

Various lengths of meteorological data records can be used for impact analysis. A five-year period can be used with corresponding evaluation of highest, second-highest short-term concentrations for comparison to AAQS or PSD increments. The term "highest, second-highest" (HSH) refers to the highest of the second-highest concentrations at all receptors (i.e., the highest concentration at each receptor is discarded). The second-highest concentration is significant because short-term AAQS specify that the standard should not be exceeded at any location more than once a year. If fewer than 5 years of meteorological data are used in the modeling analysis, the highest concentration at each receptor normally must be used for comparison to air quality standards.

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

1. The actual emissions representative of facilities in existence on the applicable baseline date; and

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

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

1. Actual emissions from any major stationary facility on which construction commenced after January 6, 1975, for SO_2 and PM (TSP) concentrations and after February 8, 1988, for NO_2 concentrations; and

2. Actual emission increases and decreases at any stationary facility occurring after the baseline date.

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

1. The major facility baseline date, which is January 6, 1975, in the cases of SO_2 and PM (TSP) and February 8, 1988, in the case of NO_2;

2. The minor facility baseline date, which is the earliest date after the trigger date on which a major stationary facility or major modification subject to PSD regulations submits a complete PSD application; and

3. The trigger date, which is August 7, 1977, for SO_2 and PM (TSP) and February 8, 1988, for NO_2.

The minor source baseline date for SO_2 and PM (TSP) has been set as December 27, 1977, for the entire State of Florida (Rules 62-204.200(22); 204.360, F.A.C.). The minor source baseline for NO_2 has been set as March 28, 1988 (Rule 62-204.200(22); 204.360, F.A.C). It should be noted that references to PM (TSP) are also applicable to PM_{10}.

3.2.4 Air Quality Monitoring Requirements

In accordance with requirements of 40 CFR 52.21(m) 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 new major stationary facility or major modification. For a new major facility, the affected pollutants are those that the facility potentially would emit in significant amounts. For a major modification, the pollutants are those for which the net emissions increase exceeds the significant emission rate (see Table 3-2).

Ambient air monitoring for a period of up to one year generally is appropriate to satisfy the PSD monitoring requirements. Data for a minimum of four months are required. Existing data from the vicinity of the proposed source may be used, if the data meet certain quality assurance requirements; otherwise, additional data may need to be gathered. Guidance in designing a PSD monitoring network is provided in *Ambient Monitoring Guidelines for Prevention of Significant Deterioration* (EPA, 1987a).

The regulations include an exemption that excludes or limits the pollutants for which an air quality analysis must be conducted. This exemption states that a new major stationary facility or major modification is exempt from the monitoring requirements with respect to a particular pollutant, if the emissions increase of the pollutant from the facility or modification would cause, in any area, air quality impacts less than the *de minimis* levels presented in Table 3-2 (Rule 62-212.400-3, F.A.C.). If a facility's predicted impacts are less than the *de minimis* levels, preconstruction monitoring would not be required, pursuant to Rule 62-212.400(3)(e) F.A.C.

3.2.5 Source Information/GEP Stack Height

Source information must be provided to adequately describe the proposed facility. The general type of information required for this facility is presented in Section 2.0.

The 1977 CAA Amendments require that the degree of emission limitation required for control of any pollutant cannot be affected by a stack height that exceeds GEP or any other dispersion technique. On July 8, 1985, EPA promulgated final stack height regulations (EPA, 1985a). Identical regulations have been adopted by FDEP (Rule 62-210.550, F.A.C.). GEP stack height is defined as the highest of:

1. 65 meters (m); or
2. A height established by applying the formula:

   $$Hg = H + 1.5L$$

   where: Hg = GEP stack height,
   H = Height of the structure or nearby structure, and
   L = Lesser dimension (height or projected width) of nearby structure(s); or
3. A height demonstrated by a fluid model or field study.

"Nearby" is defined as a distance up to five times the lesser of the height or width dimensions of a structure or terrain feature, but not greater than 0.8 km. Although GEP stack height regulations require that the stack height used in modeling for determining compliance with AAQS and PSD increments not exceed the GEP stack height, the actual stack height may be greater.

The stack height regulations also allow increased GEP stack height beyond that resulting from the above formula in cases where plume impaction occurs. Plume impaction is defined as concentrations measured or predicted to occur when the plume interacts with elevated terrain. Elevated terrain is defined as terrain that exceeds the height calculated by the GEP stack height formula.

3.2.6 Additional Impact Analysis

In addition to air quality impact analyses, federal and State of Florida PSD regulations require analyses of the impairment to visibility and the impacts on soils and vegetation that would occur as a result of the proposed source [Rule 62-212.400(5)(e), F.A.C.]. Impacts as a result of general commercial, residential, industrial, and other growth associated with the source also must be addressed. These analyses are required for each pollutant emitted in significant amounts (see Table 3-2).

3.2.7 Air Quality-Related Values

An Air Quality Related Value (AQRV) analysis is required to assess the potential risk to AQRVs in PSD Class I areas. The nearest PSD Class I area is the Okefenokee National Wilderness Area (NWA), located approximately 108 kilometers (km) north of the SGS Site; the Chassahowitzka NWA, located about 137 km to the southwest; and the Wolf Island NWA, located about 186 km to the north. As indicated, these PSD Class I areas are within 200 km of the SGS Site. Air impact modeling analyses were performed for these PSD Class I areas. Air impacts were not predicted at other PSD Class I areas since they are located more than 200 km from the SGS Site.

The U.S. Department of the Interior in 1978 administratively defined AQRVs to be:

> *All those values possessed by an area except those that are not affected by changes in air quality and include all those assets of an area whose vitality, significance, or integrity is dependent in some way upon the air environment. These values include visibility and those scenic, cultural, biological, and recreational resources of an area that are affected by air quality.*
>
> *Important attributes of an area are those values or assets that make an area significant as a national monument, preserve, or primitive area. They are the assets that are to be preserved if the area is to achieve the purposes for which it was set aside (Federal Register, 1978).*

The AQRVs include visibility, freshwater and coastal wetlands, dominant plant communities, unique and rare plant communities, soils and associated periphyton, and the wildlife dependent on these communities for habitat. Rare, endemic, threatened, and endangered species of the national park and bioindicators of air pollution (e.g., lichens) must also be evaluated.

3.3 Nonattainment Rules

Based on the current nonattainment provisions (Rule 62-212.500, F.A.C.), all major new facilities and modifications to existing major facilities, located in a nonattainment area, must undergo nonattainment review. A new major facility is required to undergo this review, if the proposed pieces of equipment have the potential to emit 100 TPY or more of the nonattainment pollutant. A major modification at a major facility is required to undergo review, if it results in a significant net emission increase of 40 TPY or more of the nonattainment pollutant or if the modification is major (i.e., 100 TPY or more).

For major facilities or major modifications that locate in an attainment or unclassifiable area, the nonattainment review procedures apply if the source or modification is located within the area of influence of a nonattainment area. The area of influence is defined as an area that is outside the boundary of a nonattainment area but within the locus of all points that are 50 km outside the boundary of the nonattainment area. Based on Rule 62-212.500(2)(c)2.a., F.A.C., all VOC sources that are located within an area of influence are exempt from the provisions of NSR for nonattainment areas. Sources that emit other nonattainment pollutants and are located within the area of influence are subject to nonattainment review unless the maximum allowable emissions from the proposed source do not have a significant impact within the nonattainment area.

Currently, there are no nonattainment areas in Florida or within 50 km of the SGS Site.

3.4 Emission Standards

3.4.1 New Source Performance Standards

The NSPS are a set of national emission standards that apply to specific categories of new sources. As stated in the 1977 CAA Amendments, these standards "shall reflect the degree of emission limitation and the percentage reduction achievable through application of the best technological system of continuous emission reduction the Administrator determines has been adequately demonstrated."

The Unit 3 boiler will be subject to emission limitations covered under 40 CFR Subpart Da, which limits NO_X, SO_2, and PM emissions from electric utility generating units capable of combusting more than 73 MW (250 MMBtu/hr heat input) using fossil fuel. EPA promulgated revisions to this NSPS on February 27, 2006 (71 FR 9866). The revised NSPS, applicable to new affected facilities that commence construction after February 28, 2005, revises the emission limits for PM, SO_2 and NO_X. The revised PM emission limit is 0.015 lb/MMBtu (the equivalent 0.14 lb/MH-hr) or 0.03 lb/MMBtu and 99.9 percent reduction. The Unit 3 boiler will meet the lower 0.015 lb/MMBtu standard. The SO_2 and NO_X emission limits are production-based and are 1.4 and 1.0 pounds per megawatt hour (lb/MW-hr) gross energy output, respectively. In addition, the SO_2 standard allows for either meeting the above production-based limit or a 95 percent reduction. The Unit 3 Project will achieve an emission rate of 0.64 lb/MW-hr for NO_X and will achieve 98 percent reduction (1.51 lb/MW-hr) for SO_2. Visible emissions are limited to 20-percent opacity (6-minute average) except up to 27 percent opacity is allowed for one six minute period per hour.

EPA has also recently issued mercury emission limits for new sources as part of Subpart Da (40 CFR 60.45a; 70 FR 28653; May 18, 2005). The emission limit for bituminous-fired units is production based and is 21×10^{-6} lb/MW-hr. The mercury emission rate proposed for Unit 3 is well below this standard.

The material handling operation associated with coal crushing and transfer are subject to the NSPS codified in 40 CFR Part 60 Subpart Y, Standards of Performance for Coal Preparation Plants. The activity of crushing coal, which will be performed by coal crushers prior to transfer and storage in the coal silos, is included in the definition of a "coal preparation plant." The emission limit for this NSPS is 20 percent opacity for coal processing and conveying equipment, and coal storage. The coal crushers and transfer equipment will be enclosed with vent filters in several locations to limit PM emissions to comply with the NSPS limits.

The grinding of limestone for use in the wet FGD system is subject to the NSPS codified in 40 CFR Part 60 Subpart OOO, Standards of Performance for Nonmetallic Mineral Processing Plants. Limestone is defined as a nonmetallic mineral and the crushing or grinding of a nonmetallic mineral is an affected facility under the NSPS. The NSPS apply to certain activities with the most stringent requirements being a PM emission limit of 0.05 grains per dry standard cubic meter (gr/dscm) and 7 percent opacity. The emissions associated with limestone processing will meet these requirements.

In addition to emission limitations, there are NSPS requirements for notifying, record keeping, reporting, performance testing, and monitoring. These are summarized below:

40 CFR 60.7 Notification and Record Keeping

(a)(1) Notification of the date of construction - 30 days after such date.

(a)(3) Notification of actual date of initial start-up - within 15 days after such date.

(a)(5) Notification of date that demonstrates continuous emission monitoring (CEM) - not less than 30 days prior to date.

60.7 (b) Maintain records of all start-ups, shutdowns, and malfunctions.

(c) Excess emissions reports – semi-annually by the 30th day following 6-month period. (required even if no excess emissions occur)

(d) Maintain file of all measurements for two years.

60.8 Performance Tests

(a) Must be performed within 60 days after achieving maximum production rate but no later than 180 days after initial start-up.

(d) Notification of Performance tests at least 30 days prior to them occurring.

3.4.2 National Emission Standards for Hazardous Air Pollutants

The emergency generator will be subject 40 CFR 63, Subpart ZZZZ, the Reciprocating Internal Combustion Engine (RICE) MACT Rule, since it will be located at a major source of HAP emissions and will have a site rating of greater that 500 horsepower (hp). The emergency generators will only be subject to the notification requirements of the RICE MACT (i.e., no emissions limitations will apply) since it would qualify for the following rule exemption:

Emergency Generator - Any stationary RICE that operates in an emergency situation. Examples include stationary RICE used to produce power for critical networks or equipment (including power supplied to portions of a facility) when electric power from the local utility is interrupted, or stationary RICE used to pump *water in case of fire or flood, etc. Emergency stationary RICE may be operated for the purpose of maintenance checks and readiness testing provided that the tests are recommended by the manufacturer, the vendor, or the insurance company associated with the engine. Required testing of such units should be minimized, but there is no time limit on the use of the emergency stationary RICE in emergency situations and for routine testing and maintenance. Emergency stationary RICE may also operate an additional 50 hours per year in non-emergency situations.*

3.4.3 Florida Rules

The FDEP regulations for new stationary sources are covered in the F.A.C. The FDEP has adopted the EPA NSPS by reference in Rule 62-204.800(7) and the EPA NESHAP by reference in Rule 62-204.800(10) and (11) Therefore, the Project is required to meet the same emission standards, performance testing, monitoring, reporting, and record keeping as those described in Subsection 3.4.1 and 3.4.2. FDEP has authority for implementing NSPS and NESHAP requirements in Florida.

3.4.4 Florida Air Permitting Requirements

The FDEP regulations require any new or modified source to obtain an air permit prior to construction. Major new sources must meet the appropriate PSD and nonattainment requirements as discussed previously, and must obtain both a Permit to Construct and a Permit to Operate. The requirements for construction permits and approvals are contained in Rules 62-4.030, 62-4.050, 62-4.210, 62-210.300(1), and 62-212.400, F.A.C. Specific emission standards are set forth in Chapter 62-296, F.A.C.

3.4.5 Local Air Regulations

Putnam County has no specific ordinances or requirements related to air emissions or impacts from the Project.

3.5 Source Applicability

3.5.1 Area Classification

The facility Site is located in Putnam County, which has been designated by EPA and FDEP as an attainment area (includes unclassifiable) for all criteria pollutants. Putnam County and surrounding counties are designated as PSD Class II areas for SO_2, PM (TSP), and NO_2.

The nearest PSD Class I area is the Okefenokee National Wilderness Area (NWA), located approximately 108 kilometers (km) north of the SGS; the Chassahowitzka NWA, located about 137 km to the southwest; and the Wolf Island NWA, located about 186 km to the north. As indicated, these PSD Class I areas are within 200 km of the SGS. Air impact modeling analyses were performed for the PSD Class I areas of Okefenokee and Chassahowitzka NWA. Air impact analyses were not performed for the Wolf Island NWA since it is located in the same general direction as the Okefenokee NWA but at a much greater distance from the SGS Site. As a result, air impacts due to the SGS would be lower at the Wolf Island NWA than at the Okefenokee NWA. Air impacts were not predicted at other PSD Class I areas since they are located more than 200 km from the SGS.

3.5.2 PSD Review

3.5.2.1 Pollutant Applicability

The Project is considered to be a major facility because the emissions of several regulated pollutants are estimated to exceed 100 TPY and the emissions units are in one of the 28 listed categories. The Project is a modification to a major facility under the PSD rules, and PSD review is required for any pollutant for which the emissions exceed the PSD significant emission rates. Table 3-3 presents the proposed emissions for all PSD pollutants from the facility with the Unit 3 project. As shown in Table 3-3, potential emissions from the Project will trigger PSD for PM (TSP), PM_{10}, CO, VOC, and fluorides. However, there will be no net emission increases for sulfur dioxide, nitrogen oxides, and SAM with the addition of Unit 3, as a result of reductions recently requested from Units 1 and 2. Conservatively, the baseline emissions used for calculating PSD applicability for the Unit 3 Project is the same as used for the Units 1 and 2 Upgrades Project (even though the rules would allow Seminole to use the projected actuals from the Units 1 and 2 Upgrades Project, which would result in a slightly higher baseline for the Unit 3 Project). This "upgrades project" for PSD review purposes consists of the installation of low NO_X burners and SCR to reduce emissions of NO_X, upgrades to the existing FGD systems, addition of an alkali injection system for reducing SO_3 formation in the SCR catalyst, installation of a carbon burnout (CBO) system and steam turbine improvements. Projected actual emissions for the upgrades project are shown in Table 3-3 and are used as the starting point for the Unit 3 netting analysis. Seminole proposes further reductions for Units 1 and 2 in emissions of SO_2, NO_X, and SAM that would totally offset the emission increases from the Unit 3 Project. The projected emissions with the Unit 3 project will therefore not exceed the respective PSD significant emission rate for these pollutants and PSD review is not required. Seminole is proposing specific annual emission limits for Units 1 and 2 for SO_2, NO_X and SAM to provide creditable decreases to formally offset the Unit 3 potential emissions (see Table 3-4).

As part of the PSD review, PSD Class II and Class I increment analyses are required if the proposed facility's impacts are greater than the EPA Class I significant impact levels (these impacts levels are proposed for Class I Areas). The nearest PSD Class I area is the Okefenokee National Wilderness Area (NWA), located approximately 108 kilometers (km) north of the SGS; the Chassahowitzka NWA, located about 137 km to the southwest; and the Wolf Island NWA, located about 186 km to the north. As indicated, these PSD Class I areas are within 200 km of the SGS. Air impact modeling analyses for the Class I increment and for applicable AQRVs were performed for the PSD Class I areas of Okefenokee and Chassahowitzka NWA.

The emission rates of SO_2, NO_X and SAM for Units 1 and 2 used in the PSD Class I air quality analysis were determined by subtracting the Project's potential future emissions for these pollutants from the actual baseline emissions from SGS. As shown in Table 3-4, annual emissions for Units 1 and 2 for SO_2, NO_X and SAM (after subtracting the potential emissions of Unit 3) are 23,637 tons per year, 20,953 tons per year and 1,965 tons per year, respectively. Using the maximum heat input for Units 1 and 2 of 14,344 MMBtu/hr for both units combined, the short-term emissions used in the air quality analysis were 5,397 lb/hr, 4,784 lb/hr and 449 lb/hr for SO_2, NO_X and SAM, respectively. The equivalent emission rates are 0.38, 0.33 and 0.03 lb/MMBtu for SO_2, NO_X and SAM, respectively. Because these rates show compliance with the AAQS and increments and regional haze, as discussed in Sections 6 and 7 of this PSD application, Seminole is also proposing a weighted-average short term emission limit for SO_2, NOx and SAM for Units and 1 and 2, as follows: SO_2 = 0.38, 24-hour block average, based on CEMs; NOx = 0.33, 30-day rolling average, based on CEMs; and SAM = 0.03, based on an initial Method 8A stack test (see Table 3-4).

Due to the conservative nature of formally projecting future emissions, Seminole is confident that there will actually be at least a ten percent reduction in SO_2, NO_X, SAM and mercury emissions even after Unit 3 comes online. Specifically, the projected future actual emissions from Units 1, 2 and 3 were calculated using the emission rates specified in Tables 2-2 and 3-4, and assuming that all three units will run continuously for 8,760 hours per year (i.e., one-hundred percent capacity factor). Historical capacity factors for Units 1 and 2 have never exceeded 90 percent, and this is expected for Unit 3 as well. In addition, emission rates will not continually be exactly at the maximum allowable level. Accordingly, the actual emissions of SO_2, NO_X, SAM and mercury from SGS after Unit 3 comes online should be at least ten percent less than baseline emissions.

3.5.2.2 Emission Standards

The applicable NSPS for the steam generators is 40 CFR Part 60, Subpart Da. The proposed emissions for the Project will be below the specified limits (see Section 4.0).

3.5.2.3 Ambient Monitoring

Based on the estimated pollutant emissions increases from the Project (see Table 3-3), a pre-construction ambient monitoring analysis is required for PM_{10}, CO, and O_3 (based on VOC emissions). If the net increase in impact of PM_{10}, VOC and CO is less than the applicable *de minimis* monitoring concentration (100 TPY in the case of VOC), then an exemption from the pre-construction ambient monitoring requirement is available by Rule 62-212.400(3)(e) F.A.C. In addition, if an acceptable ambient monitoring method for the pollutant has not been established by EPA, monitoring is not required.

As shown in Table 3-5, the Project's impacts are predicted to be below the applicable *de minimis* monitoring concentration levels for all pollutants. Therefore, pre-construction monitoring is not required to be submitted for PM_{10}, and CO. The emissions of VOC are above the *de minimis* monitoring threshold. The monitoring analysis for VOCs is presented in Section 5.0.

3.5.2.4 GEP Stack Height Impact Analysis

The GEP stack height regulations allow any stack to be at least 65 m (213 ft) high. The GEP stack height for the SGS Unit No. 3 was determined to be 675 ft. Therefore, building downwash effects for that emission unit were not included in the air modeling analyses. For other emission units with stack releases, building downwash effects were included.

3.5.3 Mercury

The NSPS emission limit for mercury is production-based and is 2.1×10^{-5} lb/MW-hr for bituminous coal. For the Unit 3 Project, mercury emissions at the NSPS emissions rate would be less than the PSD review threshold of 200 pounds/year (0.1 tons/year) and PSD review is not required. However, with the upgrades proposed for Units 1 and 2, coupled with the control technologies proposed for Unit 3, mercury emission will decrease even after Unit 3 comes online.

For Unit 3, a mercury emission rate of 7.05×10^{-6} pounds per megawatt hour (lb/MW-hr) is proposed as an annual limit. This emission level is significantly less than EPA's recently issued mercury emissions limit of 21×10^{-6} lb/MW-hr for new sources using bituminous coal (40 CFR 60.45a; 70 FR 28653; May 18, 2005). Unit 3 potential mercury emissions are estimated to be 46.3 lb/yr based on a mercury content in fuel of 7.05 lb/TrillionBtu (TBtu), a heat input of 7,500 MMBtu/hr, a 100 percent capacity factor and a mercury removal efficiency of 90 percent. At an anticipated 90 percent capacity factor, emissions would be about 41.7 lb/yr.

The emissions of mercury from Unit 3 will be offset by mercury reductions from Units 1 and 2. The baseline actual emissions of mercury for Units 1 and 2 were determined using 40 CFR Part 75, Appendix 75 sorbent testing on Unit 1 and 2. (see RMB Report, Appendix A). The average mercury emissions were 1.47 lb/TrillionBtu (TBtu) for Unit 1 and 1.4 lb/TBtu for Unit 2. Using the 2004-2005 actual average heat inputs for these units of 46,270,416 MMBtu and 45,078,537 MMBtu for Units 1 and 2, respectively, the baseline actual mercury emissions are 130 lb/yr. A reduction of 46.3 lb/yr from Units 1 and 2 are readily obtainable based on the historical Seminole data. Seminole is committing to reduce mercury emissions from SGS even further by proposing an emission limit for Units 1, 2 and 3 combined of 119 lb/yr, which equates to 90 percent removal from all three units.

As part of the recent Part 60 revisions related to mercury (the Clean Air Mercury Rule), EPA also finalized a program to substantially reduce national mercury emissions, and imposed caps on state-wide mercury emissions from both existing and new coal-fired electric generating units in 2010 and 2018. FDEP is currently promulgating regulations to implement this program (including the state-wide caps), which could include an allowance system similar to the Acid Rain program's SO_2

allowance system, or some other mechanism to ensure that Florida's emissions do not exceed the state-wide caps. SGS will comply with these regulations once promulgated.

3.5.4 Nonattainment Review

The facility Site is located in Putnam County, which is classified as an attainment area for all criteria pollutants. Therefore, nonattainment requirements are not applicable.

3.5.5 Other Clean Air Act Requirements

The 1990 CAA Amendments established a program to reduce potential precursors of acidic deposition. The Acid Rain Program was delineated in Title IV of the CAA Amendments and required EPA to develop the program. EPA's final regulations were promulgated on January 11, 1993, and included permit provisions (40 CFR Part 72), allowance system (Part 73), continuous emission monitoring (Part 75), NOx emission limits (Part 76), excess emission procedures (Part 77), and appeal procedures (Part 78).

EPA's Acid Rain Program applies to all existing and new utility units except those serving a generator less than 25 MW, existing simple cycle combustion turbines (CTs), and certain non-utility facilities; units that fall under the program are referred to as acid rain affected units. The EPA regulations would be applicable to Unit 3 for the purposes of obtaining a permit and allowances, as well as emission monitoring. New units are required to obtain permits under the program by submitting a complete application 24 months before the date on which the unit commences operation (e.g., first fire).

The permit would require Unit 3 to hold SO_2 emission allowances. Currently, an allowance is a market-based financial instrument that is equivalent to one ton of SO_2 emissions. This will change in 2010 and again in 2015, as a result of the Clean Air Interstate Rule (CAIR) Phase I and Phase II requirements. Allowances can be sold, purchased, or traded. The Acid Rain NO_X program (and limits) does not apply to new units.

Under EPA's Acid Rain Program, CEMs are required for opacity, SO_2, flow, NO_X and CO_2 for coal-fired affected units. When an SO_2 CEM is used to monitor SO_2 mass emissions, a flow monitor is also required. CO_2 emissions must also be determined through a CEM (e.g., as a diluent for NO_X

monitoring). Alternate procedures, test methods, and quality assurance/quality control (QA/QC) procedures for CEM are specified (Part 75, Appendices A through I). The acid rain CEM requirements including QA/QC procedures are, in general, more stringent than those specified in the NSPS for Subpart Da. New units are required to meet the requirements by the later of January 1, 1995, or not later than 90 operating days or 180 calendar days after the unit commences commercial operation. There are specific notification requirements regarding EPA's Acid Rain Program.

Continuous monitoring will also be required for mercury that was established by the revised 40 CFR Subpart Da.

On May 12, 2005, EPA also finalized the Clean Air Interstate Rule (CAIR), which is intended to reduce the interstate transport of SO_2 and NO_X in order to assist neighboring states in achieving compliance with the ozone and PM2.5 AAQS. CAIR imposes state-wide caps on annual SO_2 and NO_X emissions, as well as a separate cap on NO_X emissions during the ozone season (May – October), and provides a model rule to administer an allowance system for both SO_2 and NO_X. The existing Acid Rain SO_2 allowance system is used for the CAIR SO_2 program. As finalized, CAIR applies to Florida for both $PM_{2.5}$ and ozone, and FDEP is currently promulgating regulations to implement CAIR. SGS will comply with CAIR, as required.

4.0 CONTROL TECHNOLOGY REVIEW

4.1 Introduction

4.1.1 Applicability

The PSD regulations require new major stationary sources to undergo a control technology review for each pollutant that may potentially be emitted above significant amounts. The control technology review requirements of the PSD regulations are applicable to emissions of CO, PM/PM_{10}, VOCs and fluorides from the Project (see Section 3.0). There will be a decrease in NO_X, SO_2, SAM and mercury emissions from the Unit 3 Project with the offsets from Units 1 and 2. Therefore, PSD review is not required for these pollutants, including a BACT analysis. However, the proposed control technologies and emission rates for NO_X, SO_2, SAM, and mercury are discussed in light of BACT determinations for recent coal-fired projects.

This remainder of Subsection 4.1 presents the applicable NSPS requirements. Subsection 4.2 presents the proposed control technologies and emission limits for Unit 3 for the pollutants that will decrease (NO_X, SO_2, SAM and mercury), followed by the BACT analyses for CO, PM/PM_{10}, VOCs and fluorides in Subsection 4.3.

4.1.2 New Source Performance Standards

The supercritical boiler will be subject to emission limitations covered under Subpart Da, which limits NO_X, SO_2, and PM emissions from electric utility generating units capable of combusting more than 73 MW (250 MMBtu/hr heat input) using fossil fuel. EPA promulgated revisions to this NSPS on February 27, 2006 (71 FR 9866). The revised NSPS, applicable to new affected facilities that commence construction after February 28, 2005, revises the emission limits for PM, SO_2 and NO_X. The revised PM emission limit is 0.015 lb/MMBtu (the equivalent 0.14 lb/MW-hr) or 0.03 lb/MMBtu and 99.9 percent reduction. The Unit 3 boiler will meet the lower 0.015 lb/MMBtu standard. The SO_2 and NO_X emission limits are production-based and are 1.4 and 1.0 pounds per megawatt hour (lb/MW-hr) gross energy output, respectively. In addition, the SO_2 standard allows for either meeting the above production-based limit or a 95 percent reduction. The Unit 3 Project will achieve an emission rate of 0.64 lb/MW-hr for NO_X and will achieve 98 percent reduction (1.51 lb/MW-hr) for SO_2. Visible emissions are limited to 20-percent opacity (6-minute average) except up to 27-percent opacity is allowed for one 6-minute period per hour.

The NSPS mercury emission limit for new sources (40 CFR 60.45a; 70 FR 28653; May 18, 2005 is 21×10^{-6} lb/MW-hr for bituminous coal. The mercury emission rate proposed for the Unit 3 Project (7.05×10^{-6} lb/MW-hr) is well below this standard.

4.2 Control Technology Descriptions

A summary of the emission rates proposed for the Unit 3 Project are presented in Table 4-1 and include emission rates proposed as BACT for PM/PM_{10}, CO, VOC and fluorides (as hydrogen fluoride). While BACT review is not required for NO_X, SO_2, SAM, or mercury, the control technologies and emission limits proposed for the Unit 3 Project are consistent with recent BACT determinations. Appendix B contains the EPA BACT/LAER Clearinghouse information in Table B-1; Tables B1-a through B-1i present summaries of BACT determinations for recent coal-fired units. The following subsections provide technology descriptions for the control of NO_X, SO_2, SAM, and mercury. BACT analyses for PM/PM_{10}, CO, VOC and fluorides are presented in Section 4.3. Excess emissions proposed for the Project were addressed in Section 2.5.

4.2.1 Nitrogen Oxides

Emissions of NO_X are produced by the high-temperature reactions of molecular nitrogen and oxygen in the combustion air and by fuel-bound nitrogen with O_2. The former is referred to as thermal NO_X while the latter is referred to as fuel-bound NO_X. The relative amount of each depends on the combustion conditions and the amount of nitrogen in the fuel. Formation of thermal NO_X depends on the combustion temperature and becomes rapid above 1,400 degrees Celsius (°C) [2,550 degrees Fahrenheit (°F)]. The equations developed by Zeldovich are recognized as the reactions that form thermal NO_x:

$$N_2 + O \longrightarrow NO + N$$
$$N + O_2 \longrightarrow NO + O$$
$$N + OH \longrightarrow NO + H$$

The important parameters in thermal NO_X formation are combustion temperatures, gas residence time, and local stoichiometric ratio of fuel and air. Fuel-bound NO_X, although with most fossil fuels are usually small compared to thermal NO_X, is more readily formed by the nitrogen in the fuel that reacts with combustion air. Another mechanism for NO_X formation is the reaction of molecular nitrogen with free hydrogen (H) radicals. This mechanism is known as "prompt NO_X" and occurs within the combustion zone with the following major reactions:

$$N_2 + CH \text{ ---> } HCN + N$$
$$N + O_2 \text{ ---> } NO + H$$

The contribution of prompt NO_X to overall NO_X levels is relatively small (less than five percent). The primary ways to reduce NO_X emissions are through either combustion process control or through catalytic or noncatalytic reactions.

Combustion controls are the primary engineering choice in reducing NO_X concentrations within the boiler. Combustion controls include low NO_X burners (LNB) and over-fire air. Such controls are considered "pollution preventing", since the formation of NO_X is limited in the combustion process. A combustion technology referred to as reburn has also been installed as retrofits on existing units to reduce NO_X emissions.

Reburn involves using fuel as a reducing mechanism in the combustion process to remove NO_X. The process involves three basic components. The first is the primary combustion area where 80 to 85 percent of the fuel is burned. In this area, fuel is fired typically using the existing burner systems, which also can be low-NO_X burners. In the second area, downstream of the primary combustion zone, remaining fuel is introduced to form a slightly fuel rich combustion zone. This area is often referred to as the reburn zone, where hydrocarbon compounds are formed that react with nitrogen oxide, the primary form of NO_X in combustion processes. The reactions of these hydrocarbon radicals and nitrogen oxide ultimately form nitrogen, which is the opposite of the NO_X formation process (i.e., Zeldovich equation). The third area, downstream of the reburn zone, is often referred to as the burnout zone where combustion air is added to combust the remaining hydrocarbon compounds. Overall the combustion process is typically fuel lean.

Reburn has been demonstrated using natural gas, coal, and residual oil. Reductions in NO_X from 40 to 70 percent have been demonstrated with this wide variety of fuels.

Post combustion NO_X control processes include catalytic and non-catalytic conversion of NO_X, typically to nitrogen. Non-catalytic processes, referred to as selective non-catalytic reduction (SNCR), use ammonia or urea injection at high temperatures, generally about 1,800°F. These technologies, which can achieve from 30- to 80-percent NO_X removal (depending on the fuel), are primarily applicable to boilers that can maintain a relatively constant temperature for the reaction. The primary applications have been on circulating fluidized bed boilers.

The catalytic NO_X removal process that has been demonstrated and proven is selective catalytic reduction (SCR). SCR is a widely used post-combustion NO_X-control technology that has been used on a variety of fuels (e.g., coal, natural gas, residual and distillate oil) and applications (e.g. fossil steam units, combined cycle units, diesel engines and simple cycle gas turbines). Developing technologies include processes that either combine removal of various pollutants or specifically target the removal of NO_X. Such technologies, that include Electro-Catalytic Oxidation™ and SO_X-NO_X-RO_X Box and THERMALONOx™, have future promise but have not been demonstrated on large (>100 MW) thermal power facilities.

The basis for SCR was noticed by the selective reaction of ammonia with NO in the presence of a catalyst and excess oxygen that was discovered by Engelhard Corporation in 1957. SCR technology was commercially developed in Japan and used there on a continuing basis for the first time. In an SCR process, either anhydrous or aqueous ammonia is injected into the flue gas upstream of catalysts. The catalysts are arranged in modules set up into single or multiple stages. The selective reduction reactions occur at temperatures between 650 and 800°F on the surface of the SCR catalysts to produce molecular nitrogen gas and water. The reactions are as follows:

$$4NH_3 + 4NO + O_2 \dashrightarrow 4N_2 + 6H_2O$$

$$4NH_3 + 2NO_2 + O_2 \dashrightarrow 3N_2 + 6H_2O$$

SCR catalysts consist of two types: base metal oxides and zeolite. In an SCR system using a base metal oxide catalyst, either vanadium or titanium is embedded into a ceramic matrix structure; the zeolite catalysts are ceramic molecular sieves extruded into modules of honeycomb shape. Catalysts exhibit advantages and disadvantages in terms of exhaust gas temperatures, ammonia/NO_X ratio, and exhaust gas O_2 concentrations for optimum control. A common disadvantage for all catalyst systems is the temperature window where the NO_X reduction process takes place. Operating outside this temperature range results in failure to remove NO_X and/or harm to the catalyst system. Chemical poisoning can occur at lower temperature conditions (which are a concern during startup and shutdown operations), while thermal degradation can occur at higher temperatures plus NO_X can be produced at higher temperatures. Reactivity can only be restored through catalyst replacement. Sufficient O_2 is required to ensure successful reactions. For most SCR applications that have been effective, O_2 concentrations have been in excess of two percent of flue gas.

The reaction occurs typically between about 320 and 400°C (600 and 750°F). These temperatures occur after the economizer in a structure containing the ammonia injection grid followed by the SCR catalyst.

The recent permitting trend for pulverized coal-fired units is the use of combustion controls and SCR. These controls are available and technically feasible for the project and provide the maximum degree of emission reduction. Based on the ability to control NO_X using combustion controls and SCR, an emission level of 0.07 lb/MMBtu (based on a 30-day rolling average) is proposed for Unit 3 and is consistent with recent BACT determinations made for similarly designed projects (see Table B-1d) .

The SCR system has recognized collateral benefits for the conversion of elemental mercury (Hg) to an oxidized form, typically mercuric chloride ($HgCl_2$). Elemental Hg is difficult to remove in downstream pollution control equipment. The oxidized form is readily collected in wet FGD systems.

The electrical energy required to run the SCR system and the pressure drop from the SCR catalyst will reduce the available power from the Project that would otherwise be available to Seminole customers.

4.2.2 Sulfur Dioxide

4.2.2.1 Introduction

Sulfur compounds are produced in boilers firing fossil fuels by the combustion process in which complete oxidation of the fuel-bound sulfur occurs, forming primarily SO_2, with smaller quantities of sulfur trioxide (SO_3). The amount of SO_2 emissions is directly proportional to the sulfur and sulfate content in the fuel. Reducing SO_2 emissions by boiler modification is not feasible because combustion processes do not affect SO_2 emissions. Generally, complete oxidation of sulfur in fuel is readily achieved before complete combustion of carbon, the most abundant element in fossil fuel. For pulverized coal-fired utility boilers, SO_2 emission reduction is typically accomplished by treating the post-combustion flue gas with a FGD process.

Standard FGD processes for pulverized coal-fired boilers are back-end equipment of either the wet or dry type; these are often referred to as wet and dry scrubbing, respectively. Since the early 1970s, FGD has been used extensively in the United States to control SO_2 emissions from coal-fired power plants. Indeed, the use of FGD systems was, in effect, mandated for pulverized coal-fired power plants with the promulgation of the NSPS for electric utility steam generating units (i.e., 40 CFR Part 60, Subpart Da), which required minimum reductions between 70 and 90 percent in the potential combustion concentration of SO_2.

4.2.2.2 Dry FGD

In a dry FGD process, the flue gas entering the scrubber contacts an atomized slurry of either wet lime or wet sodium carbonate (Na_2CO_3) sorbent. The exact mechanisms for the absorption of gaseous SO_2 and the formation of alkaline salts are complex. Overall, the SO_2 gas reacts with lime or sodium sorbent to initially form either calcium sulfite ($CaSO_3$ □H_2O) or sodium sulfite (Na_2SO_3). Upon further oxidation or SO_2 absorption enhanced by the drying process, the sulfite salts transform into calcium sulfate ($CaSO_4$ $2H_2O$) or sodium sulfate solids. A typical dry scrubber will use lime as the reagent because it is more readily available than sodium carbonate and the sodium-based reactions produce a soluble by-product that requires special handling.

Lime slurry is injected into the dry scrubber chamber through either rotary atomizers or pressurized fluid nozzles. Rotary atomizers use centrifugal energy to atomize the slurry. The slurry is fed to the center of a rapidly rotating disk or wheel where it flows outward to the edge of the disk. The slurry is atomized as it leaves the surface of the rapidly rotating disk.

Fluid nozzles use kinetic energy to atomize the slurry. High-velocity air or steam is injected into a slurry stream, breaking the slurry into droplets, which are ejected at near sonic velocities into the spray drying chamber. Slurry droplets of comparable size can be obtained with both fluid nozzles and rotary atomizers, minimizing differences in performance due to atomizer type. The nozzle location relative to the flow, however, can be different depending on the particular design.

The moisture in the lime slurry evaporates and cools the flue gas, and the wet lime absorbs SO_2 in the flue gas and reacts to form liquid-solid phase salts that are then dried into insoluble crystals by the thermal effect of the flue gas. The dry scrubber chamber is designed to provide sufficient contact and residence time to complete this reaction process. The prolonged residence time in the chamber is typically designed for 10 to 15 seconds. Sufficient contact between the flue gas and the slurry solution is maintained in the absorber vessel, allowing the absorbing reactions and the drying process to be completed.

The particulate exiting the dry scrubber contains fly ash, dried calcium salts, and dried unreacted lime. The moisture content of the dried calcium salt leaving the absorber is about 2 to 3 percent, eventually decreasing to about one percent downstream. The simultaneous evaporation and reaction in the spray drying process increases the moisture and particulate content of the flue gas and reduces the flue gas temperature.

In the dry scrubber, the amount of water used is optimized to produce an exit stream with "dry" particulates and gases with no liquid discharge from the scrubber. The flue gas temperature exiting the dry scrubber is typically 18 to 30°F above adiabatic saturation. The "dry" reaction products and coal fly ash are removed from the flue gas by a particulate collection device located downstream of the scrubber. This differs from the wet scrubber system, wherein the slurry leaving that system must be dewatered and the gas is cooled to adiabatic saturation temperature. Moreover, in the wet process, the particulate control device is located upstream of the scrubber. The dry byproduct from the dry scrubber system is generally not marketable since the byproducts includes a flyash and reacted SO_2 and calcium compounds. In contrast, the wet limestone FGD system can produce a marketable byproduct (i.e., gypsum).

Key design and operating parameters that can significantly affect dry scrubber performance are reagent-to-sulfur stoichiometric ratio, slurry droplet size, inlet water content, residence time, and scrubber outlet temperature. An excess amount of lime above the theoretical requirement is generally fed to the dry scrubber to compensate for mass transfer limitations and incomplete mixing. Droplet size affects scrubber performance. Smaller droplet size increases the surface area for reaction between lime and acid gases and increases the rate of water evaporation. A longer residence time results in higher chemical reactivities, and the reagent-SO_2 reaction occurs more readily when the lime is wet. The scrubber outlet temperature is controlled by the amount of water in the slurry. Typically, effective utilization of lime and effective SO_2 removal occur at temperatures close to adiabatic saturation, but the flue gas temperature must be kept high enough to ensure that the slurry and reaction products are adequately dried prior to the particulate collection process.

The dry scrubber is located upstream of the particulate control device, which is typically either an ESP or a fabric filter (baghouse) system. The baghouse is generally preferred when using a dry scrubber FGD system over the ESP because it provides additional SO_2 and acid gas removal. When a baghouse is used, a layer of porous filter cake is formed on the surface of the filter bags. This filter cake contains unspent reagent, which provides a site for additional FGD since all flue gases also pass through the filter bags.

Based on BACT determinations previously issued, the dry scrubber FGD system can achieve 70 to 93-percent SO_2 removal for coal-fired boilers, with the majority of pulverized-coal boilers designed for 93 percent removal. Higher removal efficiencies of greater than 90 percent can be achieved by maintaining an optimal ratio of reagent and SO_2 gas.

4.2.2.3 Wet FGD

The primary technology that has been developed and installed to remove SO_2 at high efficiencies (90 percent or greater) from thermal power plants has been wet scrubbing. Other SO_2 control processes either have lower removal efficiencies than wet scrubbing or are in the developmental and demonstration stage. For example, there are several SO_2 control processes that have been tested at bench-, pilot-, and/or small-scale application but has neither been demonstrated at full-scale nor commercially available at the size required for the Project. Such technologies include SO_X-NO_X-RO_X Box and Electro-Catalytic Oxidation™.

Wet scrubbing is a gaseous- and liquid-phase reaction process in which the SO_2 gas is transferred to the scrubbing liquid under saturated conditions. The wet scrubbing process usually involves a liquid waste stream and slurry as by-products. Therefore, a wastewater treatment and by-product disposal system is generally associated with a wet scrubbing system.

Wet scrubbing systems include three different types, which are classified by the reagents used in the scrubbing process. The type of reagent influences the scrubber design, the quantity and type of wastes produced, and the type of disposal system required. Sodium-based, calcium-based, or dual-alkali-based chemicals are used; these systems are referred to as sodium-based, wet lime/limestone scrubbers, or dual-alkali.

The sodium scrubbing systems use either a sodium hydroxide (NaOH) or a sodium carbonate (Na_2CO_3) wet scrubbing solution to absorb SO_2 from the flue gas. Because of the high reactivity of the sodium alkali sorbent compared to the lime or limestone sorbents, these systems are characterized by a low liquid-to-gas ratio. The SO_2 gas reacts with the hydroxide or carbonate to form sulfite (e.g., Na_2CO_3) initially, then sulfate (Na_2SO_4) with further oxidation. Both sodium sulfite and sulfate are highly soluble; therefore, the final scrubber effluent is a mixture of sodium alkaline salt liquor that requires special disposal. Although these sodium-based systems are capable of achieving greater than 90-percent SO_2 reduction, they have not been used commercially on large utility boilers; therefore, these systems are considered unproven.

The dual-alkaline scrubbing process uses the sodium-based liquor to scrub the SO_2 from the flue gas initially, then calcium-based chemicals are used to regenerate the sodium hydroxide or Na_2CO_3 solution. Both the sodium-based and the dual-alkali-based scrubbing systems were developed many years ago to address the inherent fouling problem that was often experienced with conventional lime/limestone wet scrubber systems. Secondly, it was believed that the sodium-based or the dual-alkali-based systems could achieve higher percent removals of SO_2 due to higher reactivity. The primary reasons for not using the sodium-based system are the cost of premium chemicals, the lack of availability of sodium-based chemicals, the highly alkaline waste liquid produced, and lack of utility boiler experience.

The sodium-based and the dual-alkaline-based scrubbing processes are no longer commercially available from the primary supplier, FMC Corporation. Other suppliers of the sodium-based or dual-alkali-based systems, Ontario Hydro and General Electric Environmental Systems, no longer recommend these systems to control coal-fired boilers over the improved lime/limestone wet scrubber. Neither the sodium-based scrubber nor the dual-alkali scrubber has been installed for any fossil fuel-fired facility in recent years. The last dual-alkaline system was supplied by General Electric (GE) over 20 years ago at the Newton Station in Illinois. The sodium-based and the dual-alkali scrubbing processes are generally considered technically unavailable. The Department of Energy is sponsoring a commercial demonstration of a sodium based process referred to as the Airborne Process. A 5-MW demonstration was completed in 2003 and future larger scale demonstrations are planned in the future. This process is in the development stage and not yet commercially available.

Development of the spray tower limestone FGD system operating at high liquid-to-gas ratios has produced levels of SO_2 removal as high as those of the dual-alkali-based system. Improved operating techniques have also eliminated the severe fouling problems experienced by the earlier lime/limestone scrubber systems.

The most widely used system for large-scale SO_2 removal is the calcium-based wet lime/limestone FGD system. Worldwide, there are over 200,000 MW of installed wet limestone FGD systems, which represents about 80-percent of FGD systems. The remaining 20-percent are sodium-based systems and spray-dryer lime systems. It is estimated that approximately 82 percent of the coal-fired capacity with FGD control in the United States is equipped with this wet limestone FGD technology.

Depending on whether lime or limestone is used, the SO_2 reacts with the hydrates or carbonates to form calcium sulfite (i.e., $CaSO_3 \cdot \frac{1}{2} H_2O$) initially, then sulfate (i.e., $CaSO_4 \cdot 2H_2O$) with further oxidation. The latter, known as wet limestone-forced oxidation FGD, involves blowing air into the slurry to force oxidation of calcium sulfate to almost 100 percent. This produces a marketable by-product (i.e., gypsum).

One version of the wet FGD technology is the spray tower. In this system, a slurry of atomized limestone is sprayed into a tall, vertical absorber tower through a series of nozzles. The flue gas enters at the bottom of the tower, passes vertically up through the spray droplets, and exits the vessel at the top.

The slurry is recirculated through the absorber system. This recirculation increases the scrubbing utilization of the limestone reagent. The scrubbing reaction produces calcium sulfite as the byproduct. Most systems oxidize the sulfite into calcium sulfate, which is easier to dewater. A bleedstream is taken off from the recycled slurry stream to purge the system of gypsum and avoiding buildup inside the spray tower. Byproducts and unreacted reagents in the bleedstream are dewatered using various equipment including thickeners (hydroclones), centrifuges, and vacuum filters.

Dewatering can reduce the water content in the filtered by-product to as low as 10 to 15 percent by weight.

Wet scrubbing systems can use lime rather than limestone as the alkali reagent. Quick lime (calcium oxide) is slaked with water to form hydrated lime (calcium hydroxide). The slurry of calcium hydroxide and water is then sprayed into the spray tower. This alternative of using lime instead of limestone is less attractive economically because the cost of either quick lime or hydrated lime is much higher than the cost of limestone. While a limestone system requires more initial capital costs for auxiliary equipment (i.e., limestone ball mill and conveyors), the lower operating cost of the reagent provides a substantial annual savings for wet limestone FGD systems over the use of lime. This is especially beneficial for a facility using medium- and high-sulfur coals, where considerably more reagent chemicals are needed.

In conventional wet limestone FGD systems, several additives have been used to enhance SO_2 removal efficiencies. The majority of additives, both organic and inorganic, have been used to bring the performance of the FGD system up to the original performance requirements. The organic additives include various mixtures of organic acids that include dibasis acid and formac acid. Magnesium, added as magnesium-lime has been successfully used to enhance performance. With the advancement of wet FGD designs, efficiencies of 98 percent can be achieved by refinements in design including critical elements of absorbers, materials, and control systems. Additives can still play a role but their use is primarily focused on emergency condition operation, corrosion inhibition, scaling, and by-product handling.

4.2.2.4 Technology Conclusion

Wet limestone FGD systems have been demonstrated to achieve high SO_2 removal efficiencies of 98 percent or more and have been associated with emission limits that have been accepted as BACT. This technology is technically feasible for Unit 3 and provides the maximum degree of emissions reduction. For Unit 3, the proposed SO_2 emission limit is 0.165 lb/MMBtu. This emission rate is based on the use of a wet limestone FGD at 98 percent removal efficiency and the design sulfur fuel shown in Table 2-1. Ninety-eight (98) percent removal is equivalent or greater than the basis for recent proposed BACT determinations for similar projects. Indeed, SO_2 removal efficiencies have ranged from to 92.5 percent to 98 percent, the latter proposed for the Unit 3 Project (see Table B-1).

The requested averaging time is a 24-hour block average, due to the associated PSD Class I SO_2 increment issue, to be discussed in Section 6.0.

4.2.3 Sulfuric Acid Mist

The primary issues with gaseous SO_3 emissions are contribution to PM and PM_{10} and contribution to regional haze when the SO_3 in the exhaust plume enters the atmosphere. When exiting in the boiler, SO_3 is difficult to control in standard ESP and fabric filter designs and wet FGD systems. While some control is obtained in wet FGD systems, the majority of the SO_3 goes unreacted through the system and is condensed into an aerosol in the FGD system. These aerosols have a particle size within the wavelength of light and are usually exhibited as a blue haze in plumes. The formation of SO_3 in the combustion process is highly dependent on the boiler operation (e.g., excess O_2). The use of SCR will increase SO_3 emissions. The catalyst increases oxidation of SO_2 to SO_3. When firing petroleum coke, the relatively high vanadium content of the fly ash can build up on boiler surfaces and the SCR catalyst. This can exacerbate the formation of SO_3, and routine cleaning is needed to minimize the effect. With SCR, catalyst design is important in minimizing additional SO_3 emissions.

WESPs are similar to dry ESPs except that they are well suited for acid mists. They are operated at temperatures less than 190°F. Instead of rapping mechanisms, WESPs typically use water to wash particles from the collectors. The water wash can be either intermittent or continuous. Unlike dry ESPs, resistivity of the particle is not a major factor in performance since the gas stream has high humidity that reduces the resistivity of most particles. Due to this effect, WESPs can collect smaller particles than dry ESPs since resistivity is lowered for all particle sizes and there is less re-entrainment.

WESPs are an available and technically feasible control alternative that can provide the maximum degree of emission reduction for SAM. This technology will also have collateral benefits of removing other fine particulate and aerosols, including mercury. Removal efficiencies of 90 percent can be expected for SAM emissions in new designs, and an emission rate of 0.005 lb/MMBtu is proposed for the Unit 3 Project. This emission level compares favorably with other recent coal projects (Table B-1f).

The environmental benefit of reducing SAM emissions is twofold. First, SAM emissions are visible and can be seen after the water vapor in the plume dissipates. Second, SAM is a fine aerosol that contributes to PM_{10} and particulate matter with aerodynamic size of 2.5 micrograms or less ($PM_{2.5}$) as well as regional haze. In the analysis of regional haze, SAM emissions can contribute 30 percent or more to predicted regional haze.

The addition of WESP will reduce SAM emissions by about 1,500 TPY. The WESP will also reduce other fine particulates and aerosols including HAPs.

The proposed compliance method for determining emissions of sulfuric acid mist (SAM) from Unit 3 is the use of the controlled condensate stack test method. The controlled condensate was a previous EPA test method (Method 8A), and is intended to condense SAM and SO_3 without the potential of artifacts created by sulfur dioxide in Method 8. This method is currently used at some facilities in Florida as the compliance method and shows less variability than EPA Method 8. The proposed technology for reducing SAM emissions from Unit 3 is the WESP, with an emission rate of 0.005 lb/MMBtu, which is equivalent to emission rates established as BACT on other similar projects.

4.2.4 Mercury

Mercury is a trace element in coal and petroleum coke with concentrations similar to that found in native soils of Florida. During the combustion process, mercury is liberated and can be emitted in particulate or gaseous form. The emissions control equipment following the combustion process are key to the removal of mercury emissions from the combustion of fuels. Studies conducted by EPA for coal fired plants using SCR, dry ESPs and wet FGD have indicated mercury removal of 90% or greater. These studies have focused on the co-benefits of the SCR to oxidize elemental mercury (Hg^{o}) to its oxidized form (Hg^{+2}). The oxidized mercury is then collected in the wet FGD system as the primary mercury control device. This is summarized in the EPA document "Control of Mercury Emissions from Coal Fired Electric Utility Boilers: An Update", Air Pollution Prevention and Control Division, National Risk Management Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Research Triangle Park, NC, February 18, 2005. Figures 5 and 6, and Table 3 of this document summarize EPA-compiled test data indicating removals of 90 percent or greater are achievable with a combination of controls that include SCR, cold-side ESP, and wet limestone FGD. The plant, identified as S5 in the EPA study, had mercury removal of 90 percent through the wet FGD with SCR (Figure 5 of the EPA study), while the Mount Storm Power Station Unit 2 had mercury removal of greater than 90 percent with SCR (Figures 5 and 6, and Table 3 of the EPA study). Indeed, the promulgation of the Clean Air Mercury Rule, promulgated on May 18, 2005, recognized the co-benefits of the suite of air pollution control equipment that includes SCR and wet FGD systems, especially when using bituminous coals (70 FR 28614). While this report is one of the latest EPA reports on mercury removal, EPA is continuing these studies. The addition of the wet ESP proposed for the Unit 3 Project will provide additional mercury removal, especially for particulate or aerosol bound mercury. The proposed emission limit for mercury is 7.05 x 10^{-6} lb/MW-hr as an annual average, which is substantially below the NSPS requirement. As seen in Table B-1h, the emission limit proposed for Unit 3 is the lowest of those established for recent coal-fired projects.

4.3 Best Available Control Technology

4.3.1 Regulatory Overview

BACT review is required under FDEP rules and EPA regulations pertaining to PSD. Federal regulations are codified in 40 CFR Part 51.166; and FDEP has adopted PSD rules in Rule 62-212.400, F.A.C. BACT review is part of the evaluation of control technology under the Florida PSD rules. BACT is applicable to all pollutants for which PSD review is required and is pollutant specific. It is an emission limitation that is based on the maximum degree of reduction for each regulated pollutant, which is determined to be appropriate after taking into account energy, environmental, economic impacts, and other costs. BACT cannot be any less stringent than the federal NSPS applicable to the source under evaluation.

The approach to the BACT analysis is based on the regulatory definitions of BACT, as well as consideration of EPA's current policy guidelines requiring a top-down approach. A BACT determination requires an analysis of the economic, environmental, and energy impacts of the proposed and alternative control technologies [see 40 CFR 51.166, *Prevention of Significant Deterioration of Air Quality;* The State of Florida's PSD regulations are found in Rule 62-212.400, F.A.C.]. The analysis must, by definition, be specific to the Project (i.e., case by case). The FDEP has established a policy for BACT review in which the most stringent control alternatives are evaluated first. The alternatives are either rejected based on technological, environmental, energy, or economic reasons or are proposed as BACT. This procedure is referred as the "top-down" approach. For the Project, BACT is applicable for emissions of PM/PM_{10}, CO, VOC and fluorides.

4.3.2 Particulate Matter-Unit 3 Boiler

4.3.2.1 Introduction

There are two primary methods of PM formation in the proposed supercritical boiler and associated control equipment: (1) fly ash from coal combustion in the boiler, and (2) solids from reaction products introduced in the FGD system. The latter is reduced by mist eliminators and further PM removal (see Subsection 4.2.4, Sulfuric Acid Mist).

Combustion of coal in a pulverized coal-fired boiler creates ash, which is the non-combustible portion of the fuel. The ash is solid and therefore is classified as PM. A portion of this PM, approximately 20 percent, falls to the bottom of the boiler as bottom ash and is removed by the bottom ash system. The majority of the PM, approximately 80 percent, is fly ash and is entrained by the flue gases leaving the boiler. The majority of this fly ash is then collected by the flue gas PM removal system.

ESPs and fabric filters are the most effective PM-control devices being successfully applied to coal-fired power plants. PM removal efficiencies of these devices can be greater than 99.8 percent. Both devices are also highly effective in controlling PM_{10} emissions. Other technologies, such as mechanical collectors and wet scrubbers, have not demonstrated equivalent levels of control.

4.3.2.2 ESPs

In an ESP, a high-voltage electric field is produced to impart an electric charge to the solid particles in the flue gas stream. The pulsating direct current voltage in the range of 20,000 to 100,000 volts is used to ionize the gas stream, known as corona. The ions produced using a negative corona, are attracted to the particles while traveling in the ionized gas stream. These particles are then removed from the gas stream by migrating toward the collecting electrode. Rapping mechanisms, that are operated intermittently, dislodge the collected particles, which subsequently fall into a hopper. ESP performance is highly dependent on the electrical characteristics or resistivity of the particle or aerosol to be collected.

ESP performance is dependent on a number of factors, which influence the resistivity of the particle. These factors include the particle composition, flue gas characteristics, particle size distribution, and particle loading. These parameters can vary during normal operation and can influence ESP performance when gas streams come directly from the boiler. The fuels for the Unit 3 Project will produce ash with good resistivity that is very effectively controlled in an ESP.

4.3.2.3 Fabric Filters

In a fabric filter, PM is removed from the flue gas as it passes through a fabric filter media such as woven cloths or felts; hence the term "fabric filter." The filters are normally arranged as a number of cylinders or tubes (commonly referred to a "bags") through which the flue gas is directed. The filters are contained in a housing which has gas inlets and outlets. The flue gas enters the fabric filter housing from the bottom and flows upward, from either the inside of the cylinder to the outside or the opposite depending upon the design. Particulate collection occurs through several mechanisms, including gravitational settling, direct impaction, inertial impaction, diffusion, and electrostatic attraction. When the pressure drop reaches a predefined level, a section of the filters is taken offline for cleaning. Various methods are used to clean the bags in the fabric filter. The three general types of cleaning are shaker cleaning, pulse-jet cleaning, and reverse-air cleaning. All three types of cleaning methods ensures the fabric filter achieves the same low emission rates.

The shaker cleaning is accomplished by taking the bags off-line, shaking the bags of the fabric filter, and then deflating the bag by inducing a vacuum. The PM collected on the bags is dislodged and then falls into the collection hoppers at the bottom of the fabric filter.

In the pulse-jet method of cleaning, cleaning is accomplished off-line by directing a short burst of compressed air inside the filter bags. This burst produces a shock wave, which travels down the length of the bag, dislodging the accumulated dust cake. The collected PM then falls into the hoppers located below the bags. This is currently the best practice for cleaning.

In reverse air fabric filters, the PM is collected on the inside of the filter bags. Cleaning is accomplished by introducing a reverse flow of air through the bags. This causes the bag to collapse, thereby dislodging the filter cake. The dislodged PM falls into the collection hoppers for disposal.

4.3.2.4 Impacts Analysis

Economic

The total estimated capital, annualized, and incremental costs for an ESP are summarized in Tables B-2 and B-3, shown with and without ash disposal cost, respectively. The capital cost for an ESP installed for an 820-MW unit is about $43 million with an annualized cost of about $6.6 million if ash can be sold (no net cost for disposal). If ash is stored onsite, the annualized cost is $10.9 million. The cost effectiveness ranges from $24 to $39 per ton of PM removed. The difference depends on the amount of ash that can be recycled as a pozzolin material.

The total estimated capital, annualized, and incremental costs for a fabric filter are summarized in Tables B-4 and B-5, shown with and without ash disposal cost respectively. The capital cost for a fabric filter installed for an 820 MW unit is $40 million with an annualized cost of $9.2 million if ash can be sold (no net cost for disposal). If ash is stored onsite the annualized cost is $13.2 million. The cost effectiveness ranges for $33 to $47 per ton of PM removed. The lower cost effectiveness for the ESP is a result of the much higher pressure drop for the fabric filter.

Environmental

The maximum predicted PM/PM_{10} impact of the Project with an ESP or baghouse is considerably below the PSD Class II increments and the AAQS of 100 $\mu g/m^3$. Indeed, the predicted impacts are less than the significant impact levels.

The electrical energy required to run the ESP system or the pressure drop from a fabric filter will reduce the available power from the Unit 3 Project. The pressure drop is a result of the filter bags located in the exhaust gas stream. The pressure drop to reduce PM to 0.015 lb/MMBtu is estimated to eight inches of water gauge. This pressure drop requires more fan power. The ESP is a high-voltage device and requires electrical energy. The pressure drop of the ESP will be generally low. The lost power from electrical usage or back pressure would otherwise be available to the electrical system. To replace this lost energy, additional emissions from the Project would occur. Based on the amount of MW-hr required to provide the fan and electric energy, the additional emissions would be 21 TPY for the ESP and 57 TPY for the fabric filter. While this amount of increased emissions is low compared to the amount of PM reduced, the fabric filter results in more than twice the amount of emissions from lost energy.

Energy

Energy losses will occur with ESP/fabric filter. With a fabric filter, the output is reduced due to the pressure drop; with an ESP, there are high energy use requirements. The energy required to operate an ESP would be about 9,715 MWh per year per unit. This is about 0.12 percent of the gross generation, and could supply the electrical needs of about 810 residential customers. The energy required to operate a fabric filter would be about 34,472 MWh per year per unit. This is about 0.43 percent of the gross generation, and could supply the electrical needs of about 2,870 residential customers.

4.3.2.5 Proposed BACT and Rationale

The proposed BACT is an emission limit of 0.015 lb/MMBtu using an ESP as the primary PM control device, and is consistent with recent BACT determination for similar projects (see Table B-1b). This technology can achieve the maximum amount of emission reduction available, is technically feasible, and demonstrated for the Project, and is feasible and reasonable based on the economic, environmental, and energy impacts. An ESP is proposed for Unit 3 rather than a fabric filter because they are not considered equivalent for high-sulfur applications. EPSs are well proven, while there is only one fabric filter operating on high-sulfur coal, which has been in service under two years and did not achieve 0.015 lb/MMBtu emissions. Due to the lack of long-term operating experience, the potential performance risk, and unknown long-term reliability of fabric filters on sulfur fuels, fabric filters are not considered equivalent to EPSs for this type of application. In addition, the ESP is preferred based on the overall cost-effectiveness of the two devices, which is due in part to the increased pressure drop and resulting greater energy penalty associated with a fabric filter. Also, an ESP is the PM control device imposed as BACT in the majority of determinations on similar units. While the primary purpose of the WESP is to limit emissions of SAM, this control device is equally efficient in removing filterable PM/PM_{10}. The combination of the ESP and WESP will achieve the maximum degree of PM/PM_{10} emission reduction.

4.3.3 Carbon Monoxide and Volatile Organic Compounds-Unit 3 Boiler Combustion Products

4.3.3.1 Carbon Monoxide

There are no applicable NSPS for the control of carbon monoxide (CO) from utility boilers. CO emissions result from incomplete combustion of the fuel. CO emissions are controlled by boiler design features and combustion air feed rates. The boiler will be designed and operated for high-combustion efficiency, which will inherently minimize the production of CO.

Theoretically, CO emissions can be reduced by passing the flue gas over an oxidation catalyst at a suitable temperature (900 to 1,000°F). In practice, this technology has several unknowns and disadvantages, including the following:

1. No utility pulverized coal-fired boilers are operating with catalytic CO control systems and it would be difficult to locate an oxidation catalyst in the proper temperature zone in a boiler.
2. Catalyst converts up to 70 percent of SO_2 to SO_3.
3. There is a lack of experience with large-scale operation of this technology using particulate-laden gases from coal-fired boilers. Catalysts can be easily eroded and fouled by silica and trace metals in the flue gas.
4. The temperature profile of the flue gas does not match the temperature requirements of typical catalysts.
5. Use of an undemonstrated catalyst technology would reduce the availability and reliability of the plant (e.g., catalyst plugging).
6. The high costs to install and operate the system (additional pressure drop, catalyst replacement and disposal, etc.) are without corresponding demonstrated needs or benefits. Design and operation of the boiler to efficiently combust the fuel will minimize CO emissions. The additional costs to further lower emissions are not justified.

CO emission limits established as BACT over the last several years range from 0.1 to 0.16 lb/MMBtu, with a median average of 0.15 lb/MMBtu (see Table B-1e). Combustion control is the primary method used to control CO emissions.

4.3.3.2 Volatile Organic Compounds

Similar to CO, there are no applicable NSPS for VOC emissions (hydrocarbons) from utility boilers. VOC emissions result from incomplete combustion of the fuel. This incomplete combustion can result from poor air/fuel mixing or insufficient oxygen for combustion. Such emissions are reduced by modifying design features of the boiler and control of the combustion air feed rates. Design of a boiler and combustion air system to efficiently burn the coal represents the control technology with the greatest degree of emissions reduction.

BACT emission limits established over the last several years range from 0.0024 to 0.01, with a median average of about 0.0036 lb/MMBtu (see Table B-1e). The predominant control method is combustion control. The proposed BACT emission rate for VOCs would be achieved through good combustion practices, which have been accepted as the control technology to establish BACT on pulverized coal fired power plant units. No other control technology is available to further reduce emissions. This emission rate proposed for the Unit 3 Project is within the range of emission rates established for similar sources.

4.3.3.3 Proposed BACT and Rationale

Design of a boiler and combustion air system to efficiently burn the coal represents BACT for control of CO and VOC emissions. There are no other control devices demonstrated that are available or feasible for the Unit 3 Project. The CO and VOC emission rates for the Unit 3 boiler of 0.15 lb/MMBtu and 0.004 lb/MMBtu, respectively, are within the range of emission rates recently established as BACT (see Table B-1e). Air quality impacts predicted for Unit 3 are well below the significant impact levels.

4.3.4 Fluorides-Unit 3 Boiler

Fluorides are emitted in the combustion process in gaseous and particulate form as a trace element in fuel. The primary control device for fluorides would be the wet FGD system since fluorides are highly soluble. Fluorides in particulate form are readily removed in the ESP. Sections 4.2.3 and 4.3.2 provide technology descriptions of these technologies. There are no other control technologies with a greater amount of emissions reduction than the ESP followed by the wet FGD system. In addition, the addition of the WESP would assure extremely low emissions of fluorides. The proposed emission rate of 0.00023 lb/MMBtu as BACT is in the lower range of recent BACT determinations (see Table B-1g) and is based on 97 percent removal.

4.3.5 Particulate Matter-Cooling Tower

For the cooling tower, the installation of drift eliminators is the only feasible technology for controlling PM emissions. Drift eliminators use inertial separation caused by airflow direction changes to remove water droplets from the air stream exhausting from the cooling tower. These water droplets generally contain the same concentration of dissolved solids and chemical impurities as the water circulating through the tower.

Drift eliminator configurations include cellular (or honeycomb), wave-form, and herringbone (blade-type) designs. Drift eliminators may also be constructed of various materials, such as ceramic; fiberglass; metal; plastic; and wood installed or formed into slats, sheets, honeycomb assemblies, or tiles.

Particulate emissions from the proposed cooling tower will be controlled utilizing high-efficiency drift eliminators achieving a drift loss rate of 0.0005 percent of the cooling tower recirculating water flow. This rate is consistent with recent BACT determinations (see Table B-1i).

4.3.6 Particulate Matter-Material Handling

Fugitive particulate emissions from fuel, ash and FGD by-product handling, conveying, and storage will be minimized by equipment design and operating procedures. Fuel will be unloaded in a partially enclosed rotary rail unloader using water sprays. Fuel is unloaded into an enclosed underground hopper that is protected from wind. Dust from fuel unloading operations will be controlled using wet suppression systems.

Conveyors used for transfer of the fuel to the active storage piles will be enclosed for minimizing wind-borne fugitive dust. Unloading onto the active and inactive storage piles will be accomplished using a stacker/reclaimer that is designed to minimize dust emissions. The fuel will be reclaimed and conveyed to an enclosed crusher tower. The transfer points for Unit 3 will have a fabric filter with a maximum design emission rate of 0.01 grain/cubic feet. After crushing, the fuel is then conveyed through an enclosed tripper house to the storage silos adjacent to the boiler. All fuel storage silos are connected to a dust collection system. Outdoor conveyors will be enclosed (i.e., covers and windskirts) to minimize dust emissions. All conveyor transfer points will have a dust collection system. The inactive storage pile will be compacted when built and sprayed with a crusting agent and/or chemical stabilizer to prevent wind erosion.

Fugitive particulate emissions from the limestone handling and storage systems will be minimized by equipment design and operating procedures. Limestone used in the wet FGD system will be transported to the SGS Site by truck. The limestone will be transferred from the existing truck unloading system to a storage facility utilizing the existing limestone handling system. SCA Section 3.0 (Figure 3.9.5-1) presents a flow diagram of the limestone handling system. Dust collection or suppression techniques will be utilized to minimize dust emissions.

Bottom ash will have sufficient moisture content to minimize fugitive dust during transport. A new submerged chain conveyor system will be used to collect and transport the Unit 3 bottom ash to a new truck loading area. Bottom ash will be sold to concrete and concrete block manufacturers. Fly ash will be pneumatically conveyed to a storage silo that will be equipped with a fabric filter to minimize PM emissions. Fly ash will be blended for use in the CBO unit if necessary or trucked or hauled by rail from the storage silo for offsite sales to the maximum extent feasible. Section 3.0 of the SCA (Figure 3.9.6-1 and 3.9.6-2) presents a flow diagram of the fly ash and bottom ash handling systems, respectively.

Fugitive emissions from the FGD byproduct storage area are minimized by the higher moisture content of the by-products. The FGD by-product is calcium sulfate (gypsum) with inherently high moisture content. Waste slurry from the plant's Unit 3 FGD system will be pumped to the existing Units 1 and 2 effluent processing system where it will be treated and dewatered to produce gypsum for use in the production of wallboard.

Watering, using a water-spray truck, will also be performed as necessary to minimize fugitive emissions from active areas (i.e., unpaved roads and working areas of the storage area). Table B-1j provides a summary of particulate emissions from material handling operations for other recently permitted projects.

4.3.7 Particulate Matter/CO and VOCs-Emergency Generator

The emergency generator proposed will have potential emissions for each regulated pollutant of less than 5 TPY. As a result, the generator is classified as an exempt activity under FDEP Rule 62-210.300(3)(b) , F.A.C., and therefore is not subject to the PSD/BACT requirements of Rule 62-212.400, F.A.C. Nonetheless, the emergency generator proposed for the Project will utilize clean fuel (i.e., distillate fuel oil) and good combustion techniques to minimize emissions of PM/PM_{10}, VOCs and CO. The emergency generator will meet the requirements of 40 CFR Part 60, Subpart IIII, as finally adopted by EPA. These NSPS do not apply to specific engines, but rather to certifications to EPA for engine manufacturers. Seminole will supply a certification that the engine meets the requirements as applicable at the time of purchase.

4.3.8 ZLD Spray Dryer

The ZLD system will utilize three spray dryers to remove the final moisture from the wastewater treatment effluent. This process involves the atomization of concentrated wastewater into a spray of droplets and contacting the droplets with hot air in a drying chamber. The sprays can be produced by either rotary (wheel) or nozzle atomizers. Evaporation of moisture from the droplets and formation of dry particles proceed under controlled temperature and airflow conditions. The particles are discharged continuously from the drying chamber and collected in a particulate removal device. The particulate control device with the greatest degree of emission reduction is a fabric filter, commonly referred to as a baghouse. For the Unit 3 Project, a baghouse will be used to limit PM emissions to 0.3 lb/hr/dryer. The fabric filter will have an efficiency of greater than 99.5 percent. Fabric filter technology is demonstrated and cost effective for the proposed project. There are no other particulate control devices that would provide greater control. Typical design features for a wastewater fabric filter are a maximum air to cloth ratio of 4 to 1, fiberglass bags (although Nomex and Teflon can be used) and pulsed jet cleaning.

The spray dryer will use distillate oil for heating the air necessary to dry the concentrated wastewater. Small amounts of CO and VOC will be emitted in the combustion process. Good combustion practices are proposed for the three spray dryers associated with the Unit 3 Project. There are no other available or feasible control technologies that would further reduce CO and VOC emissions other than good combustion practices. Add-on control technologies, such as an oxidation catalyst, are not feasible due to the generation of particulate matter in the spray dryer system.

4.4 Consideration of IGCC

Seminole considered IGCC as a potentially promising technology, from both operational and environmental perspectives. However, in 2004, there were only two commercial scale plants operating in the U.S., and both were built with federal assistance. Existing plant performance confirms that, in the absence of more project experience in electric utility applications, IGCC technology at a scale that would meet Seminole's needs would subject Seminole to availability and cost risks that were considered unacceptable for a utility of Seminole's size. A further test of the readiness and cost-effectiveness of IGCC technology would be the industry responses to Seminole's all-source competitive bidding process. The RFP produced no IGCC bids from utility or non-utility providers. Accordingly, Seminole deemed the economic and reliability risks too high as a self-build alternative. Moreover, IGCC technology does not afford meaningful environmental benefits compared to proposed Unit 3 especially in light of the proposed pollution control upgrades associated with Units 1 and 2. Constructing an IGCC facility would also avoid the substantial benefits from co-utilizing the existing infrastructure, and create additional complexities associated with the chemical processes of gasifying coal.

In addition, a recent PSD applicability determination, dated December 13, 2005, was issued by Stephen D. Page, Director of EPA's Office of Air Quality Planning and Standards (OAQPS). EPA's determination is that companies that propose a new coal-fired power plant are not required to consider IGCC technology in determining what constitutes Best Available Control Technology under the Clean Air Act. As noted in prior EPA decisions and guidance, EPA does not have to consider the BACT requirement as a means to redefine the basic design of the source or change the fundamental scope of the project when considering available control alternatives. Furthermore, the core process of gasification at an IGCC facility is more akin to technology employed in the refinery and chemical manufacturing industries than technologies generally in use in power generation (i.e., controlled chemical reaction vs. a true combustion process). This technology would necessitate a different type of expertise on the part of the company and its employees to produce the desired product (electricity) than the typical SCPC unit. EPA's conclusion is that the IGCC process would redefine the basic design of the source being proposed and, therefore, an applicant does not have to consider IGCC in a BACT analysis for a proposed new coal plant employing conventional pulverized coal-burning technology with a supercritical, or high-pressure, boiler.

5.0 AMBIENT MONITORING ANALYSIS

The PSD rules require that an air quality analysis be conducted for each criteria and non-criteria pollutant subject to regulation under the Act before a major stationary source is constructed. Criteria pollutants are those pollutants for which AAQS have been established. Non-criteria pollutants are those pollutants that may be regulated by emission standards for which AAQS have not been established. This analysis may be performed by the use of modeling and/or by monitoring the air quality. In addition, if EPA has not established an acceptable ambient monitoring method for the pollutant, monitoring is not required.

Based on the potential emissions from the Project (see Table 3-3), pre-construction ambient monitoring analyses for PM_{10}, CO, and O_3 (based on VOC emissions) may be required as part of the application. Ambient monitoring analyses are not required if it can be demonstrated that the proposed project's maximum air quality impacts will not exceed the PSD *de minimis* concentration levels and, for O_3 (based on VOC emissions), VOC emissions of 100 TPY.

As shown in Section 6.10, the Project's maximum impacts are predicted to be below the PSD *de minimis* concentration levels for PM/PM10 and CO .Because the Project's VOC emissions are greater than 100 TPY, pre-construction ambient monitoring analysis for O_3 (based on VOC emissions) is required as part of the application.

5.1 O_3 Ambient Monitoring Analysis

Ambient O_3 monitoring data from existing monitoring stations operated by FDEP are included in this application to satisfy the preconstruction monitoring requirements for VOC (see Table 5-1). Putnam County and adjacent counties are classified as attainment or maintenance areas for O_3. The nearest monitors to the plant site that measure O_3 concentrations are located in Gainesville in Alachua County.

Since O_3 is a regional pollutant, O_3 monitoring data collected in Alachua County are considered to be representative of O_3 concentrations for the region and are used to satisfy this requirement. These stations are operated by the FDEP and measure concentrations according to EPA procedures.

From 2002 through 2004, the second-highest 1-hr average O_3 concentration measured in Gainesville was 0.096 parts per million (ppm). This maximum concentration is less than the existing 1-hour average O_3 AAQS of 0.12 ppm. In addition, the 3-year average of the 4^{th} highest 8-hour average O_3 concentrations was 0.074 ppm, and is below the revised 8-hour average O_3 AAQS of 0.08 ppm. These O_3 monitoring data are proposed as part of this construction permit application to satisfy the preconstruction monitoring requirement for the project.

Until recently, the courts had stayed the 8-hour standard but they will now be implemented by the states in the next several years. FDEP has not yet adopted the revised standards.

6.0 AIR QUALITY IMPACT ANALYSIS

6.1 Significant Impact Analysis Approach

6.1.1 Site Vicinity

The general modeling approach for this Project followed EPA and FDEP modeling guidelines for determining compliance with AAQS and PSD increments. For all criteria pollutants that will be emitted in excess of the PSD significant emission rate due to a proposed project, a significant impact analysis is performed to determine whether the emission and/or stack configuration changes due to the Project alone will result in predicted impacts that are in excess of the EPA significant impact levels at any location beyond the plant's restricted boundaries.

If the Project-only impacts are above the significant impact levels in the vicinity of the facility, then two additional and more detailed air-modeling analyses are required. The first analysis demonstrates compliance with federal and Florida AAQS, and the second analysis demonstrates compliance with allowable PSD Class II increments.

6.1.2 PSD Class I Areas

Generally, if a major new facility is located within 200 km of a PSD Class I area, then a significant impact analysis is also performed to evaluate the impact due to the Project alone at the PSD Class I area. The maximum predicted impacts are compared to EPA's proposed significant impact levels for PSD Class I areas. These recommended levels have never been promulgated as rules but are the currently accepted criteria to determine whether a proposed Project will incur a significant impact on a PSD Class I area.

If the Project-only impacts at the PSD Class I area are above the proposed EPA PSD Class I significant impact levels, then an analysis is performed to demonstrate compliance with allowable PSD Class I impacts at the PSD Class I area.

The nearest PSD Class I area is the Okefenokee National Wilderness Area (NWA), located approximately 108 kilometers (km) north of the SGS Site; the Chassahowitzka NWA, located about 137 km to the southwest; and the Wolf Island NWA, located about 186 km to the north. As indicated, these PSD Class I areas are within 200 km of the SGS Site. Air impact modeling analyses were performed for these PSD Class I areas. Air impacts were not predicted at other PSD Class I areas since they are located more than 200 km from the SGS Site.

In addition, the Project's maximum concentrations are evaluated at the PSD Class I area for pollutants whose emissions are greater than the PSD significant emission rate, to address potential impacts on AQRV. This analysis includes evaluations of regional haze degradation. Because the Project's SO_2 and NO_X emissions did not exceed the PSD significant emission rates, acid deposition estimates for sulfur and nitrogen compounds were not required.

6.2 Pre-construction Monitoring Analysis Approach

The modeling approach followed EPA and FDEP modeling guidelines for evaluating a Project's impacts relative to the *de minimis* monitoring levels to determine the need to submit ambient monitoring data prior to construction. Current FDEP policies stipulate that the predicted highest annual average and highest short-term concentrations are to be compared to the applicable *de minimis* monitoring levels.

6.3 Air Modeling Analysis Approach

6.3.1 General Procedures

As stated in the previous sections, air modeling analyses are required to determine if the Project's impacts are predicted to be greater than the significant impact levels and *de minimis* monitoring levels for each pollutant that is emitted above the significant emission rate. These analyses consider the Project's impacts alone. Air quality impacts are predicted using five years of meteorological data and selecting the highest predicted ground-level concentrations for comparison to the significant impact levels and *de minimis* monitoring levels.

To predict the maximum annual and short-term concentrations for the Project, the modeling approach was divided into screening and refined phases. Concentrations are predicted for the screening phase using a coarse receptor grid and a 5-year meteorological data record. If the highest concentration is predicted at a receptor that lies in an area where the receptor spacing is more than 100 m, then a refined analysis is performed in that area using a receptor grid of greater resolution. Modeling refinements are performed using a receptor spacing of 100 m with a receptor grid centered on the screening receptor at which the maximum concentration was predicted. The air dispersion model is then executed with the refined grid for the entire year of meteorology during which the screening concentration occurred.

If the Project's impacts are greater than the significant impact levels, the air modeling analyses must consider other nearby sources and background concentrations to predict a total concentration for comparison to AAQS.

Generally, when using five years of meteorological data for the analysis, the highest annual and the highest, second-highest (HSH) short-term (i.e., 24 hours or less) concentrations are compared to the applicable AAQS and allowable PSD increments. The HSH concentration is calculated each year for a receptor field by:

1. Eliminating the highest concentration predicted at each receptor;
2. Identifying the second-highest concentration at each receptor; and
3. Selecting the highest concentration among these second-highest concentrations.

The HSH approach is consistent with AAQS and allowable PSD increments, which permit a short-term average concentration to be exceeded once per year at each receptor.

It should be noted that for determining compliance with the 24-hour AAQS for PM_{10}, the highest of the sixth-highest concentration predicted in five years (i.e., H6H), instead of the HSH concentration predicted for each year, is used to compare to the applicable 24-hour AAQS.

The AAQS analysis is a cumulative source analysis that evaluates whether the concentrations from all sources will comply with the AAQS. These concentrations include the modeled impacts from sources at the Project Site and from other nearby facility sources added to a background concentration. The background concentration accounts for sources not included in the modeling analysis.

The PSD Class II analysis is a cumulative source analysis that evaluates whether the concentrations for increment-affecting sources will comply with the allowable PSD Class II increments. These concentrations include the modeled impacts from PSD increment-affecting sources at the SGS Site, plus nearby PSD increment-affecting sources at other facilities.

Because the Project's impacts were predicted to be below the PSD significant impact levels for PM_{10} and CO, cumulative source modeling analyses to address compliance with the AAQS and PSD Class II increments for those pollutants were not required.

6.3.2 PSD Class I Analysis

For each pollutant for which a significant impact is predicted at the PSD Class I area, a PSD Class I analysis is required. The PSD Class I analysis is a cumulative source analysis that evaluates whether the concentrations for increment-affecting sources located within 200 km of the PSD Class I area will comply with the allowable PSD Class I increments. These concentrations include the impacts from PSD increment-affecting sources at the Project Site, plus the impacts from PSD increment-affecting sources at other facilities.

Because the Project's impacts were predicted to be below the PSD Class I significant impact levels for PM_{10}, cumulative source modeling analyses to address compliance with the PSD Class I increments were not required. It should be noted that PSD Class II increment consumption analyses were conducted for SO_2 at the Okefenokee NWA since there have been modeled exceedances of the SO_2 PSD Class I increment in recent years.

6.4 Model Selection

The selection of an air quality model to predict air quality impacts for the proposed projects was based on the ability of the model to simulate impacts in areas surrounding the projects as well as at the PSD Class I areas. Two air quality dispersion models were selected and used in these analyses to address air quality impacts for these projects. These models were:

- The American Meteorological Society and EPA Regulatory Model (AERMOD) dispersion model, and
- The California Puff model (CALPUFF).

The AERMOD dispersion model (Version 04300) is available on the EPA's Internet web site, Support Center for Regulatory Air Models (SCRAM), within the Technical Transfer Network (TTN). A listing of AERMOD model features is presented in Table 6-1.

On November 9, 2005, the EPA implemented AERMOD into its *Guideline of Air Quality Models (Appendix W to 40 CFR Part 51)* as the recommended model for regulatory modeling applications. The FDEP is allowing the use of AERMOD for air permitting projects as a replacement for the Industrial Source Complex Short-Term Model (ISCST3), which will no longer be in effect as of December 2006.

The EPA and FDEP recommend that the AERMOD model be used to predict pollutant concentrations at receptors located within 50 km from a source. The AERMOD model calculates hourly concentrations based on hourly meteorological data. The AERMOD model is applicable for most applications since it is recognized as containing the latest scientific algorithms for simulating plume behavior in all types of terrain. For evaluating plume behavior within the building wake of structures, the AERMOD model incorporates the Plume Rise Model Enhancement (PRIME) downwash algorithm developed by the Electric Power Research Institute (EPRI). AERMOD can predict pollutant concentrations for averaging times of annual and 24, 8, 3, and 1 hour.

The AERMOD model was used to predict the maximum pollutant concentrations due to the SGS Unit 3 Project in nearby areas surrounding the SGS Site. The AERMOD model was also used to predict the maximum pollutant concentrations due to the Project's emissions together with appropriate background sources. The predicted concentrations were then compared to the applicable AAQS and PSD Class II increments.

For this analysis, the EPA regulatory default options were used to predict all maximum impacts.

These options include:

- Final plume rise at all receptor locations;
- Stack-tip downwash;
- Buoyancy-induced dispersion;
- Default wind speed profile coefficients;

- Default vertical potential temperature gradients; and
- Calm wind processing.

At distances beyond 50 km from a source, the CALPUFF model, Version 5.711a (EPA, 2004), is recommended for use by the EPA and the Federal Land Manager (FLM). The CALPUFF model is a long-range transport model applicable for estimating the air quality impacts in areas that are more than 50 km from a source. The CALPUFF model is maintained by the EPA on the SCRAM internet website. The methods and assumptions used in the CALPUFF model are based on the latest recommendations for modeling analysis as presented in the following reports:

- The Interagency Workgroup on Air Quality Models (IWAQM), *Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts* (EPA, 1998); and
- The *Federal Land Manager's Air Quality Relative Values Workgroup (FLAG) Phase I Report* (December, 2000).

In addition, updates to the modeling methods and assumptions were followed based on discussion with the FLM.

The CALPUFF model was used to assess the Project's impact on regional haze. A more detailed description of the assumptions and methods used for the CALPUFF model is presented in Table 6-2 and in Appendix C.

As discussed in Section 6.10, the Project's PM_{10} and CO impacts were predicted to be less than the PSD Class II significant impact levels for the applicable averaging periods. As a result, cumulative source impact analyses are not required to demonstrate compliance with the PM_{10} AAQS and PSD Class II increments and CO AAQS. In addition, the Project's PM_{10} impacts were also predicted to be less than the PSD Class I significant impact levels for PM_{10}. As a result, cumulative source impact analyses are not required to demonstrate compliance with the 24-hour and annual average PM_{10} PSD Class I increments. As discussed previously, PSD Class II increment consumption analyses were conducted for SO_2 at the Okefenokee NWA since there have been modeled exceedances of the SO_2 PSD Class I increment in recent years.

6.5 Meteorological Data

Meteorological data used in the AERMOD model to determine air quality impacts consisted of a concurrent five-year period of hourly surface weather observations and twice-daily upper air soundings from the National Weather Service (NWS) offices located at the Jacksonville International Airport and in Waycross, Georgia, respectively. Concentrations were predicted using five years of hourly meteorological data from 1986 through 1990. The NWS office at Jacksonville is located approximately 92 km (55 miles) northeast of the site. The FDEP consider this station to have surface meteorological data representative of the project site.

The data for these stations were processed into a format that can be input to the AERMOD model using the meteorological preprocessor program AERMET. The data were processed using the Lakes Environmental graphical interface using the latest version of AERMET (04300). The hourly surface data were obtained from the Solar and Meteorological Observation Network (SAMSON) CD. Upper air sounding data were obtained in the required NCDC TD-6201 format from the Lakes website (www.webmet.com).

A unique feature of AERMOD is its incorporation of land use parameters for the processing of boundary layer parameters used for the dispersion. Based on the most recent regulatory guidance, the land use parameters should be representative of the data measurement site (i.e., NWS at Jacksonville). Land use data, representing the average surface roughness, albedo, and Bowen ratio that exist within a 3-km radius of the NWS station at Jacksonville were extracted from 1-degree land use files from the U.S. Geographical Survey (USGS) using the AERSURFACE program. AERSURFACE currently extracts land use data in 12 wind direction sectors covering 360 degrees. The land use values for each wind direction sector were input into Stage 3 of the AERMET preprocessor program to create the surface and profile meteorological files that AERMOD requires.

CALMET, the meteorological preprocessor to CALPUFF, was used to develop a three dimensional wind field necessary to perform the air modeling analysis to evaluate pollutant impacts at each PSD Class I area. The modeling domain consisted of a rectangular 3-dimensional grid that extended from approximately 79.0 to 83.5 degrees longitude and from 23.75 to 28.0 degrees latitude. The modeling domain includes the following meteorological and land use parameters:

- Surface weather data;

- Upper air data;
- A 1-degree land use data;
- A 1-degree Digital Elevation Model (DEM) terrain data;
- Mesoscale Model - Generations 4 and 5 (MM4 and MM5) data (for initializing the wind field); and
- Hourly precipitation data.

These data were obtained and processed for 1990, 1992, and 1996, the years for which MM4 and MM5 data are available. It should be noted that MM4 data are available for 1990 while MM5 data are available for 1992 and 1996. The CALMET wind field and the CALPUFF model options used were consistent with the suggestions of the FLMs. Meteorological data used with the CALPUFF model consist of a CALMET-developed wind field covering North-Central Florida. More detailed descriptions of the assumptions and methods used for processing the meteorological data and establishing the model domain are presented in Appendix C.

6.6 Emission Inventory

6.6.1 Significant Impact Analysis

A summary of the criteria pollutant emission rates, physical stack, and stack operating parameters for the Project that were used in the air modeling analysis were previously presented in Tables 2-2, 2-7 and 2-9 for SGS Unit 3 boiler, cooling tower and ZLD, respectively. Table 2-8 presented emissions information for the material handling operations and more detail on the type of sources is presented in Appendix A. In an effort to obtain the maximum air quality impacts for a range of possible operating conditions, the air modeling for the SGS Unit 3 considered operating loads at 100, 75, and 50 percent.

The AERMOD model was used to predict maximum concentrations for the annual and 24-, 8-, 3-, and 1-hour averaging times in the near-field areas of the Project. To estimate impacts due to emissions from the boiler stacks, a total emission rate of 7.94 lb/hr or 1.0 grams per second (g/s) was initially used. These modeling results produced relative concentrations as a function of the modeled emission rate (i.e., $\mu g/m^3$ per 1.0 g/s). These impacts are referred to as generic pollutant impacts. Maximum air quality impacts for specific pollutants were then determined by multiplying the maximum pollutant-specific emission rate in lb/hr (g/s) by the maximum predicted generic impact divided by the modeled emission rate [e.g., 7.94 lb/hr (1.0 g/s)].

To address PM_{10} impacts from the Project, the PM_{10} sources were modeled explicitly using the maximum PM_{10} emission rates. These sources included the SGS Unit 3 boiler; cooling tower, material handling operations for coal, petcoke, limestone, flyash, and gypsum; and ZLD system. To address CO impacts from the Project, the CO sources were modeled and included the SGS Unit 3 and ZLD system. Detailed descriptions of these sources are presented in Section 2.0 and Appendix A.

For the PSD Class I areas, regional haze analyses were performed for the Project with the CALPUFF model based on the maximum hourly emissions for the SGS Unit 3 which is for 100-percent load conditions. Detailed descriptions of the operating conditions and pollutant emission factors and rates are provided in Appendix C.

6.6.2 AAQS And PSD Class II Analyses

The maximum pollutant impacts for the Project are predicted to be less than the significant impact levels for the applicable pollutants of PM_{10} and CO. As a result, no additional modeling analyses are required to address compliance with the AAQS and PSD Class II increments.

6.6.3 PSD Class I Analysis

The maximum Project impacts at the PSD Class I areas are predicted to be less than the PSD Class I significant impact levels for the PM_{10}. As a result, cumulative source impact analyses are not required to demonstrate compliance with the PM_{10} PSD Class I increments.

For SO_2, although there will be a decrease in SO_2 emissions due to the Project, PSD Class I increment consumption analyses were performed since there has been modeled exceedances of the SO_2 PSD Class I increment at the Okefenokee NWA in recent years. A listing of background SO_2 sources that were used in the PSD Class I analyses and their locations relative to the PSD Class I areas are provided in Table 6-3. PSD sources located within 200 km of the Class I areas were included in the PSD Class I modeling analysis. Detailed SO_2 background source data that were used for the PSD Class I analyses are presented in Appendix D.

6.7 Building Downwash Effects

All significant building structures in the SGS Site were identified by the site plot plan (See Figure 2-2). The building structures were processed in the EPA Building Profile Input Program [(BPIP), Version 95086] to determine direction-specific building heights and widths for each 10-degree azimuth direction for each source that was included in the modeling analysis. A listing of dimensions for each structure is presented in Table 6-4. See Appendix D for plots of these building structures.

Based on this evaluation, the GEP stack height for the SGS Unit 3 was determined to be 675 ft. Therefore, building downwash effects for that emission unit were not included in the air modeling analyses. For other emission units with stack releases, building downwash effects were included, as appropriate.

6.8 Receptor Locations

6.8.1 Site Vicinity

To determine the maximum impact for all pollutants and averaging times in the vicinity of the Project, concentrations were predicted at receptors located in a detailed receptor grids centered on the stack for SGS Unit 3, the modeling origin, and extended from the plant property out to 20 km.

Along the plant boundary, a Cartesian receptor grid was used to predict concentrations for the Project at 352 receptors spaced at 50-m intervals.

In addition, a general Cartesian grid was used to predict concentrations beyond the plant property out to 20 km. Receptors were located at the following intervals and distances from the origin:

- Every 100 m from the plant property to 3,000 m;
- Every 250 m from 3,250 to 5,000 m;
- Every 500 m from 5,500 to 10,000 m; and
- Every 1,000 m from 11,000 to 20,000 m.

More than 6,000 receptors were used in the analysis to determine the maximum impacts for the Project.

6.8.2 Class I Area

For determining the Project's impacts at the PSD Class I areas, pollutant concentrations were predicted in an array of 268 discrete receptors located at the PSD Class I areas of the Okefenokee, Wolf Island, and Chassahowitzka NWA. These receptors are a subset of the more than 900 receptors provided by the National Park Service (NPS). The 268 receptors include all of the NPS boundary receptors and an array of interior receptors with less resolution than for the NPS set.

6.9 Model Results

6.9.1 PSD Class II Significant Impact Analysis

The maximum pollutant concentrations predicted for the Project are given in Tables 6-5 through 6-7. The maximum PM_{10} and CO concentrations predicted for the SGS Unit No. 3 for the unit operating for three operating loads are presented in Table 6-5. The maximum PM_{10} and CO concentrations predicted for the Project, including the PM_{10} emissions from the SGS Unit No. 3, cooling tower, material handling operations, and ZLD system are presented in Table 6-6. A summary of the PM_{10} and CO concentrations predicted for the Project for comparison to the PSD Class II significant impact levels is presented in Table 6-7.

Based on these modeling results, the maximum concentrations due to the Project are predicted to be less than the PSD significant impact levels. As a result, the Project's impacts are predicted to comply with the AAQS and PSD Class II increments.

6.9.2 PSD Class I Significant Impact Analysis

The maximum PM_{10} concentrations predicted for the Project at the PSD Class I areas are shown in Table 6-8. As shown, the maximum Project impacts at the PSD Class I areas are predicted to be less than the PSD Class I significant impact levels.

As a result, the Project's impacts are predicted to comply with the PM_{10} Class I increments and cumulative source impact analyses are not required to demonstrate compliance with the PSD Class I increments.

6.9.3 Cumulative SO_2 PSD Class I Increment Analysis

As discussed previously, although there will be a decrease in SO_2 emissions due to the Project, PSD Class I increment consumption analyses were performed since there has been modeled exceedances of the SO_2 PSD Class I increment at the Okefenokee NWA in recent years.

A summary of the results of the cumulative PSD Class I increment analyses (i.e., impacts due to PSD increment consuming sources) for the SO_2 concentrations are presented in Table 6-9.

The HSH 3- and 24-hour average and annual SO_2 concentrations due to the Project and other PSD increment-affecting sources are predicted to be below the allowable 3-hour, 24-hour, and annual PSD Class I increments of 25, 5, and 2 $\mu g/m^3$, respectively. The SGS Units 1, 2, and 3 contributions to the overall maximum 3-hour and 24-hour average concentrations are 30 percent or less of the total SO_2 increment consumption.

6.10 Conclusions

Based on these air quality modeling analyses, the maximum pollutant concentrations due to the Project are predicted to be less than the PSD Class II and I significant impact levels for all pollutants. Although not required, more detailed SO_2 modeling analyses were performed with background sources to address compliance with the SO_2 PSD Class I increments at the Okefenokee NWA. The results of the modeling analysis demonstrate the Project will not have a significant affect on air quality and will comply with all applicable AAQS and PSD increments.

7.0 ADDITIONAL IMPACT ANALYSIS

This section presents the impacts the Project will have on vegetation, soils, visibility, and direct growth resulting from the Project, both in the vicinity of the SGS Site and at the PSD Class I areas under consideration.

7.1 Impacts Due to Associated Direct Growth

7.1.1 Introduction

Rule 62-212.400(3)(h)(5), F.A.C., states that an application must include information relating to the air quality impacts of, and the nature and extent of all general, residential, commercial, industrial, and other growth that has occurred since August 7, 1977, in the area the facility or modification would affect. This growth analysis considers air quality impacts due to emissions resulting from the industrial, commercial, and residential growth associated with the construction and operation of the Project. This information is consistent with the EPA Guidance related to this requirement in the *Draft New Source Review Workshop Manual* (EPA, 1990).

The SGS is being constructed to meet current and projected electric demands. Seminole has an obligation to meet this increase in electric demand. Additional growth as a direct result of the additional electric power provided by SGS is not expected.

Construction of the SGS will occur over a five-year period requiring an average of approximately 1,500 workers during that time. It is anticipated that many of these construction personnel will commute to the SGS Site.

The SGS will employ a total of about 50 additional operations employees at SGS build-out. The operational workforce will also include annual contracted maintenance workers to be hired for periodic routine services. The workforce needed to operate the SGS represents a small fraction of the population already present in the immediate area. Therefore, while there would be a small increase in vehicular traffic in the area, the effect on air quality levels would be minimal.

There are also expected to be no air quality impacts due to associated commercial and industrial growth given the location of the SGS. The existing commercial and industrial infrastructure should be adequate to provide any support services that the SGS might require and would not increase with the operation of the SGS. The addition of the proposed unit will have little effect on the increase or growth in the area.

The following discussion presents general trends in residential, commercial, industrial, and other growth that has occurred since August 7, 1977, in Putnam County. As such, the information presented is available from a variety of sources (i.e., Florida Statistical Abstract, FDEP, etc.) that characterize Putnam County as a whole.

7.1.2 Residential Growth

7.1.2.1 Population and Household Trends

As an indicator of residential growth, the trend in the population and number of household units in Putnam County since 1977 are shown in Figure 7-1. The county experienced a 47-percent increase in population for the years 1977 through 2000. During this period, there was an increase in population of about 22,600. Similarly, the number of households in the county increased by about 12,000, or 73 percent, since 1977.

7.1.2.2 Growth Associated with the Operation of the Project

Because there will be about 50 additional operations employees needed to operate the SGS, residential growth due to the SGS will be minimal.

7.1.3 Commercial Growth

7.1.3.1 Retail Trade and Wholesale Trade

As an indicator of commercial growth in Putnam County, the trends in the number of commercial facilities and employees involved in retail and wholesale trade are presented in Figure 7-2. The retail trade sector comprises establishments engaged in retailing merchandise. The retailing process is the final step in the distribution of merchandise. Retailers are, therefore, organized to sell merchandise in small quantities to the general public. The wholesale trade sector comprises establishments engaged in wholesaling merchandise. This sector includes merchant wholesalers who buy and own the goods they sell; manufacturers' sales branches and offices that sell products manufactured domestically by their own company; and agents and brokers who collect a commission or fee for arranging the sale of merchandise owned by others.

Since 1977, retail trade has increased by about 14 establishments and 2,000 employees or 6 and 118 percent, respectively. For the same period, wholesale trade has increased by 28 establishments and 346 employees, or 82 and 126 percent, respectively.

7.1.3.2 Labor Force

The trend in the labor force in Putnam County since 1977 is shown in Figure 7-3. The greatest number of persons employed in Putnam County has been in the manufacturing, government, and retail trade sectors. Between 1977 and 1999, approximately 5,000 persons were added to the available work force, for an increase of 34 percent.

7.1.3.3 Tourism

Another indicator of commercial growth in Putnam County is the tourism industry. As an indicator of tourism growth in the county, the trend in the number of hotels and motels and the number of units at the hotels and motels are presented in Figure 7-4.

This industry comprises establishments primarily engaged in marketing and promoting communities and facilities to businesses and leisure travelers through a range of activities, such as assisting organizations in locating meeting and convention sites; providing travel information on area attractions, lodging accommodations, restaurants; providing maps; and organizing group tours of local historical, recreational, and cultural attractions.

Between 1978 and 2000, there was a decrease of 12 percent in the number of hotels and motels, and an increase of 14 percent in the number of units at those establishments in the county.

7.1.3.4 Transportation

As an indicator of transportation growth, the trend in the number of vehicle miles traveled (VMT) by motor vehicles on major roadways in Putnam County is presented in Figure 7-5. The county's main roadways are U.S. Highway 17 and State Road 100.

Between 1977 and 2001, there was an increase of about 1,560,000 VMT, or 113 percent, on major roadways in the county.

7.1.3.5 Growth Associated with the Operation of the Project

The existing commercial and transportation infrastructure should be adequate to provide any support services that might be required during construction and operation of the SGS. The workforce needed to operate the SGS represents a small fraction of the labor force present in the immediate and surrounding areas.

7.1.4 Industrial Growth

7.1.4.1 Manufacturing and Agricultural Industries

As an indicator of industrial growth, the trend in the number of employees in the manufacturing industry in Putnam County since 1977 is shown in Figure 7-6. As shown, the manufacturing industry experienced a slight decrease in employees from 1977 through 2000.

As another indicator of industrial growth, the trend in the number of employees reported in the agricultural industry in Putnam County since 1977 is also shown in Figure 7-6. As shown, the agricultural industry experienced an increase of about 400 employees from 1977 through 2000.

7.1.4.2 Utilities

Existing power plants in Putnam County include the following:

- Florida Power & Light's Putnam Plant; and
- Seminole Electric Cooperative, Inc.'s Seminole Generating Station.

Together, these power plants have an electrical nameplate generating capacity of over 1,800 megawatts (MW).

As an indicator of electrical utility growth, the electrical nameplate generating capacity in Putnam County since 1977 is shown in Figure 7-7. As shown, the electrical nameplate generating capacity has increased by 1,585 MW, or 521 percent since 1977.

As an indicator of electrical utility growth, the electrical generation capacity in Putnam County since 1977 is shown in Figure 7-7.

7.1.4.3 Growth Associated with the Operation of the Project

Since the PSD baseline date of August 7, 1977, there has been only one major facility built within a 35 km radius of the SGS Site. This was the Seminole Generating Station. There are a limited number of facilities located throughout the 35 km radius area surrounding the Site. Based on the locations of nearby air emission sources, there has not been a concentration of industrial and commercial growth in the vicinity of the SGS Site.

7.1.5 Air Quality Discussion

7.1.5.1 Air Emissions and Spatial Distribution of Major Facilities

Besides the SGS, the other major air pollutant facilities in Putnam County are Georgia-Pacific Corporation's Palatka Operations and Florida Power & Light's Putnam Plant. Based on actual emissions reported for 1999 (latest year of available data) by EPA on its AIRSdata website, total emissions from stationary sources in the county are as follows:

SO_2:	43,000 TPY
PM_{10}:	1,700 TPY
NO_X:	28,900 TPY
CO:	4,640 TPY
VOC:	800 TPY

7.1.5.2 Air Emissions from Mobile Sources

The trends in the air emissions of CO, VOC, and NO_X from mobile sources in Putnam County are presented in Figure 7-8. Between 1977 and 2002, there were significant decreases in CO and VOC emissions, and there was only a slight increase in NO_X emissions during that same time period. The decrease in CO and VOC emissions were about 41 and 5 tons per day, respectively, which represent decreases from 1977 emissions of 48 and 42 percent, respectively. The increase in NO_X emissions was less than one half of a ton per day, which represents an increase of about 5 percent since 1977.

7.1.5.3 Air Monitoring Data

Since 1977, Putnam County has been classified as attainment for all criteria pollutants. Air quality monitoring data have been collected in Putnam County, primarily in the central portion of the county in and around the city of Palatka. For this evaluation, the air quality monitoring data collected at the monitoring station nearest to the GP Palatka Mill were used to assess air quality trends since 1977. Air quality monitoring data were based on the following monitoring stations:

- PM_{10} concentrations – Palatka, and
- CO concentrations – Jacksonville.
- O_3 concentrations – Gainesville and Jacksonville.

Data collected from these stations are considered to be generally representative of air quality in Putnam County. Because the monitoring stations in Jacksonville (CO) are located in more urbanized areas than the SGS, the reported concentrations for those stations are likely to be higher than that experienced at the site.

The air monitoring data indicate that the maximum air quality concentrations currently measured in the region comply with and are well below the applicable AAQS. These monitoring stations are located in areas where the highest concentrations of a measured pollutant are expected due to the combined effect of emissions from stationary and mobile sources, as well as the effects of meteorology. Therefore, the ambient concentrations in areas not monitored should have pollutant concentrations less than the monitored concentrations from these sites.

In addition, since 1988, PM in the form of PM_{10} has been collected at the air monitoring stations due to the promulgation of the PM_{10} AAQS. Prior to 1989, the AAQS for PM was in the form of total suspended particulates (TSP) concentrations, and this form was measured at the stations.

7.1.5.4 PM_{10}/TSP Concentrations

The trends in the 24-hour and annual average PM_{10} and TSP concentrations since 1977 are presented in Figures 7-9 and 7-10, respectively. TSP concentrations are presented through 1988 since the AAQS was based on TSP concentrations through that year. In 1988, the TSP AAQS was revoked and the PM standard was revised to PM_{10}.

As shown in these figures, measured TSP concentrations were generally below the TSP AAQS. Since 1988 when PM_{10} concentrations have been measured, the PM_{10} concentrations have been and continue to be below the AAQS.

7.1.5.5 CO Concentrations

The trends in the one hour and eight hour average CO concentrations measured since 1977 in Jacksonville are presented in Figures 7-11 and 7-12, respectively. As shown in these figures, measured CO concentrations have been well below the AAQS for the past several years.

7.1.5.6 O_3 Concentrations

The trends in the one hour average O_3 concentrations since 1977 are presented in Figure 7-13. The trends in the eight hour average O_3 concentrations since 1995 are presented in Figure 7-14. As shown in these figures, even in the more urbanized areas of Jacksonville and Gainesville, the measured O_3 concentrations have primarily been below the one-hour average AAQS and the new eight hour average AAQS.

7.1.5.7 Air Quality Associated with the Operation of the Project

The air quality data measured in the region of the SGS Site indicate that the maximum air quality concentrations are well below and comply with the AAQS. Also, based on the trends of these maximum concentrations, the air quality has generally improved in the region since the baseline date of August 7, 1977. Because the maximum concentrations for the SGS are predicted to be low and, for certain pollutants, below the significant impact levels, the air quality concentrations in the region are expected to remain below and comply with the AAQS when the Project becomes operational.

7.2 Impacts on Soils, Vegetation, Wildlife, and Visibility in the Project Vicinity

7.2.1 Impacts on Vegetation and Soils

The uses adjacent to the Site are primarily agricultural, associated with citrus production and cattle ranching. Cypress swamp, freshwater marsh, and mixed hardwood forest exist to the north of the Site. To the west of the Site is a mixture of upland (pasture, scrub, scrubby flatwoods, mesic flatwoods, prairie hammock) and wetland (wet flatwoods, depressional marsh, wet prairie, baygall) habitats in marginal to good condition. Native soils in the area are primarily spodosols, which generally have low buffering capacities.

Air emissions resulting from the construction and operation of the SGS will not result in impacts to any vegetative communities or wildlife habitat within the area. Wildlife habitat has been preserved and is actively utilized by wildlife adjacent to power generation facilities throughout the state of Florida.

The Project's impacts on the local air quality, together with background sources, are predicted to be well below the AAQS. In addition, the Project's VOC emissions represent an insignificant increase in regional VOC emissions. Since the AAQS are also designed to protect the public welfare, including effects on soils and vegetation, no detrimental effects on soils or vegetation should occur in this area due to the Project's operation.

7.2.2 Impacts on Wildlife

Although air pollution impacts to wildlife have been reported in the literature, many of the incidents involved acute exposures to pollutants, usually caused by unusual or highly concentrated releases or unique weather conditions. Generally, there are three ways pollutants may affect wildlife: through inhalation, through exposure with skin, and through ingestion (Newman, 1980). Ingestion is the most common means and can occur through eating or drinking of high concentrations of pollutants. Bioaccumulation is the process of animals collecting and accumulating pollutant levels in their bodies over time. Other animals that prey on these animals would then be ingesting concentrated pollutants levels.

It is unlikely that the Project's emissions will cause injury or death to wildlife based on a review of the available literature on air pollutant effects on wildlife. The Project's impacts are predicted to be very low and dispersed over a large area. Coupled with the mobility of wildlife, the potential for exposure of wildlife to the Project's impacts under weather conditions that lead to high concentrations is extremely unlikely.

7.2.3 Impacts on Visibility

In addition, no visibility impairment in the SGS's vicinity is expected due to the types and quantities of emissions proposed for the Project. The opacity of the boiler's emissions will be 10 percent or less under normal operation.

7.3 Impacts to PSD Class I Areas

7.3.1 Identification of AQRVs and Methodology

An AQRV analysis was conducted to assess the potential risk to AQRVs at the Class I areas due to the emissions from the SGS.

The U.S. Department of the Interior in 1978 administratively defined AQRVs to be:

> *All those values possessed by an area except those that are not affected by changes in air quality and include all those assets of an area whose vitality, significance, or integrity is dependent in some way upon the air environment. These values include visibility and those scenic, cultural, biological, and recreational resources of an area that are affected by air quality.*
>
> *Important attributes of an area are those values or assets that make an area significant as a national monument, preserve, or primitive area. They are the assets that are to be preserved if the area is to achieve the purposes for which it was set aside (Federal Register 1978).*

The AQRVs include visibility freshwater and coastal wetlands, dominant plant communities, unique and rare plant communities, soils and associated periphyton, and the wildlife dependent on these communities for habitat. Rare, endemic, threatened, and endangered species of the Class I areas and bioindicators of air pollution (e.g., lichens) are also evaluated.

The maximum predicted atmospheric concentrations due to the increase in emissions resulting from the Project are presented in Table 7-1. As shown, the predicted increase in impacts is very low for all pollutants considered.

7.3.2 Impacts to Soils

For soils, the potential and hypothesized effects of atmospheric deposition include:

- Increased soil acidification,
- Alteration in cation exchange,
- Loss of base cations, and
- Mobilization of trace metals.

The potential sensitivity of specific soils to atmospheric inputs is related to two factors. First, the physical ability of a soil to conduct water vertically through the soil profile is important in influencing the interaction with deposition. Second, the ability of the soil to resist chemical changes, as measured in terms of pH and soil cation exchange capacity (CEC), is important in determining how a soil responds to atmospheric inputs.

The soils of the Class I areas are generally classified as histosols or entisols. Histosols (peat soils) are organic and have extremely high buffering capacities based on their CEC, base saturation, and bulk density. Therefore, they would be relatively insensitive to atmospheric inputs. The entisols are shallow sandy soils overlying limestone, such as the soils found in the pinelands. The direct connection of these soils with subsurface limestone tends to neutralize any acidic inputs. Moreover, the groundwater table is highly buffered due to the interaction with subsurface limestone formations, which results in high alkalinity (as $CaCO_3$).

The relatively low sensitivity of the soils to acid inputs coupled with the extremely low ground-level concentrations of contaminants projected for the Class I areas from the SGS emissions precludes any significant impact on soils.

7.3.3 Impacts to Vegetation

In general, the effects of air pollutants on vegetation occur primarily from SO_2, NO_2, O_3, and PM. Effects from minor air contaminants, such as fluoride, chlorine, hydrogen chloride, ethylene, ammonia, hydrogen sulfide, CO, and pesticides, have also been reported in the literature. The effects of air pollutants are dependent both on the concentration of the contaminant and the duration of the exposure. The term "injury," as opposed to damage, is commonly used to describe all plant responses to air contaminants and will be used in the context of this analysis. Air contaminants are thought to interact primarily with plant foliage, which is considered to be the major pathway of exposure. For purposes of this analysis, it was assumed that 100 percent of each air contaminant of concern is accessible to the plants.

Injury to vegetation from exposure to various levels or air contaminants can be termed acute, physiological, or chronic. Acute injury occurs as a result of a short-term exposure to a high contaminant concentration and is typically manifested by visible injury symptoms ranging from chlorosis (discoloration) to necrosis (dead areas). Physiological or latent injury occurs as the result of a long-term exposure to contaminant concentrations below that which results in acute injury symptoms. Chronic injury results from repeated exposure to low concentrations over extended periods of time, often without any visible symptoms, but with some effect on the overall growth and productivity of the plant. In this assessment, 100 percent of the particular air pollutant in the ambient air was assumed to interact with the vegetation, which is a very conservative approach.

The concentrations of the pollutants, duration of exposure and frequency of exposures influence the response of vegetation to atmospheric pollutants. The pattern of pollutant exposure expected from the facility is that of a few episodes of relatively high ground-level concentration, which occur during certain meteorological conditions interspersed with long periods of extremely low ground-level concentrations. If there are any effects of stack emissions on plants, they will be from the short-term, higher doses. A dose is the product of the concentration of the pollutant and duration of the exposure.

7.3.3.1 Particulate Matter

Although information pertaining to the effects of PM on plants is scarce, baseline concentrations are available (Mandoli and Dubey, 1988). Ten species of native Indian plants were exposed to levels of PM that ranged from 210 to 366 $\mu g/m^3$ for an eight-hour averaging period. Damage in the form of a higher leaf area/dry weight ratio was observed at varying degrees for most plants tested. Concentrations of PM lower than 163 $\mu g/m^3$ did not appear to be injurious to the tested plants.

The maximum eight-hour PM concentration due to the Project at any of the Class I areas is predicted to be 0.24 $\mu g/m^3$. This concentration is about 0.1 percent of the values that affected plant foliage (i.e., 210 μg/m^3). As a result, no significant effects to vegetative AQRVs are expected from the Project's emissions.

7.3.3.2 Carbon Monoxide

As with PM, information pertaining to the effects of CO on plants is scarce. The main effect of high concentrations of CO is the inhibition of cytochrome *c* oxidase, the terminal oxidase in the mitochondrial electron transfer chain. Inhibition of cytochrome *c* oxidase depletes the supply of ATP, the principal donor of free energy required for cell functions. However, this inhibition only occurs at extremely high concentrations of CO. Pollok *et al.* (1989) reported that exposure to $CO:O_2$ ratio of 25 (equivalent to an ambient CO concentration of 6.85 x 10^6 μg/m^3) resulted in stomatal closure in the leaves of the sunflower (*Helianthus annuus*). Naik *et al.* (1992) reported cytochrome *c* oxidase inhibition in corn, sorghum, millet, and Guinea grass at $CO:O_2$ ratios of 2.5 (equivalent to an ambient CO concentration of 6.85 x 10^5 μg/m^3). These plants were considered the species most sensitive to CO-induced inhibition of cytochrome *c* oxidase.

The maximum one-hour average concentration due to the Project at any of the Class I areas is 3.0 μg/m^3 in the Class I area, which is about 1 x 10^6 times lower than the minimum value that caused inhibition in laboratory studies (i.e., 6.85 x 10^6 μg/m^3). The amount of damage sustained at this level, if any, for 1 hour would have negligible effects over an entire growing season. The maximum annual concentration predicted at any of the Class I areas is 0.037 μg/m^3 and reflects a more realistic, yet conservative, CO level for the Class I areas. This maximum concentration is predicted to be about 1 x 10^7 times lower than the value that caused cytochrome *c* oxidase inhibition (6.85 x 10^5 μg/m^3).

7.3.3.3 VOC Emissions and Impacts to Ozone

It is difficult to predict what effect the proposed increase in emissions of VOC from the SGS will have on ambient O_3 concentrations on a regional scale. VOC and NO_X emissions are precursors to the formation of O_3. O_3 is not directly emitted from fuel combustion, but is formed down-wind from emission sources when VOC and NO_X emissions react in the presence of sunlight. Natural (i.e., without man-made sources) ambient concentrations of O_3 are normally in the range of 20 to 39 μg/m^3 (0.01 to 0.02 ppm) (Heath, 1975).

The nearest monitor to the Project that measures O_3 concentrations is located in Alachua County (See Table 5-1). This station measures concentrations according to EPA procedures. Based on the O_3 monitoring concentrations measured over the last several years, the region is in attainment of the existing 1-hour O_3 AAQS as well as the new 8-hour O_3 AAQS.

O_3 can cause various damage to broad-leaved plants including: tissue collapse, interveinal necrosis and markings on the upper surface leaves know as stippling (pigmented yellow, light tan, red brown, dark brown, red, or purple), flecking (silver or bleached straw white), mottling, chlorosis or bronzing, and bleaching. O_3 can also stunt plant growth and bud formation. On certain plants such as citrus, grape, and tobacco, it is common for leaves to wither and drop early.

Total regional VOC and NO_X emissions, precursors to O_3 formation (i.e., Putnam County) are more than 28,000 TPY for stationary and mobile sources. The maximum VOC emissions increase due to the Project is 131 TPY, with a decreas in NO_X emissions. The VOC emission represents less than a one percent increase in regional VOC and NO_X emissions. Therefore, the effects of O_3, as a result of VOC emissions from the Project, are expected to be insignificant.

7.3.3.4 Summary

In summary, the phytotoxic effects on the Class I areas from the Project's emissions are expected to be minimal. It is important to note that the substances were evaluated with the assumption that 100 percent was available for plant uptake. This is rarely the case, if ever, in a natural ecosystem.

7.3.4 Impacts to Wildlife

A wide range of physiological and ecological effects to fauna has been reported for gaseous and particulate pollutants (Newman, 1981; Newman and Schreiber, 1988). The most severe of these effects have been observed at concentrations above the secondary AAQS. Physiological and behavioral effects have been observed in experimental animals at or below these standards. No observable effects to fauna are expected at concentrations below the values reported in Table 7-5.

The major air quality risk to wildlife in the United States is from continuous exposure to pollutants above the National AAQS. This occurs in non-attainment areas, e.g., Los Angeles Basin. Risks to wildlife also may occur for wildlife living in the vicinity of an emission source that experiences frequent upsets or episodic conditions resulting from malfunctioning equipment, unique meteorological conditions, or startup operations (Newman and Schreiber, 1988). Under these conditions, chronic effects (e.g., particulate contamination) and acute effects (e.g., injury to health) have been observed (Newman, 1981).

For impacts on wildlife, the lowest threshold values of SO_2, NO_X, and particulates that are reported to cause physiological changes are shown in Table 7-2. These values are up to orders of magnitude larger than maximum predicted concentrations for the Class I areas.

No significant effects on wildlife AQRVs from SO_2, NO_X, and particulates are expected. These results are considered indications of the risk of other air pollutant emissions predicted from the SGS, which is also considered to be negligible.

7.4 Impacts on Visibility

The CAA Amendments of 1977 provide for implementation of guidelines to prevent visibility impairment in mandatory Class I areas. The guidelines are intended to protect the aesthetic quality of these pristine areas from reduction in visual range and atmospheric discoloration due to various pollutants. Visibility can take the form of plume blight for nearby areas (i.e., distances within 50 km) or regional haze for long distances (i.e., distances beyond 50 km).

Sources of air pollution can cause visible plumes if emissions of PM_{10} and NO_X are sufficiently large. A plume will be visible if its constituents scatter or absorb sufficient light so that the plume is brighter or darker than its viewing background (e.g., the sky or a terrain feature, such as a mountain). PSD Class I areas, such as national parks and wilderness areas, are afforded special visibility protection designed to prevent plume visual impacts to observers within a Class I area.

Visibility is an AQRV for the Class I areas under consideration. Because the distance to the nearest PSD Class I area is about 108 km, the change in visibility for the SGS was analyzed as regional haze.

Currently, there are several air quality modeling approaches recommended by the Interagency Workgroup on Air Quality Models (IWAQM) to perform these analyses. The IWAQM consists of EPA and FLM of Class I areas that are responsible for ensuring that AQRVs are not adversely impacted by new and existing sources. These recommendations have been summarized in guidelines required by the 1977 Clean Air Act Amendments and are contained in two documents:

- *Interagency Workgroup on Air Quality Models (IWAQM), Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts* (EPA, 1998), referred to as the IWAQM Phase 2 report; and
- *Federal Land Managers' Air Quality Related Values Workgroup (FLAG), Phase I Report,* USFS, NPS, USFWS (December, 2000), referred to as the FLAG document.

Based on recent communications with the U.S. Fish and Wildlife Service (USFWS), the proposed project's impacts on visibility at the PSD Class I areas were evaluated using two different methods. The first method uses hourly relative humidity data to calculating the background extinctions (i.e., Method 2). For the first analysis, the RHMAX was set to the default value of 98 percent. The second method used monthly relative humidity factors (i.e., Method 6). The use of Method 6 for predicting visibility impairment is compatible with future modeling procedures being developed to address the Best Available Retrofit Technology (BART) Regulations.

The methods and assumptions recommended in these documents and by the FWS were used to assess visibility impairment due to the SGS.

Based on the FLAG document, current regional haze guidelines characterize a change in visibility by the change in the light-extinction coefficient (b_{ext}). The b_{ext} is the attenuation of light per unit distance due to the scattering and absorption by gases and particles in the atmosphere. A change in the extinction coefficient produces a perceived visual change. An index that simply quantifies the percent change in visibility due to the operation of a source is calculated as:

$$\Delta\% = (b_{exts} / b_{extb}) \times 100$$

where: b_{exts} is the extinction coefficient calculated for the source, and
b_{extb} is the background extinction coefficient.

The purpose of the visibility analysis is to calculate the extinction at each receptor for each day (24-hour period) of the year due to the SGS. The criteria to determine if the SGS's impacts are potentially significant are based on a change in extinction of 5 percent or greater for any day of the year.

Processing of visibility impairment for this study was performed with the CALPUFF model (see Appendix C) and the CALPUFF post-processing program CALPOST. The analysis was conducted in accordance with the most recent guidance from the FLAG report (December 2000). The CALPUFF postprocessor model CALPOST is used to calculate the combined visibility effects from the different pollutants that are emitted from the Project. Daily background extinction coefficients are calculated on an hour-by-hour basis using hourly relative humidity data from CALMET and hygroscopic and non-hygroscopic extinction components specified in the FLAG document. For the Class I area evaluated, the hygroscopic and non-hygroscopic components are 0.9 and 8.5 inverse mega meter (Mm^{-1}). CALPOST then predicts the percent extinction change for each day of the year.

The results of the refined regional haze analysis for the project are presented in Table 7-3. These results account for the reduction in SO_2, NOx, and sulfuric acid mist for Units 1 and 2. The maximum project impact on visibility at the Class I areas is predicted to be 2.67 percent using Method and 1.52 percent using Method 6. As previously, discussed, Method 2 used hourly relative humidity data to calculating the background extinctions. Method 6 used monthly relative humidity factors and is compatible with future modeling procedures being developed to address the BART Regulations.

Therefore, the Project is not expected to have an adverse impact on regional haze in the Class I areas under consideration.

8.0 REFERENCES

Ashenden, T.W. and I.A.D. Williams. 1980. Growth Reductions on *Lolium multiflorum* Lam. and *Phleum pratense* L. as a Result of SO_2 and NO_2 pollution. Environ. Pollut. Ser. A. 21:131-139.

Auer, A.H., 1978. Correlation of Land Use and Cover with Meteorological Anomalies. J . Applied Meteorology, Vol. 17.

Carlson, R.W. 1979. Reduction in the Photosynthetic Rate of *Acer quercus* and *Fraxinus* Species Caused by Sulphur Dioxide and Ozone. Environ. Pollut. 18:159-170.

Florida Department of Environmental Protection. 1995. Florida Air Toxics Working List (Version 4.0).

Hart, R., P.G. Webb, R.H. Biggs, and K.M. Portier. 1988. The Use of Lichen Fumigation Studies to Evaluate the Effects of New Emission Sources on Class I Areas. J. Air Poll. Cont. Assoc. 38:144-147.

Heck, W.W. and D.T. Tingey. 1979. Nitrogen Dioxide: Time-Concentration Model to Predict Acute Foliar Injury. EPA-600/3-79-057, U.S. Environmental Protection Agency, Corvallis, OR.

Holzworth, G.C., 1972. Mixing Heights, Wind Speeds and Potential for Urban Air Pollution Throughout the Contiguous United States. Pub. No. AP-101. U.S. Environmental Protection Agency.

Huber, A.H. and W.H. Snyder, 1976. Building Wake Effects on Short Stack Effluents. Preprint Volume for the Third Symposium on Atmospheric Diffusion and Air Quality, American Meteorological Society , Boston, Massachusetts.

Malhotra, S.S. and A.A. Kahn. 1978. Effect of Sulfur Dioxide Fumigation on Lipid Biosynthesis in Pine Needles. Phytochemistry 17:241-244.

Mandoli, B.L. and P.S. Dubey. 1988. The Industrial Emission and Plant Response at Pithampur (M.P.). Int. J. Ecol. Environ. Sci. 14:75-79.

Matsumaru, T., T. Yoneyama, T. Totsuka, and K. Shiratori. 1979. Absorption of Atmospheric NO_2 by Plants and Soils. Soil Sci. Plant Nutr. 25:255-265.

McLaughlin, S.B. and N.T. Lee. 1974. Botanical Studies in the Vicinity of the Widows Creek Steam Plant. Review of Air Pollution Effects Studies, 1952-1972, and Results of 1973 Surveys. Internal Report I-EB-74-1, TVA.

Naik, R.M., A.R. Dhage, S.V. Munjal, P. Singh, B.B. Desai, S.L. Mehta, and M.S. Naik. 1992. Differential Carbon Monoxide Sensitivity of Cytochrome c Oxidase in the Leaves of C3 and C4 Plants. Plant Physiology 98:984-987.

Newman, J.R. 1981. Effects of Air Pollution on Animals at Concentrations at or Below Ambient Air Standards. Performed for Denver Air Quality Office, National Park Service, U.S. Department of the Interior. Denver, Colorado.

Newman, J.R. and R.K. Schreiber. 1988. Air Pollution and Wildlife Toxicology. Environmental Toxicology and Chemistry. 7:381-390.

Pollok, M., U. Hever, and M.S. Naik. 1989. Inhibition of stomatal opening in sunflower leaves by carbon monoxide and reversal of inhibition by light. Planta 178:223-230.

U.S. Department of Agriculture, Soil Conservation Service. 1981. Soil Survey of Pasco County, Florida.

U.S. Environmental Protection Agency. 1978. Guidelines for Determining Best Available Control Technology (BACT). Office of Air Quality Planning and Standards.

U. S .Environmental Protection Agency. 1980. Prevention of Significant Deterioration Workshop Manual.

U.S. Environmental Protection Agency (EPA). 1982. Air Quality Criteria for Particulate Matter and Sulfur Oxides. Vol. 3.

U.S. Environmental Protection Agency. 1987. Ambient Monitoring Guidelines for Prevention of Significant Deterioration. EPA Report No. EPA 450/4-87-007.

U.S. Environmental Protection Agency. 1990. "Top-Down" Best Available Control Technology Guidance Document (Draft). Research Triangle Park, North Carolina.

U.S. Environmental Protection Agency. 1995. 1995 Guideline on Air Quality Models. Revised. Research Triangle Park, North Carolina.

U.S. Environmental Protection Agency. 1997. User's Guide for the Industrial Source Complex (ISC3) Dispersion Models. Through Addendum A. EPA-454/4-92-008. September.

U.S. Environmental Protection Agency. 1999. Industrial Source Complex (ISC3) Dispersion Model (Version 00101). Updated from Technical Transfer Network.

Woltz, S.S. and T.K. Howe. 1981. Effects of Coal Burning Emissions on Florida Agriculture. In: The Impact of Increased Coal Use in Florida. Interdisciplinary Center for Aeronomy and (other) Atmospheric Sciences. University of Florida, Gainesville, Florida.

Zahn, R. 1975. Gassing Experiments with NO_2 in Small Greenhouses. Staub Reinhalt. Luft 35:194-196.

TABLE 2-1

ULTIMATE AND PROXIMATE ANALYSIS OF REPRESENTATIVE FUELS AND DESIGN FUEL BLEND FOR SEMINOLE ELECTRIC COOPERATIVE, SEMINOLE GENERATING STATION UNIT 3

	Units	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	
		Illinois-Western Kentucky Bituminous			Central Appalachian Bituminous			Petroleum Coke			Design Blend[a]
Ultimate Analysis											
Carbon	%	59.0	61.0	65.0	60.0	68.0	75.0	78.0	80.0	85.0	64.70
Sulfur*	%	2.0	2.8	3.8	0.1	1.0	2.0	3.5	5.5	6.8	4.70
Oxygen	%	6.5	7.0	8.0	5.0	6.0	6.5	0.1	0.8	2.0	4.58
Hydrogen	%	3.8	4.0	4.5	3.8	4.5	5.0	2.5	2.8	3.5	3.41
Nitrogen	%	0.8	1.2	1.4	0.8	1.2	1.8	1.0	1.3	1.8	0.86
Ash	%	5.0	8.5	12.0	5.0	8.5	12.0	0.1	0.3	0.5	8.55
Moisture	%	7.0	10.0	14.0	2.0	6.0	10.0	5.0	7.0	12.0	13.40
Proximate Analysis											
Moisture	%	7.0	10.0	14.0	2.0	6.0	10.0	5.0	7.0	12.0	13.40
Volatile matter	%	29.0	33.0	38.0	29.0	32.0	40.0	9.0	10.0	12.0	23.00
Fixed Carbon	%	38.0	43.0	48.0	38.0	46.0	50.0	78.0	80.0	85.0	50.00
Ash	%	5.0	8.5	12.0	5.0	8.5	12.0	0.1	0.3	0.5	8.55
Gross (Higher) Heating Value	Btu/lb	11,300	11,700	12,800	12,000	12,400	13,000	12,900	14,000	14,500	11,780
		Southern Illinois-Indiana Bituminous			Northern Appalachian Bituminous			Petroleum Coke			Design Blend[a]
Ultimate Analysis											
Carbon	%	59.0	61.0	65.0	60.0	71.0	75.0	78.0	80.0	85.0	64.70
Sulfer*	%	2.0	2.8	3.8	2.0	2.8	3.8	3.5	5.5	6.8	4.70
Oxygen	%	6.5	7.0	8.0	4.0	5.0	6.0	0.1	0.8	2.0	4.58
Hydrogen	%	3.8	4.0	4.5	3.8	4.5	5.0	2.5	2.8	3.5	3.41
Nitrogen	%	0.8	1.2	1.4	0.8	1.2	1.4	1.0	1.3	1.8	0.86
Ash	%	5.0	10.0	12.0	5.0	8.5	12.0	0.1	0.3	0.5	8.55
Moisture	%	7.0	12.0	14.0	2.0	6.0	10.0	5.0	7.0	12.0	13.40
Proximate Analysis											
Moisture	%	7.0	12.0	14.0	2.0	6.0	10.0	5.0	7.0	12.0	13.40
Volatile matter	%	29.0	33.0	38.0	29.0	36.0	40.0	9.0	10.0	12.0	23.00
Fixed Carbon	%	38.0	43.0	48.0	38.0	46.0	50.0	78.0	80.0	85.0	50.00
Ash	%	5.0	8.5	12.0	5.0	8.5	12.0	0.1	0.3	0.5	8.55
Gross (Higher) Heating Value	Btu/lb	10,500	11,000	12,000	12,000	13,000		12,900	14,000	14,500	11,220

[a] Design Blend is 70% Coal and 30% Petroleum Coke

Note: Data for the the Ultimate and Proximate Analysis is based on the range and average of each fuel. These data do not total 100%, since they represent a statistic of the fuel data.

* Representative maximum 70/30 Blend = 4.7% S, based on 3.8% S for coal and 6.8% S for pet coke. Individual shipments of coal can exceed 3.8% and pet coke is limited to 7%.

Note: Petroleum Coke will be co-fired with coal at a maximum amount of 30 percent on a weight basis.
Blends of coals shown are approximately based on equal weight.

TABLE 2-2
AIR POLLUTANT EMISSIONS FOR CRITERIA POLLUTANTS FROM SECI SGS UNIT 3

Parameter	Units	Data for Each Nominal 750 MW net Unit [a]		
		100% Load	75% Load	50% Load
Performance				
Gross Power Output	kW	820,000	615,000	410,000
Net Heat Rate	Btu/kWhr	9,260	9,570	10,250
Heat Input (HHV)	MMBtu/hr	7,500	5,250	3,000
Capacity Factor		100%	75%	50%
Stack Data				
Height	feet	675	675	675
Diameter	feet	26.00	26.00	26.00
Temperature	°F	126	126	126
Velocity	ft/sec	61.80	46340.00	30.90
Flow	acfm	1,970,000	1,477,000	985,000
Emissions				
SO_2 *	lb/MMBtu	0.165	0.165	0.165
	lb/hr	1,238	866	495
	lb/MW-hr	1.51	1.41	1.21
	tons/year	5,420	2,846	1,084
PM/PM_{10}	lb/MMBtu	0.015	0.015	0.015
	lb/hr	113	79	45
	lb/MW-hr	0.14	0.13	0.11
	tons/year	493	259	99
NO_x	lb/MMBtu	0.07	0.07	0.07
	lb/hr	525	368	210
	lb/MW-hr	0.64	0.60	0.51
	tons/year	2,300	1,207	460
CO	lb/MMBtu	0.15	0.15	0.15
	lb/hr	1,125	788	450
	lb/MW-hr	1.37	1.28	1.10
	tons/year	4,928	2,587	986
VOC	lb/MMBtu	0.004	0.004	0.004
	lb/hr	30.00	21.00	12.00
	lb/MW-hr	0.037	0.034	0.029
	tons/year	131.4	69.0	26.3
Sulfuric Acid Mist	lb/MMBtu	0.005	0.005	0.005
	lb/hr	37.50	26.25	15.00
	lb/MW-hr	0.046	0.043	0.037
	tons/year	164	86	33

[a] Based on Eastern Bituminous (IL-WKY) Coal and Petroleum Coke Blend. See Table 2-1.
* A minimum of 95% control must be achieved per the revised NSPS, Subpart Da

Sources: Burns & McDonnell, 2005; Golder, 2005.

TABLE 2-3
TRACE METAL HAP EMISSIONS ESTIMATES FOR SECI SGS UNIT 3

	Trace Metal in Coal											
	Antimony	Arsenic	Beryllium	Cadmium	Chromium	Cobalt	Lead	Manganese	Mercury	Nickel	Selenium	Vanadium
Emissions-EPA Factors (EF = a x (C/A x PM) [b]												
Multiplier - a	0.92	3.1	1.2	3.3	3.7	1.7	3.4	3.8		4.4		3.8
Exponent - b	0.63	0.85	1.1	0.5	0.58	0.69	0.8	0.6		0.48		0.6
Concentration (C) (ppm)	1.64	29.72	3.330	0.72	19.21	8.39	22.890	44.97		172.057	4.08	520.736
Actual PM Concentration (PM) (lb/mmBtu)	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150		0.0150		0.0150
Ash Concentration (A) (fraction)	0.1273	0.1273	0.1273	0.1273	0.1273	0.1273	0.1273	0.1273		0.1273		0.1273
Emission Factor (lb/10^12 Btu)	0.327	8.996	0.429	0.961	5.943	1.687	7.520	10.335	0.707	18.654	17.317	44.927
Heat Input (mmBtu/hr)	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500
Maximum Fuel Input (lb/hr)	636,672	636,672	636,672	636,672	636,672	636,672	636,672	636,672	636,672	636,672	636,672	636,672
Emissions (lb/hr)	0.002	0.067	0.003	0.007	0.045	0.013	0.056	0.078	0.005	0.140	0.130	0.337
Uncontrolled (lb/hr)	1.044	18.922	2.120	0.458	12.230	5.342	14.573	28.631		109.544	2.598	331.538
Removal	99.77%	99.64%	99.85%	98.43%	99.64%	99.76%	99.61%	99.73%		99.87%	95.00%	99.90%
Emissions (tons/yr)	0.011	0.296	0.014	0.032	0.195	0.055	0.247	0.339	0.023	0.613	0.569	1.476

Sources: EPA,1998, AP-42, Table 1.1-16 (all metals except mercury, selenium and vanadium), Trace Metal Concentration based on upper 95% Confidence Interval from USGS COALQUAL Database Trace Elements for the Central Appalachian Region
http://energy.er.usgs.gov/coalqual.htm
Controlled Mercury emissions based on 7.05E-06 lb/MW-hr
Controlled Selenium emissions based on 95% control from FGD system
EPA Emission Factor Rating: A-Excellent
Souce: EIR NAPP EIR EIR NAPP EIR EIR EIR
Legend for source: EIR = Eastern Interior Region (Illinois, Indiana, Western Kentucky), CAPP = Central Appalachian, NAPP = Northern Appalachian

TABLE 2-4
HALOGEN HAP EMISSIONS ESTIMATES FOR SECI SGS UNIT 3

	HCL	HF
Halogen Emission Calculation		
Concentration (ppm)	1040.5	89.9
Maximum Fuel Input (lb/hr)	636,672	636,672
Uncontrolled Emissions (lb/hr)	662	57
Removal	97%	97%
Emissions (lb/hr)	19.87	1.72
Heat Input (MMBtu/hr)	7,500	7,500
Emissions (lb/MMBtu)	0.0026	0.00023
Net Power Output (MW)	750.00	750.00
Emissions (lb/MW-hr)	0.0265	0.0023
Emissions (tons/year)	87.0	7.5

Sources: CL and F Concentrations based on upper 95% Confidence Interval from USES COEQUAL Database Trace Elements for the Central Appalachian Region http://energy.er.usgs.gov/coalqual.htm.

TABLE 2-5
PCDD/PCDF AND RADIONUCLIDES HAP EMISSIONS ESTIMATES FOR SECI SGS UNIT 3

Organic Compound	Emission Factor	Emisson Factor Units	Rating	Emissions- Hourly Amount	Emissions- Hourly Units	Emissions- Annual Amount	Emissions- Annual Units
Total PCDD/PCDF	1.8E-09	lb/ton	D	5.6E-07	lb/hr	2.45E-06	tons/year
Radionuclides	52.8	picoCuri/gram PM	NA	2.69E+06	piC/hr	2.36E+10	piC/yr
Data used in Calculation:							
Maximum Fuel Input (lb/hr)	636,672						
Maximum Fuel Input (ton/hr)	318.336163						
Heat Input (MMBtu/hr)	7,500						
PM Emissons (lb/MMBtu)	0.015						
PM Emissons (lb/hr)	112.5						
PM Emissons (grams.hr)	51,030						

Note: ESP = Electrostatic precipitator.
FF = Fabric Filter.
PCDD = Polychlorinated Dibenzo-P-Dioxins and PCDF=Polychlorinated Dibenzofurans.
pico = 10-12.

Sources: EPA, 1998, Table 1.1-12 for PCDD and PCDF (with ESP or FF); EPRI, 1994 for Radionuclides

TABLE 2-6

ORGANIC HAP EMISSIONS ESTIMATES FOR SECI SGS UNIT 3

Organic Compound	Emission Factor (lb/ton)	Rating	Emissions (lb/hr)	Emissions (TPY)
Acetaldehyde	5.7E-04	C	1.8E-01	0.79
Acetophenone	1.5E-05	D	4.8E-03	0.02
Acrolein	2.9E-04	D	9.2E-02	0.40
Benzene	1.3E-03	A	4.1E-01	1.81
Benzyl chloride	7.0E-04	D	2.2E-01	0.98
Biphenyl	1.7E-06	D	5.4E-04	0.00
Bis(2-ethylhexyl)phthalate (DEHP)	7.3E-05	D	2.3E-02	0.10
Bromoform	3.9E-05	E	1.2E-02	0.05
Carbon disulfide	1.3E-04	D	4.1E-02	0.18
2-Chloroacetophenone	7.0E-06	E	2.2E-03	0.01
Chlorobenzene	2.2E-05	D	7.0E-03	0.03
Chloroform	5.9E-05	D	1.9E-02	0.08
Cumene	5.3E-06	E	1.7E-03	0.01
Cyanide	2.5E-03	D	8.0E-01	3.49
2,4-Dintrotoluene	2.8E-07	D	8.9E-05	0.00
Dimethly sulfate	4.8E-05	E	1.5E-02	0.07
Ethyl benzene	9.4E-05	D	3.0E-02	0.13
Ethyl chloride	4.2E-05	D	1.3E-02	0.06
Ethylene dichloride	4.0E-05	E	1.3E-02	0.06
Ethylene dibromide	1.2E-06	E	3.8E-04	0.00
Formaldehyde	2.4E-04	A	7.6E-02	0.33
Hexane	6.7E-05	D	2.1E-02	0.09
Isophorone	5.8E-04	D	1.8E-01	0.81
Methyl bromide	1.6E-04	D	5.1E-02	0.22
Methyl chloride	5.3E-04	D	1.7E-01	0.74
Methyl ethyl ketone	3.9E-04	D	1.2E-01	0.54
Methyl hydrazine	1.7E-04	E	5.4E-02	0.24
* Maximums are Coal= 3.5% S, Pe	2.0E-05	E	6.4E-03	0.03
Methyl tert butyl ether	3.5E-05	E	1.1E-02	0.05
Methylene chloride	2.9E-04	D	9.2E-02	0.40
Napthalene	1.3E-05	C	4.1E-03	0.02
Phenol	1.6E-05	D	5.1E-03	0.02
Propionaldehyde	3.8E-04	D	1.2E-01	0.53
Tetrachloroethylene	4.3E-05	D	1.4E-02	0.06
Toluene	2.4E-04	A	7.6E-02	0.33
1,1,1-Trichloroethane	2.0E-05	E	6.4E-03	0.03
Styrene	2.5E-05	D	8.0E-03	0.03
Xylenes	3.7E-05	C	1.2E-02	0.05
Vinyl acetate	7.6E-06	E	2.4E-03	0.01
Total HAP Emissions	NA	NA	2.9	12.83
Maximum Fuel Input (lb/hr)	636,672			
Maximum Fuel Input (ton/hr)	318.34			
Heat Input (MMBtu/hr)	7,500			

EPA Emission Factor Ratings: A-Excellent; B-Above Average; C-Average
D-Below Average; E-Poor.

* Organic HAP emissions will be controlled and minimized by boiler design features and combustion air feed rates.

Source: EPA, 1998; Tables 1.1-13 and 1.1-14.

TABLE 2-7

PHYSICAL, PERFORMANCE, AND EMISSIONS DATA FOR THE MECHANICAL DRAFT COOLING TOWER

Parameter	One Tower
Physical Data	
Number of Cells	26
Deck Dimensions, ft	
Length	1404
Width	54
Height	37
Stack Dimensions	
Height, ft	47
Stack Top Effective Inner Diameter, per cell, ft	34.0
Effective Diameter, all cells, ft	173.2
Performance Data	
Discharge Velocity, ft/min	1,391
Circulating Water Flow Rate (CWFR), gal/min	360,352
Design hot water temperature, °F	106.3
Design cold water temperature, °F	87.9
Heat Rejected, million Btu/hr	
Design Air Flow Rate per cell, acfm	1,259,541
Liquid/ Gas (Air Flow) (L/G) Ratio	1.240
Hours of operation	8,760
Emission Data	
Drift Rate[a] (DR), percent	0.0005
Total Dissolved Solids (TDS) Concentration [b], maximum ppm	2,400
Solution Drift [c] (SD), lb/hr	902
PM Drift [d], lb/hr	2.16
PM Drift [d], tons/year	9.5
PM_{10} Drift[e]	
PM_{10} Emissions, lb/hr	1.25
tons/year	5.5

[a] Drift rate is the percent of circulating water.

[b] A TDS of 5,000 results in maximum PM emissions.

[c] Includes water and based on circulating water flow rate and drift rate (CWFR x DR x 8.34 lb/gal x 60 min/hr).

[d] PM calculated based on total dissolved solids and solution drift (TDS x SD).

[e] PM_{10} based on Cooling Tower PM emissions study see Appendix A.

Sources: Burns & McDonnell, 2005; Golder, 2005.

TABLE 2-8
SUMMARY OF PM EMISSIONS FROM THE MATERIAL HANDLING OPERATIONS
SEMINOLE ELECTRIC COOPERATIVE, INC., SEMINOLE GENERATING STATION UNIT 3

Operation	Emission Rate (lb/hr)		Emission Rate (TPY)	
	PM 24-hour Rate	PM10 24-hour Rate	PM Annual Rate	PM10 Annual Rate
Coal Handling System				
Emission Points	1.34	1.34	5.87	5.87
Transfer Points (Fugitive)	0.78	0.37	2.19	1.04
Fugitive Emissions	6.27	3.02	3.71	1.63
Limestone Handling System- Dust Collection and Ventilation				
Transfer Points (Fugitive)	0.05	0.03	0.42	0.20
Fugitive Emissions	0.28	0.10	0.35	0.10
Fly Ash Handling System				
Transfer Points (Fugitive)	0.006	0.003	0.016	0.008
Bottom Ash Handling System				
Transfer Points (Fugitive)	0.0011	0.0005	0.0040	0.0019
Fugitive Emissions	0.0007	0.0004	0.0003	0.0002
Gypsum Handling System				
Transfer Points (Fugitive)	0.03	0.02	0.12	0.06
TOTAL EMISSIONS	8.77	4.88	12.69	8.91
Number of Sources	28			

TABLE 2-9
PERFORMANCE AND EMISSION DATA FOR THE
ZLD SPRAY DRYERS ASSOCIATED WITH SGS UNIT 3

Parameter		ZLD Spray Dryers
Performance		
Number of Units		3
Fuel		Diesel
Fuel Heat content (Btu/lb) (HHV)		19,300
Fuel density (lb/gal)		7.0
Heat input (MMBtu/hr) (HHV)		50.0
Fuel usage (gallons/hr)		370.1
Maximum operation (hours)		8,760
Maximum fuel usage (gallons/yr)		3,242,076
Stack Parameters		
Height (feet)		105
Diameter (feet)		2.34
Temperature (degrees F)		140
Velocity (ft/sec)		45
Combustion Emissions		
SO_2 -	Basis (%S)	0.5%
	Conversion of S to SO_2	100
	Molecular weight SO_2/ S (64/32)	2
	Emission rate (lb/hr)	3.7
	(tpy)	16.2
NO_x -	Basis (lb/1,000 gal)	20.0
	Emission rate (lb/hr)	7.4
	(tpy)	32.4
CO -	Basis (lb/1,000 gal)	5.0
	Emission rate (lb/hr)	1.9
	(tpy)	8.1
VOC -	Basis (lb/1,000 gal)	0.34
	Emission rate (lb/hr)	0.1
	(tpy)	0.6
PM/PM_{10} -	Basis (0.9 lb/hr) Baghouse	
	Emission rate (lb/hr)	0.9
	(tpy)	3.9

Source: EPA AP-42 Compliation of Air Pollutant Emission Factors Tables 1.3-1 and 1.3-3.
Burns and McDonnell, 2005.

Table 2-10
PERFORMANCE AND EMISSION DATA FOR THE EMERGENCY DIESEL GENERATOR ASSOCIATED WITH SGS UNIT 3

Parameter		Emergency Generator
Performance		
Number of Units		1
Rating (kW)		1,825
Rating (hp)		2,600
Fuel		Diesel
Fuel Heat content (Btu/lb) (HHV)		19,300
Fuel density (lb/gal)		7.0
Heat input (MMBtu/hr) (HHV)		16.63
Fuel usage (gallons/hr)		123.1
Maximum operation (hours)		160
Maximum fuel usage (gallons/yr)		19,696
Emissions		
SO_2 -	Basis (%S)	0.50%
	Conversion of S to SO_2	100
	Molecular weight SO_2/ S (64/32)	2
	Emission rate (lb/hr)	1.231
	(tpy)	0.098
NO_x -	Basis (g/hp-hr)	8.74
	Emission rate (lb/hr)	50.1
	(tpy)	4.01
CO -	Basis (g/hp-hr)	0.32
	Emission rate (lb/hr)	1.8
	(tpy)	0.15
VOC -	Basis (g/hp-hr)	0.14
	Emission rate (lb/hr)	0.8
	(tpy)	0.06
PM/PM_{10} -	Basis (g/hp-hr)	0.078
	Emission rate (lb/hr)	0.4
	(tpy)	0.04

Source: Caterpillar, 2005.

TABLE 2-11
SUMMARY OF POTENTIAL AIR EMISSIONS FOR SECI SGS BASED ON 100-PERCENT CAPACITY FACTOR

Pollutant	750 MW (net) Unit	Cooling Tower	Material Handling	Emergency Diesel Generator	ZLD Spray Dryer	Total Emissions
SO_2	5,420			0.10	16.2	5,437
PM	493	9.5	12.7	0.04	3.9	519
PM_{10}	493	5.5	8.9	0.04	3.9	511
NO_x	2,300			4.01	32.4	2,336
CO	4,928			0.15	8.1	4,936
VOC (as methane)	131			0.06	0.6	132
Sulfuric Acid Mist	164					164
Fluoride	7.522					7.522
Lead	0.247					0.247
Mercury	0.023					0.023

TABLE 3-1
NATIONAL AND STATE AAQS, ALLOWABLE PSD INCREMENTS, AND SIGNIFICANT IMPACT LEVELS

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

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

[a] Short-term maximum concentrations are not to be exceeded more than once per year.
[b] Maximum concentrations are not to be exceeded.
[c] On July 18, 1997, EPA promulgated revised AAQS for particulate matter and ozone. For particulate matter, $PM_{2.5}$ standards were introduced with a 24-hour standard of 65 ug/m^3 (3-year average of 98th percentile) and an annual standard of 15 ug/m^3 (3-year average at community monitors). These standards have not yet been adopted by FDEP.
[d] 0.08 ppm; achieved when 3-year average of 99th percentile is 0.08 ppm or less. The standard has not yet been adopted by FDEP.

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

TABLE 3-2

PSD SIGNIFICANT EMISSION RATES AND *DE MINIMIS* MONITORING CONCENTRATIONS

Pollutant	Regulated Under	Significant Emission Rate (TPY)	*De Minimis* Monitoring Concentration[a] ($\mu g/m^3$)
Sulfur Dioxide	NAAQS, NSPS	40	13, 24-hour
Particulate Matter [PM(TSP)]	NSPS	25	10, 24-hour
Particulate Matter (PM_{10})	NAAQS	15	10, 24-hour
Nitrogen Dioxide	NAAQS, NSPS	40	14, annual
Carbon Monoxide	NAAQS, NSPS	100	575, 8-hour
Volatile Organic Compounds (Ozone)	NAAQS, NSPS	40	100 TPY[b]
Lead	NAAQS	0.6	0.1, 3-month
Sulfuric Acid Mist	NSPS	7	NM
Total Fluorides	NSPS	3	0.25, 24-hour
Total Reduced Sulfur	NSPS	10	10, 1-hour
Reduced Sulfur Compounds	NSPS	10	10, 1-hour
Hydrogen Sulfide	NSPS	10	0.2, 1-hour
Mercury	NSPS	0.1	0.25, 24-hour

Note: Ambient monitoring requirements for any pollutant may be exempted if the impact of the increase in emissions is below *de minimis* monitoring concentrations.

NAAQS = National Ambient Air Quality Standards.
NM = No ambient measurement method established; therefore, no *de minimis* concentration has been established.
NSPS = New Source Performance Standards.
NESHAP = National Emission Standards for Hazardous Air Pollutants.
ug/m^3 = micrograms per cubic meter.

[a] Short-term concentrations are not to be exceeded.
[b] No *de minimis* concentration; an increase in VOC emissions of 100 TPY or more will require monitoring analysis for ozone.

Sources: 40 CFR 52.21; Rule 62-212.400.

TABLE 3-3
PSD NETTING ANALYSIS

Pollutant	Units 1 and 2 Baseline Actual Emissions (tpy)	Projected Actual Emissions from Units 1-2 Project (tpy)	Net Emissions Increase from Units 1-2 Project (tpy)	Unit 3 Project	Net Emissions Decrease from Units 1 and 2 with Unit 3 Project (tpy)	Net Emissions Increase with Unit 3 Project (tpy)	Significant Emission Rates (tpy)	PSD Review Required for Unit 3 Project?
SO_2	29,074	29,074	0.0	5,437	(5,437)	0	40	No
NOx	23,289	23,289	0.0	2,336	(2,336)	0	40	No
PM	822	846	24.4	519	NA	519	25	Yes
PM_{10}	822	836	14.4	511	NA	511	15	Yes
H_2SO_4	2,129	2,129	0.0	164	(164)	0	7	No
VOC	108	147	39.0	132	NA	132	40	Yes
CO	4,976	5,099	122.6	4,936	NA	4,936	100	Yes
Pb	NA	NA	NA	0.247	NA	0.247	1	No
HF	NA	NA	NA	7.5	NA	7.5	3	Yes
Hg	0.066	0.066	0	0.023	(0.023)	0.000	<0.1	No

* Units 1 and 2 baseline actual emissions are based on Tables B-4E through B-4S, supplied with Units 1 and 2 application.

Table 3-4. Proposed Emission Rates for SECI SGS Units 1 and 2.

Pollutant	Emission Unit	Proposed Emission Limits	Type of Emission Limit	Compliance Methods
CO *	Units 1 and 2 Boilers	0.15 lb/MMBtu	BACT	Initial: EPA Method 10
NO_x	Units 1 and 2 Boilers	0.33 lb/MMBtu 20,953 TPY	PSD Netting	40 CFR Part 75 CEMS 30-day weighted rolling average (Units 1 and 2)
SO_2	Units 1 and 2 Boilers	0.38 lb/MMBtu 23,637 TPY	PSD Netting	40 CFR Part 75 CEMS weighted 24-hour block average (Units 1 and 2)
SAM	Units 1 and 2 Boilers	0.03 lb/MMBtu 1,965 TPY	PSD Netting	Initial: Method 8A Controlled Condensate (weighted average Units 1 and 2)
Mercury	Units 1, 2 & 3 Boilers	119 lb/yr	Proposed	40 CFR Part 75 CEMS annual average

Legend: BACT = Best Available Control Technology; PSD = Prevention of Significant Deterioration; COMS - Continuous Opacity Monitoring System; CEMS = Continuous Emission Monitoring System

* Requested in the Units 1 and 2 upgrades application filed on 2/13/06.

TABLE 3-5

PREDICTED NET INCREASE IN IMPACTS DUE TO THE UNIT 3 PROJECT COMPARED TO PSD *DE MINIMIS* MONITORING CONCENTRATIONS

Pollutant	Concentration (μg/m^3) Predicted Increase in Impacts[a]	*De Minimis* Monitoring Concentration
Particulate Matter (PM_{10})	3.98	10, 24-hour
Carbon Monoxide	18.8	575, 8-hour
VOCs	132 TPY	100 TPY

[a] See Section 6.0 for air dispersion modeling results.

TABLE 4-1
PROPOSED EMISSION RATES FOR SGS UNIT 3 PROJECT

Pollutant	Emission Unit	Proposed Emission Limits	Type of Emission Limit	Compliance Methods
PM/PM_{10}	Unit 3 Boiler	0.015 lb/MMBtu	BACT	Initial/Annual: EPA Method 5B
		20% Opacity	BACT	40 CFR Part 75 COMS
	Cooling Tower	0.0005% drift of circulating water rate	BACT	Manufacturer certification of design drift rate
	Material Handling	0.01 grain/cubic foot for fabric filters	BACT	Manufacturer certification of filter design
		Fugitive-best management practices	BACT	Watering when required
	ZLD	0.9 lb/hr with fabric filter	BACT	10% or less VE using EPA Method 9
	Emergency Generator	EPA Tier II Emission Limits	BACT	Manufacturer certification
CO	Unit 3 Boiler	0.15 lb/MMBtu	BACT	Initial/Annual: EPA Method 10
	Emergency Generator	EPA Tier II Emission Limits	BACT	Manufacturer certification
VOC	Unit 3 Boiler	0.004 lb/MMBtu	BACT	Initial Only: EPA Methods 18 or 25a (baseload)
	Emergency Generator	EPA Tier II Emission Limits	BACT	Manufacturer certification
Fluorides	Unit 3 Boiler	0.00023 lb/MMBtu	BACT	Initial: EPA Methods 13A or 13B; Continuous: Meeting SO_2 emission limit
NO_x	Unit 3 Boiler	0.07 lb/MMBtu	PSD Netting	40 CFR Part 75 CEMS 30-day rolling average
SO_2	Unit 3 Boiler	0.165 lb/MMBtu	PSD Netting	40 CFR Part 75 CEMS 24-hour block average
		> 95 percent control	NSPS	
SAM	Unit 3 Boiler	0.005 lb/MMBtu	PSD Netting	Initial/Annual: Method 8A Controlled Condensate
Mercury	Unit 3 Boiler	7.05×10^{-6} lb/MW-hr	Proposed	40 CFR Part 75 CEMS, annual average
	Units 1, 2 and 3	119 lb/yr	Proposed	40 CFR Part 75 CEMS, annual average

Legend: BACT = Best Available Control Technology; PSD = Prevention of Significant Deterioration; COMS - Continuous Opacity Monitoring System; CEMS = Continuous Emission Monitoring System

TABLE 5-1

SUMMARY OF MAXIMUM AMBIENT OZONE CONCENTRATIONS MEASURED NEAR THE SGS

				Concentration (ppm)		
				1-Hour		8-Hour
County	AIRS No.	Location	Year	Highest	2nd Highest	4th Highest
Florida AAQS [a]				**NA**	**0.12**	**0.08**
Alachua	12-001-0025	2821 NW 143rd Street	2004	0.093	0.092	0.073
			2003	0.089	0.086	0.073
Alachua	12-001-3011	200 Savannah	2004	0.095	0.091	0.075
			2003	0.089	0.087	0.071
			2002	0.090	0.085	0.071

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

[a] On July 18, 1997, EPA promulgated revised AAQS for O_3. The O_3 standard was modified to be 0.08 ppm for the 8-hour average; achieved when the 3-year average of 99[th] percentile values is 0.08 ppm or less. Until recently, the courts had stayed these standards but they will now be implemented by the states in the next several years. FDEP has not yet adopted the revised standards.

Source: EPA; 2004, 2003, 2002 (Quick Look Report, Air Quality Subsystem).

TABLE 6-1
MAJOR FEATURES OF THE AERMOD MODEL, VERSION 04300

AERMOD Model Features
• Plume dispersion/growth rates are determined by the profile of vertical and horizontal turbulence, vary with height, and use a continuous growth function.
• In a convective atmosphere, uses three separate algorithms to describe plume behavior as it comes in contact with the mixed layer lid; in a stable atmosphere uses a mechanically mixed layer near the surface.
• Polar or Cartesian coordinate systems for receptor locations can be included directly or by an external file reference.
• Urban model dispersion is input as a function of city size and population density; sources can also be modeled individually as urban sources.
• Stable plume rise: uses Briggs equations with winds and temperature gradients at stack top up to half-way up to plume rise. Convective plume rise: plume superimposed on random convective velocities.
• Procedures suggested by Briggs (1974) for evaluating stack-tip downwash.
• Has capability of simulating point, volume, area, and multi-sized area sources.
• Accounts for the effects of vertical variations in wind and turbulence (Brower *et al.*, 1998).
• Uses measured and computed boundary layer parameters and similarity relationships to develop vertical profiles of wind, temperature, and turbulence (Brower *et al.*, 1998).
• Concentration estimates for 1-hour to annual average times.
• Creates vertical profiles of wind, temperature, and turbulence using all available measurement levels.
• Terrain features are depicted by use of a controlling hill elevation and a receptor point elevation.
• Modeling domain surface characteristics are determined by selected direction and month/season values of surface roughness length, Albedo, and Bowen ratio.
• Contains both a mechanical and convective mixed layer height, the latter based on the hourly accumulation of sensible heat flux.
• The method of Pasquill (1976) to account for buoyancy-induced dispersion.
• A default regulatory option to set various model options and parameters to EPA-recommended values.
• Contains procedures for calm-wind and missing data for the processing of short term averages.

Note: AERMOD = The American Meteorological Society and Environmental Protection Agency Regulatory Model.
Source: Paine *et al.*, 2004.

TABLE 6-2
MAJOR FEATURES OF THE CALPUFF MODEL, VERSION 5.711A

CALPUFF Model Features
• Source types: Point, line (including buoyancy effects), volume, area (buoyant, non-buoyant).
• Non-steady-state emissions and meteorological conditions (time-dependent source and emission data; gridded 3-dimensional wind and temperature fields; spatially-variable fields of mixing heights, friction velocity, precipitation, Monin-Obukhov length; vertically and horizontally-varying turbulence and dispersion rates; time-dependent source and emission data for point, area, and volume sources; temporal or wind-dependent scaling factors for emission rates).
• Efficient sampling function (integrated puff formulation; elongated puff (slug) formation).
• Dispersion coefficient options (Pasquill-Gifford (PG) values for rural areas; McElroy-Pooler values (MP) for urban areas; CTDM values for neutral/stable; direct measurements or estimated values).
• Vertical wind shear (puff splitting; differential advection and dispersion).
• Plume rise (buoyant and momentum rise; stack-tip effects; building downwash effects; partial plume penetration above mixing layer).
• Building downwash effects (Huber-Snyder method; Schulman-Scire method).
• Complex terrain effects (steering effects in CALMET wind field; puff height adjustments using ISC model method or plume path coefficient; enhanced vertical dispersion used in CTDMPLUS).
• Subgrid scale complex terrain (CTSG option) (CTDM flow module; dividing streamline as in CTDMPLUS).
• Dry deposition (gases and particles; options for diurnal cycle per pollutant, space and time variations with a resistance model, or none).
• Overwater and coastal interaction effects (overwater boundary layer parameters; abrupt change in meteorological conditions, plume dispersion at coastal boundary; fumigation; option to use Thermal Internal Boundary Layers (TIBL) into coastal grid cells).
• Chemical transformation options (Pseudo-first-order chemical mechanisms for SO_2, SO_4, HNO_3, and NO_3; Pseudo-first-order chemical mechanisms for SO_2, SO_4, NO, NO_2, HNO_3, and NO_3 (RIVAD/ARM3 method); user-specified diurnal cycles of transformation rates; no chemical conversions).
• Wet removal (scavenging coefficient approach; removal rate as a function of precipitation intensity and type).
• Graphical user interface.
• Interface utilities (scan ISCST3 and AUSPLUME meteorological data files for problems; translate ISCST3 and AUSPLUME input files to CALPUFF input files.

Note: CALPUFF = California Puff Model.
Source: EPA, 2004.

TABLE 6-3
SUMMARY OF SO_2 SOURCES INCLUDED IN THE PSD CLASS I AIR MODELING ANALYSES
AT THE OKEFENOKEE NWA

Facility	UTM Coordinates East (km)	UTM Coordinates North (km)	Emission Rate [a] (TPY)	PSD [b] Source (C/E)
Florida Power & Light (FPL)- Putnam Plant	443.3	3277.6	4,053.2	C
Florida Power & Light (FPL)- Palatka Plant	442.8	3277.6	-8,934.9	E
Georgia Pacific, Palatka Mill	433.9	3283.5	13,724.4	C
			13,537.3	E
Gerdau Ameristeel	405.7	3350.0	141.1	C
			49.6	E
JEA Brandy Branch	408.8	3354.5	429.8	C
Millenium Specialty Products	436.8	3360.7	2,782.3	C
			295.1	E
JEA - Northside Power Plant	447.0	3,365.2	4,847.7	C
			-44,356.2	E
JEA - St. Johns River Power Park	447.1	3,366.7	64,642.5	C
Anheiser Busch, Inc	440.6	3,366.8	74.4	C
Cedar Bay Cogeneration	441.6	3,365.5	3,357.0	C
Gilman Paper Co. St. Mary's, GA	448.2	3,401.3	7,276.4	C
			-12,931.4	E
Jefferson Smurfit Corp. (Jacksonville)	439.9	3,359.3	2,215.7	C
			-1,886.9	E
Jefferson Smurfit Corp. (Fernandina Beach)	456.2	3,394.2	15,087.7	C
			-12,656.5	E
Rayonier, Inc.	454.7	3,392.2	5,536.9	C
			-1,383.5	E
Stone Container Corp. (Seminole Kraft)	443.0	3,365.4	75.1	C
			-19,261.9	E
JEA - Kennedy Power Plant	440.0	3,359.2	-11,648.7	E
JEA- Southside Power Plant	437.7	3,353.9	-11,054.3	E
PCS	328.3	3,368.8	10,000.0	C
			-13,213.0	E
Suwannee American Cement	321.4	3,315.9	124.4	C
Florida Rock Thompson S. Baker Cement Plant	348.4	3,287.0	77.5	C

[a] Based on 24-hour average emission rate.
[b] Comsuming (C) sources are sources that were constructed or modified after the PSD baseline date.
Expanding (E) sources are sources that have shutdown or have been modified since the baseline date.

TABLE 6-4.
PROJECT BUILDING DIMENSIONS USED IN THE MODELING ANALYSIS

Stucture	Height ft	Height m	Length ft	Length m	Width ft	Width m	
Unit No. 3							
Boiler Structure	250	76.2	215	65.5	70	21.3	
Steam Turbine Building	110	33.5	289	88.1	154	47.0	
ESP	85	25.9	250	76.2	70	21.3	
Wet FGD	155	47.3	60	18.3	60	18.3	[a]
Wet ESP	105	32.0	100	30	55	16.8	
Fly Ash Silo	125	38.1	44	13.4	44	13.4	[a]
Cooling Tower (26 cells)	37	11.3	1404	225.6	54	16.5	
Wastewater Treatment (ZLD)	100	30.5	120	36.6	115	35.1	
Coal Crusher Building	100	30.5	50	15.2	50	15.2	
Coal Transfer Tower	65	19.8	30	9.2	30	9.2	
Limestone Ball Mill	62	18.9	60	18.3	49	15.0	
Existing							
Unit No. 1 Boiler Structure	270	82.3	216	65.9	177	54.1	
Unit No. 2 Boiler Structure	270	82.3	216	65.9	177	54.1	
Unit No. 1 & 2 Steam Turbine Bldg.	104	31.7	544	165.9	128	39.1	
Unit No. 1 FGD	111	33.9	263	80.3	74	22.5	
Unit No. 2 FGD	111	33.9	263	80.3	74	22.5	
EPF Silos	140	42.7	740	225.6	30	9.2	

Note: ESP= electrostatic precipitator
FGD= flue gas desulfurization
ZLD= zero liquid discharge

[a] Diameter

TABLE 6-5

MAXIMUM PM_{10} AND CO CONCENTRATIONS PREDICTED FOR SGS UNIT NO. 3 BY OPERATING LOAD

Pollutant	Emissions (lb/hr) for Operating Load			Averaging Time	Maximum Concentration (ug/m^3) for Operating Load			PSD Class II Significant Impact Levels (ug/m^3)
	100%	75%	50%		100%	75%	50%	
Modeled rate	7.937	7.937	7.937	Annual	0.008	0.009	0.011	NA
				24-Hour	0.062	0.070	0.082	NA
				8-Hour	0.132	0.149	0.179	NA
				3-Hour	0.177	0.205	0.246	NA
				1-Hour	0.275	0.301	0.339	NA
PM_{10}	112.5	78.8	45.0	Annual	0.11	0.09	0.06	1
				24-Hour	0.87	0.69	0.46	5
CO	1,125.0	787.5	450.0	8-Hour	18.8	14.7	10.2	500
				1-Hour	39	30	19	2,000

NA= not applicable

[a] Concentrations are based on highest concentrations predicted using AERMOD with five years of meteorological data from 1986 to 1990 of surface and upper air data from the National Weather Service stations at Jacksonville and Waycross, Georgia, respectively.

Pollutant concentrations were based on a modeled or generic concentration predicted using a modeled emission rate.
Specific pollutant concentrations were estimated by multiplying the modeled concentration by the ratio of the specific pollutant emission rate to the modeled emission rate.

TABLE 6-6
MAXIMUM PM_{10} AND CO CONCENTRATIONS PREDICTED FOR THE PROJECT

Averaging Time and Rank	Maximum Concentration [a] (µg/m³)	Receptor Location: UTM Coordinates (m) East	UTM Coordinates (m) North	Local Coordinates (m) [b] x	Local Coordinates (m) [b] y	Time Period (YYMMDDHH)	PSD Class II Significant Impact Levels (µg/m³)
PM10 IMPACTS							
Annual							
Highest	0.64	439,646	3,289,357	598	22	86123124	1
	0.56	439,657	3,289,309	609	-26	87123124	
	0.54	439,646	3,289,357	598	22	88123124	
	0.65	439,646	3,289,357	598	22	89123124	
	0.56	439,646	3,289,357	598	22	90123124	
24-Hour							
Highest	3.14	439,612	3,289,501	564	166	86042324	5
	2.73	439,669	3,289,261	621	-74	87120124	
	3.47	437,855	3,290,267	-1,193	932	88040324	
	3.98	439,657	3,289,309	609	-26	89052724	
	2.35	439,669	3,289,261	621	-74	90111224	
CO IMPACTS							
8-Hour							
Highest	18.84	437,791	3,290,132	-1,257	797	86070716	500
	17.82	440,462	3,288,575	1,414	-760	87050816	
	16.78	440,462	3,288,724	1,414	-611	88092516	
	18.46	440,462	3,289,223	1,414	-112	89080616	
	15.68	437,834	3,290,222	-1,214	887	90050816	
1-Hour							
Highest	39.18	440,500	3,287,600	1,452	-1,735	86012516	2,000
	34.81	436,800	3,285,200	-2,248	-4,135	87022710	
	29.15	439,500	3,290,200	452	865	88071712	
	29.24	441,800	3,287,950	2,752	-1,385	89070308	
	28.90	439,600	3,290,000	552	665	90091415	

Note: YYMMDDHH = Year, Month, Day, Hour Ending.

[a] Concentrations are based on highest concentrations predicted using AERMOD with five years of meteorological data from 1986 to 1990 of surface and upper air data from the National Weather Service stations at Jacksonville and Waycross, Georgia, respectively. Concentrations due to the SGS Unit No. 3 boiler, PM material handling operations, cooling tower, and ZLD system, where applicable.

[b] Relative to Boiler Unit No. 3's stack.

TABLE 6-7
SUMMARY OF MAXIMUM POLLUTANT CONCENTRATIONS PREDICTED FOR THE PROJECT COMPARED TO THE EPA CLASS II SIGNIFICANT IMPACT LEVELS AND INCREMENTS

Averaging Time and Rank	Maximum Concentration (μg/m^3)	PSD Class II Significant Impact Levels (μg/m^3)	PSD Class II Increment (μg/m^3)
PM10 IMPACTS			
Annual			
Highest	0.65	1	17
24-Hour			
Highest	3.98	5	30
CO IMPACTS			
8-Hour			
Highest	18.8	500	NA
1-Hour			
Highest	39.2	2,000	NA

TABLE 6-8
SUMMARY OF MAXIMUM PM10 CONCENTRATIONS PREDICTED FOR THE PROJECT COMPARED TO THE EPA CLASS I SIGNIFICANT IMPACT LEVELS AND INCREMENTS

PSD Class I Area	Averaging Period	Maximum Concentrations (μg/m³) [a] 1990	1992	1996	PSD Class I Significant Impact Levels (μg/m³)	PSD Class I Increment (μg/m³)
PM10 IMPACTS						
Okefenokee NWA	Annual	0.0055	0.0045	0.0049	0.2	4
	24-Hour	0.087	0.113	0.099	0.3	8
Wolf Island NWA	Annual	0.0036	0.0035	0.0029	0.2	4
	24-Hour	0.089	0.135	0.087	0.3	8
Chassahowitzka NWA	Annual	0.0036	0.0033	0.0037	0.2	4
	24-Hour	0.068	0.089	0.115	0.3	8

[a] Concentrations are highest predicted using CALPUFF model and CALMET wind fields for north central Florida, 1990, 1992, and 1996.

TABLE 6-9
MAXIMUM SO_2 IMPACTS PREDICTED FOR COMPARISON TO THE SO_2 PSD CLASS I INCREMENTS AT THE OKEFENOKEE NWA

Pollutant / Averaging Time	Maximum Concentration [a] (µg/m³)	Receptor Location UTM Coordinates (km) East	North	Time Period (YYMMDDHH)	PSD Class I Increment (µg/m³)
Okefenokee NWA					
Annual					
Highest	0.00 [b]	NA	NA	NA	2
	0.00	NA	NA	NA	
	0.00	NA	NA	NA	
24-Hour					
Highest, second-highest	3.11	390.317	3,401.812	90010724	5
	2.22	390.487	3,418.437	92112424	
	4.13	390.147	3,385.188	96010624	
3-Hour					
Highest, second-highest	24.1	390.355	3,405.506	90010712	25
	13.9	390.242	3,394.424	92101512	
	22.1	388.530	3,383.358	96011703	

Note: YYMMDDHH = Year, Month, Day, Hour Ending
UTM = Universal Transverse Mercator: Zone 16.

[a] Based on the CALPUFF model using 3 years of CALMET meteorological data for 1990, 1992, and 1996 for North Central Florida.

[b] A "0.00" impact means that the predicted concentration was zero or less. The CALPUFF model does not printout a negative concentration

TABLE 7-1
MAXIMUM POLLUTANT CONCENTRATIONS PREDICTED FOR THE PROJECT AT THE PSD CLASS I AREAS

Pollutant	Averaging Time	Maximum Concentrations ($\mu g/m^3$) [a] 1990	1992	1996	Significant Impact Level (µg/m3)
Okefenokee NWA					
PM_{10}	Annual	0.0055	0.0045	0.0049	0.20
	24-Hour	0.087	0.113	0.099	0.30
	8-Hour	0.187	0.205	0.179	NA
	3-Hour	0.338	0.244	0.238	NA
	1-Hour	0.438	0.308	0.398	NA
CO	Annual	0.047	0.043	0.040	NA
	24-Hour	0.671	0.933	0.712	NA
	8-Hour	1.515	1.470	1.164	NA
	3-Hour	2.522	0.867	1.711	NA
	1-Hour	3.017	2.262	2.890	NA
Wolf Island NWA					
PM_{10}	Annual	0.0036	0.0035	0.0029	0.20
	24-Hour	0.089	0.135	0.087	0.30
	8-Hour	0.146	0.155	0.161	NA
	3-Hour	0.187	0.192	0.201	NA
	1-Hour	0.219	0.246	0.261	NA
CO	Annual	0.033	0.037	0.027	NA
	24-Hour	0.702	0.936	0.619	NA
	8-Hour	1.097	1.076	1.043	NA
	3-Hour	1.688	1.309	1.518	NA
	1-Hour	2.022	1.571	1.722	NA
Chassahowitzka NWA					
PM_{10}	Annual	0.0036	0.0033	0.0037	0.20
	24-Hour	0.068	0.089	0.115	0.30
	8-Hour	0.138	0.140	0.244	NA
	3-Hour	0.191	0.208	0.392	NA
	1-Hour	0.251	0.252	0.421	NA
CO	Annual	0.030	0.028	0.030	NA
	24-Hour	0.501	0.626	0.789	NA
	8-Hour	0.880	1.112	1.666	NA
	3-Hour	1.499	1.429	2.668	NA
	1-Hour	2.010	1.676	2.866	NA

[a] Based on the CALPUFF model using 3 years of CALMET meteorological data for 1990, 1992, and 1996 for North Central Florida.

TABLE 7-2

EXAMPLES OF REPORTED EFFECTS OF AIR POLLUTANTS AT CONCENTRATIONS BELOW NATIONAL SECONDARY AMBIENT AIR QUALITY STANDARDS

Pollutant	Reported Effect	Concentration (mg/m^3)	Exposure
Sulfur Dioxide[a]	Respiratory stress in guinea pigs	427 to 854	1 hour
	Respiratory stress in rats	267	7 hours/day; 5 day/week for 10 weeks
	Decreased abundance in deer mice	13 to 157	continually for 5 months
Nitrogen Dioxide[b,c]	Respiratory stress in mice	1,917	3 hours
	Respiratory stress in guinea pigs	96 to 958	8 hours/day for 122 days
Particulates[a]	Respiratory stress, reduced respiratory disease defenses	120 PbO_3	continually for 2 months
	Decreased respiratory disease defenses in rats, same with hamsters	100 $NiCl_2$	2 hours

Sources: [a] Newman and Schreiber, 1988.
[b] Gardner and Graham, 1976.
[c] Trzeciak et al., 1977.

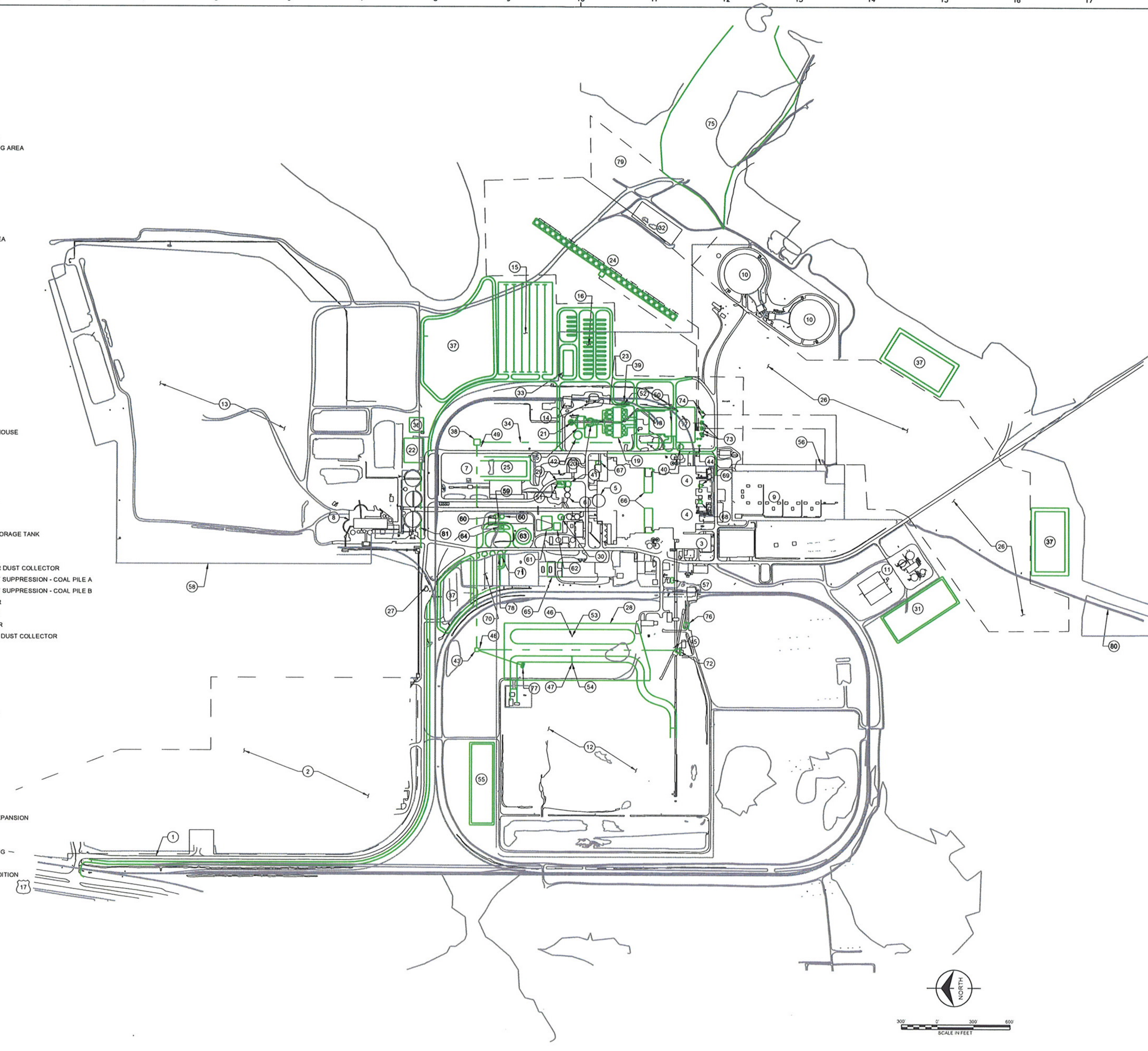
TABLE 7-3
MAXIMUM 24-HOUR AVERAGE VISIBILITY IMPAIRMENT PREDICTED FOR THE PROJECT AT THE PSD CLASS I AREAS

PSD Class I Area	Visibility Impairment (%) [a] (Number of Days Greater than 5% / 10% Criteria)			Total Number of Days > Visibility Impairment Criteria	
	1990	1992	1996	5%	10%
Method 2 [b]					
Okefenokee NWA	2.67 (0/0)	1.45 (0/0)	1.95 (0/0)	0	0
Wolf Island NWA	1.46 (0/0)	1.62 (0/0)	0.89 (0/0)	0	0
Chassahowitzka NWA	1.83 (0/0)	0.67 (0/0)	1.80 (0/0)	0	0
Method 6 [c]					
Okefenokee NWA	0.92 (0/0)	1.03 (0/0)	1.14 (0/0)	0	0
Wolf Island NWA	0.97 (0/0)	1.51 (0/0)	0.81 (0/0)	0	0
Chassahowitzka NWA	1.09 (0/0)	0.64 (0/0)	1.52 (0/0)	0	0

[a] Based on the CALPUFF model using 3 years of CALMET meteorological data for 1990, 1992, and 1996 for North Central Florida.

[b] Method 2 used (hourly relative humidity) with maximum relative humidity set to 98% based on FLM recommendation..

[c] Method 6 used (monthly average relative humidity) based on FLM recommendation.. This method will be used for future modeling procedures being developed to address the Best Available Retrofit Technology (BART) Regulations.



KEY NOTES:

1. PLANT ENTRANCE ROAD
2. LAFARGE PROPERTY
3. EXISTING SERVICE BLDG
4. EXISTING TURBINE BLDG
5. EXISTING STACK
6. EXISTING LIMESTONE PREPARATION
7. EXISTING LIMESTONE STORAGE PILE
8. EXISTING FGD EFFLUENT PROCESSING AREA
9. EXISTING SWITCHYARD
10. EXISTING COOLING TOWER
11. EXISTING WASTE TREATMENT AREA
12. EXISTING COAL YARD
13. EXISTING LANDFILL
14. EXISTING RAILCAR REPAIR
15. CONSTRUCTION PARKING
16. CONSTRUCTION OFFICE TRAILER AREA
17. UNIT 3 TURBINE BLDG.
18. UNIT 3 BOILER
19. UNIT 3 PRECIPITATOR
20. UNIT 3 WET FGD
21. UNIT 3 STACK
22. UNIT 3 EFFLUENT PROCESSING
23. UNIT 3 HOUSE SPUR
24. UNIT 3 COOLING TOWER
25. UNIT 3 LIMESTONE PILE EXPANSION
26. UNIT 3 CONSTRUCTION LAYDOWN
27. EXISTING GUARD HOUSE
28. UNIT 3 COAL PILE LINER LIMIT
29. UNIT 3 LIMESTONE PREPARATION
30. UNIT 3 FUEL OIL STORAGE TANK
31. WASTE WATER SURGE POND
32. EXISTING PERCOLATION POND
33. TEMPORARY CONSTRUCTION WAREHOUSE
34. COAL CONVEYOR
35. UNIT 3 WET ESP
36. ZERO LIQUID DISCHARGE SYSTEM
37. STORMWATER RUNOFF POND
38. UNIT 3 CRUSHER HOUSE
39. FLY ASH SILO
40. CONDENSATE STORAGE TANK
41. LIMESTONE SLURRY TANK
42. LIMESTONE SLURRY EMERGENCY STORAGE TANK
43. COAL TRANSFER TOWER
44. EMERGENCY DIESEL GENERATOR
45. EXISTING TRANSFER SAMPLE TOWER DUST COLLECTOR
46. STACKER RECLAIMER W/SPRAY DUST SUPPRESSION - COAL PILE A
47. STACKER RECLAIMER W/SPRAY DUST SUPPRESSION - COAL PILE B
48. TRANSFER TOWER DUST COLLECTOR
49. CRUSHER TOWER DUST COLLECTOR
50. UNIT FEED SYSTEM DUST COLLECTOR
51. LIMESTONE TRANSFER TO BALL MILL DUST COLLECTOR
52. FLY ASH SILO BIN VENT
53. COAL PILE A
54. COAL PILE B
55. COAL PILE RUNOFF POND
56. SWITCHYARD EXPANSION
57. SEWAGE TREATMENT PLANT
58. EXISTING PERMITTED LANDFILL LIMIT
59. UREA DISSOLVER TANK
60. UREA REACTION FEED TANK
61. CBO PLANT
62. CBO CONTROL ROOM
63. CBO STORAGE DOME
64. CBO LOADOUT SILO
65. WAREHOUSE EXPANSION
66. SCR
67. OXIDATION AIR BLOWER BUILDING EXPANSION
68. UNIT 1 AUXILIARY TRANSFORMER
69. UNIT 2 AUXILIARY TRANSFORMER
70. UNIT 1 AND 2 CONSTRUCTION PARKING
71. CAR RINSE
72. AS-RECEIVED TRANSFER TOWER ADDITION
73. UNIT 3 STEP-UP TRANSFORMER
74. UNIT 3 START-UP TRANSFORMER
75. EXISTING BORROW PIT AREA
76. AS-RECEIVED SAMPLING SYSTEM
77. UNIT 3 RECLAIM HOPPERS
78. OIL WATER SEPARATOR
79. BORROW PIT AREA EXPANSION
80. UNIT 3 PLANT MAKE-UP WATER LINE
81. GYPSUM CONVEYOR

Burns & McDonnell SINCE 1898

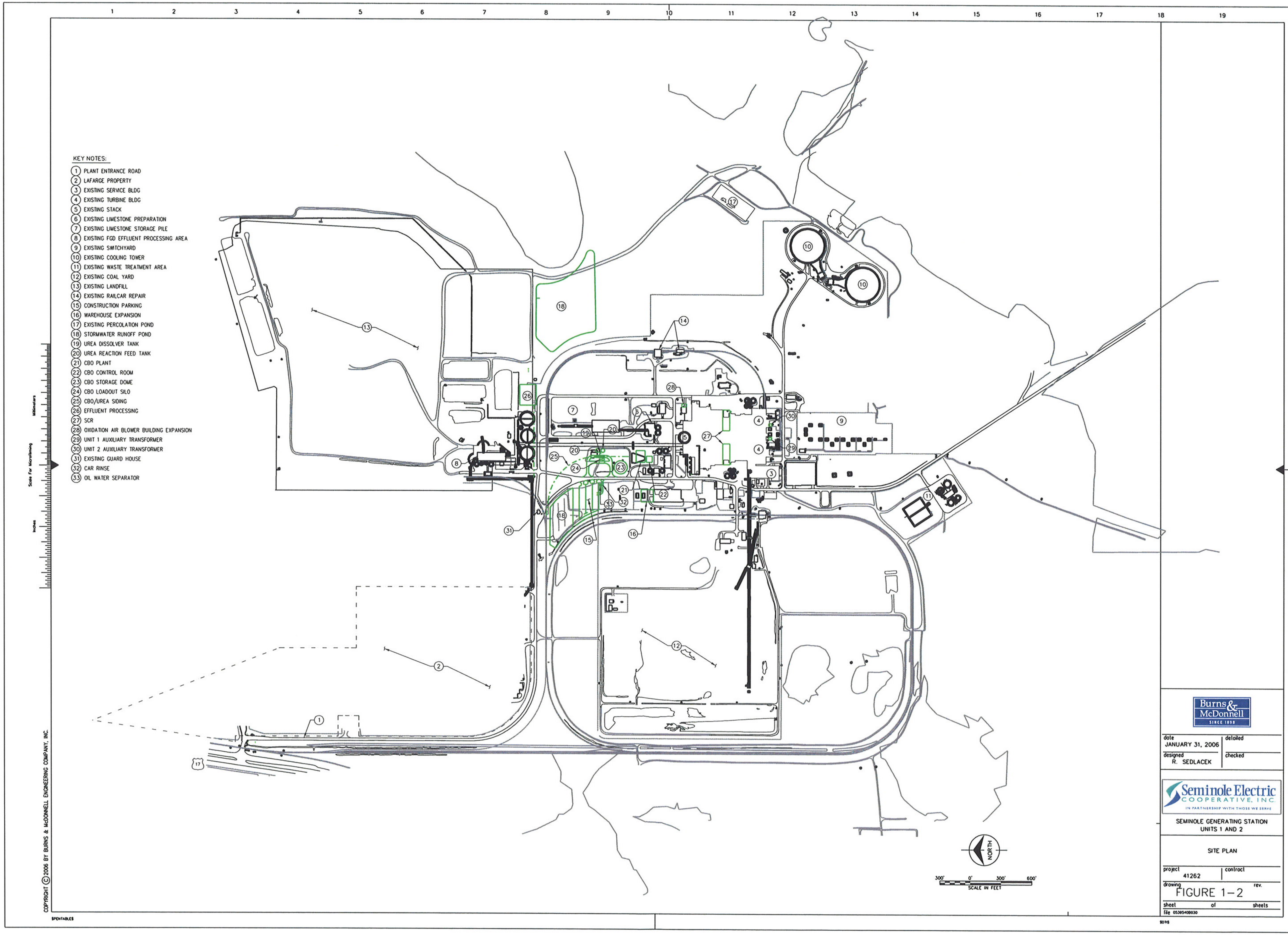
date AUGUST 29, 2005 | detailed
designed R. SEDLACEK | checked

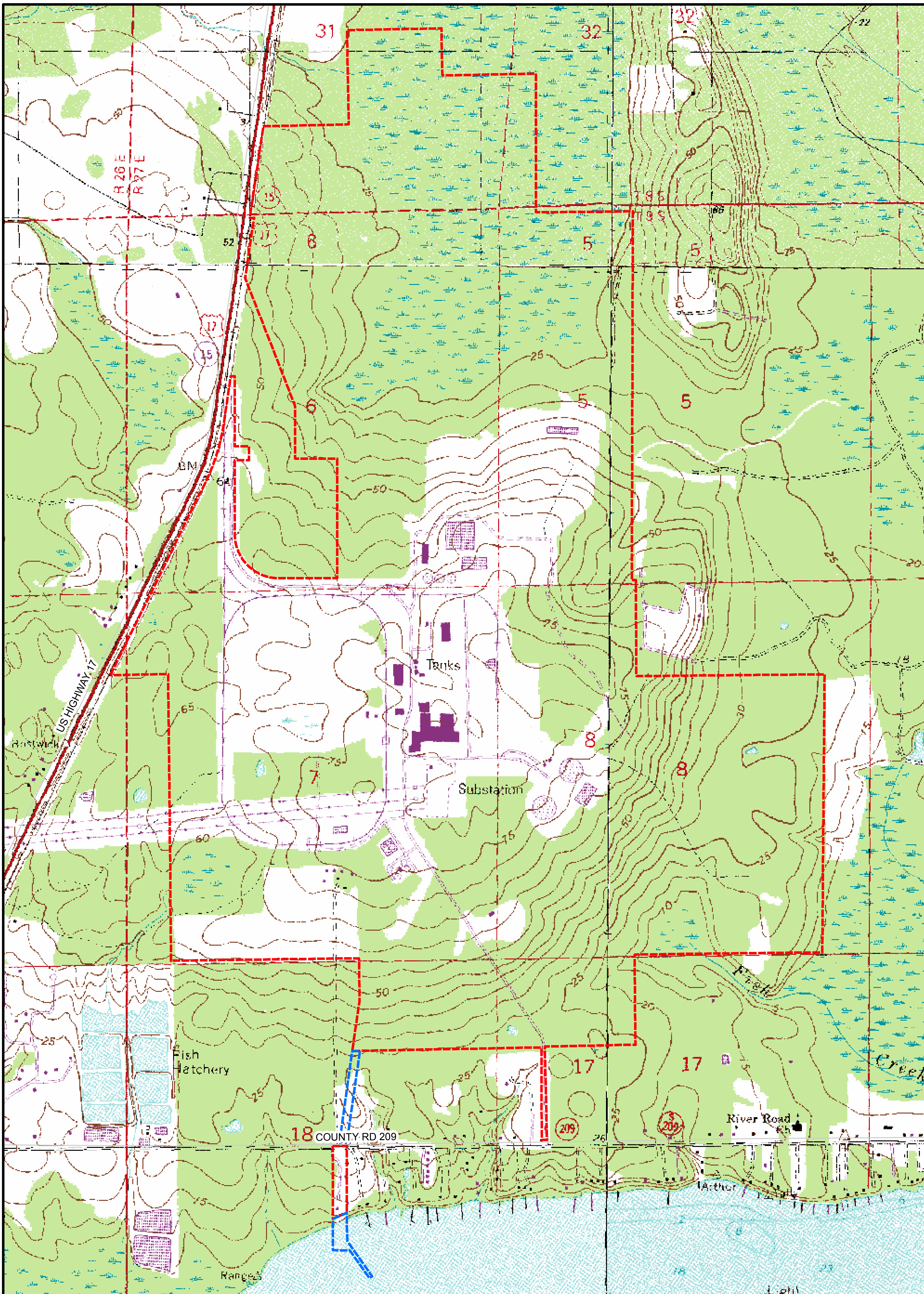
Seminole Electric COOPERATIVE, INC. IN PARTNERSHIP WITH THOSE WE SERVE

SEMINOLE GENERATING STATION
UNIT 3

SITE PLAN

project | contract
drawing FIGURE 1-1 rev.
sheet of sheets
file 05395408028


KEY NOTES:
1 PLANT ENTRANCE ROAD
2 LAFARGE PROPERTY
3 EXISTING SERVICE BLDG
4 EXISTING TURBINE BLDG
5 EXISTING STACK
6 EXISTING LIMESTONE PREPARATION
7 EXISTING LIMESTONE STORAGE PILE
8 EXISTING FGD EFFLUENT PROCESSING AREA
9 EXISTING SWITCHYARD
10 EXISTING COOLING TOWER
11 EXISTING WASTE TREATMENT AREA
12 EXISTING COAL YARD
13 EXISTING LANDFILL
14 EXISTING RAILCAR REPAIR
15 CONSTRUCTION PARKING
16 WAREHOUSE EXPANSION
17 EXISTING PERCOLATION POND
18 STORMWATER RUNOFF POND
19 UREA DISSOLVER TANK
20 UREA REACTION FEED TANK
21 CBO PLANT
22 CBO CONTROL ROOM
23 CBO STORAGE DOME
24 CBO LOADOUT SILO
25 CBO/UREA SIDING
26 EFFLUENT PROCESSING
27 SCR
28 OXIDATION AIR BLOWER BUILDING EXPANSION
29 UNIT 1 AUXILIARY TRANSFORMER
30 UNIT 2 AUXILIARY TRANSFORMER
31 EXISTING GUARD HOUSE
32 CAR RINSE
33 OIL WATER SEPARATOR
NORTH
300' 0' 300' 600'
SCALE IN FEET
COPYRIGHT © 2006 BY BURNS & McDONNELL ENGINEERING COMPANY, INC.
Burns & McDonnell
SINCE 1898
date JANUARY 31, 2006
detailed
designed R. SEDLACEK
checked
Seminole Electric
COOPERATIVE, INC.
IN PARTNERSHIP WITH THOSE WE SERVE
SEMINOLE GENERATING STATION
UNITS 1 AND 2
SITE PLAN
project 41262
contract
drawing FIGURE 1-2
rev.
sheet of sheets
file 05305400030



0 0.25 0.5 Miles

LEGEND

Easement

Property Boundary

REFERENCE

1.) Property parcel, Putnam County parcel data set and property legal description

2.) USGS Digital Raster Graphic (DRG) Florida Topographic Quadrangles (Bostwick, Hastings, Palatka, Riverdale), LABINS

N

PROJECT SEMINOLE ELECTRIC COOPERATIVE INC.
SGS UNIT 3
PUTNUM COUNTY, FL

TITLE

SITE LOCATION

Golder Associates
Tampa, Florida

PROJECT No. 053-9540			SCALE AS SHOWN	REV. 0
DESIGN	JWT	11/28/2005	**FIGURE 2-1**	
GIS	JWT	3/8/2006		
CHECK	MM	2/20/2006		
REVIEW	RAZ	2/20/2006		

N:\FILE\2005\053-9540 SECIA - GIS\MapDocuments\0539540A201.mxd

Figure 7-1. Population and Household Unit Trends in Putnam County

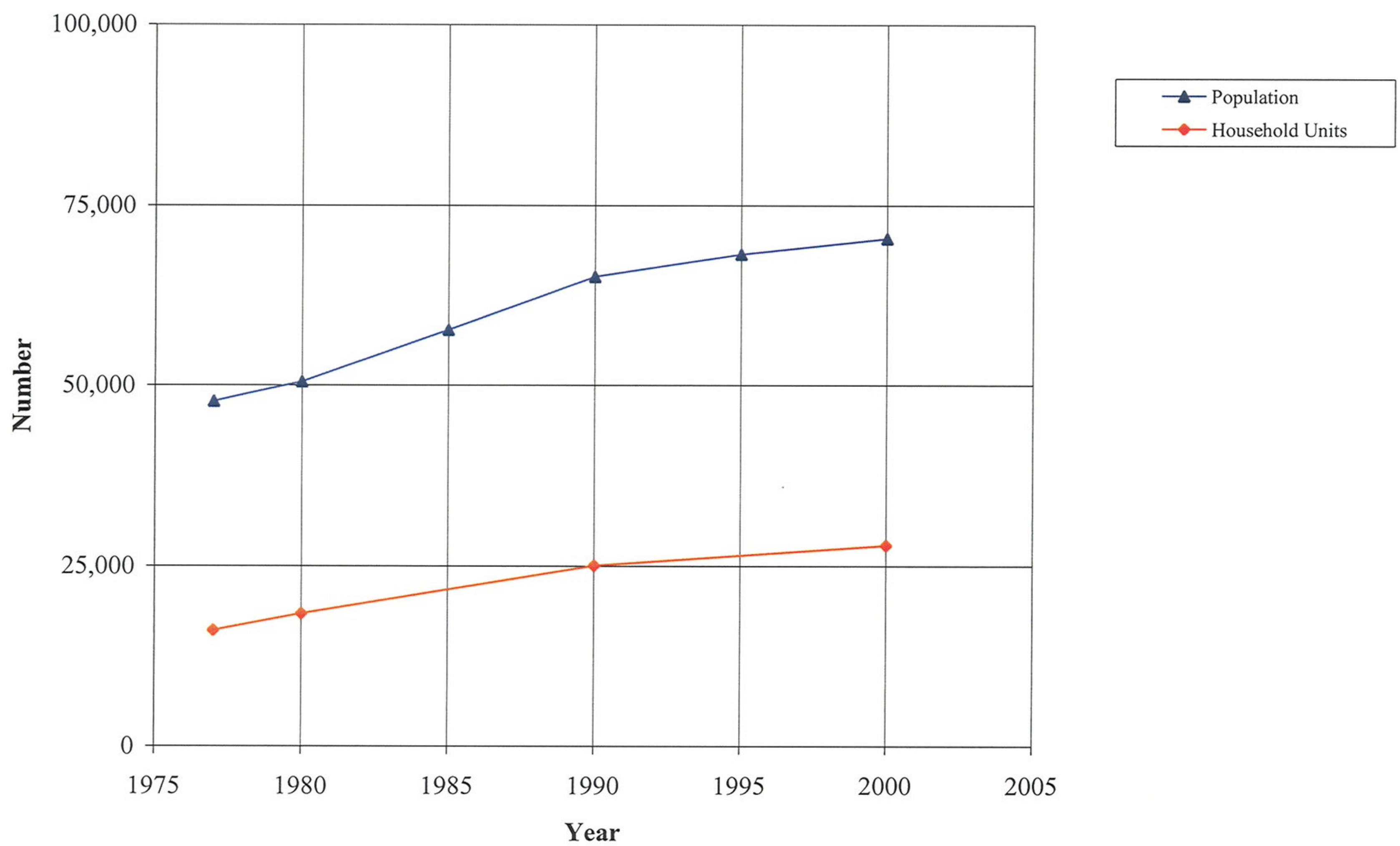


Figure 7-2. Retail and Wholesale Trade Trends in Putnam County

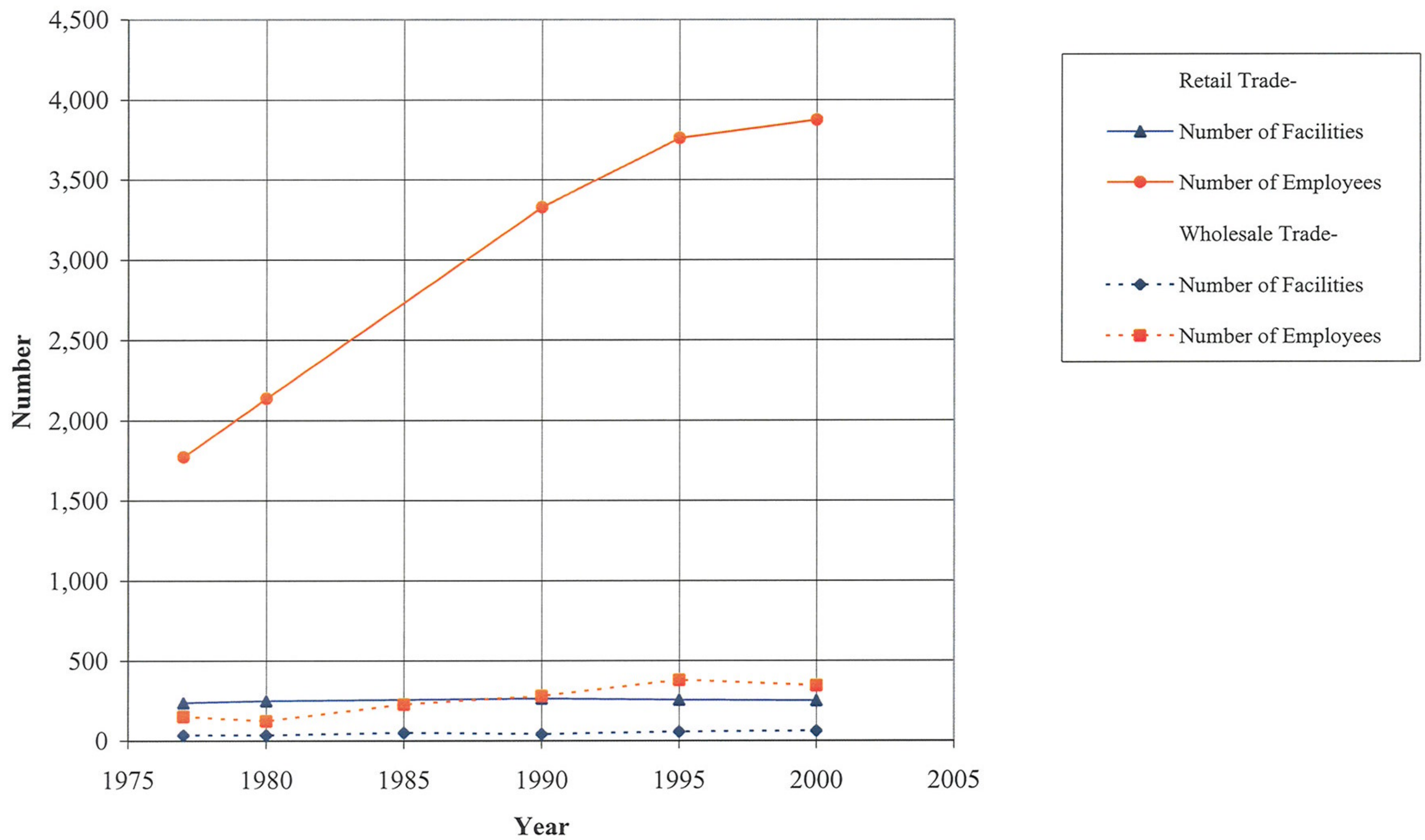


Figure 7-3. Labor Force Trend in Putnam County

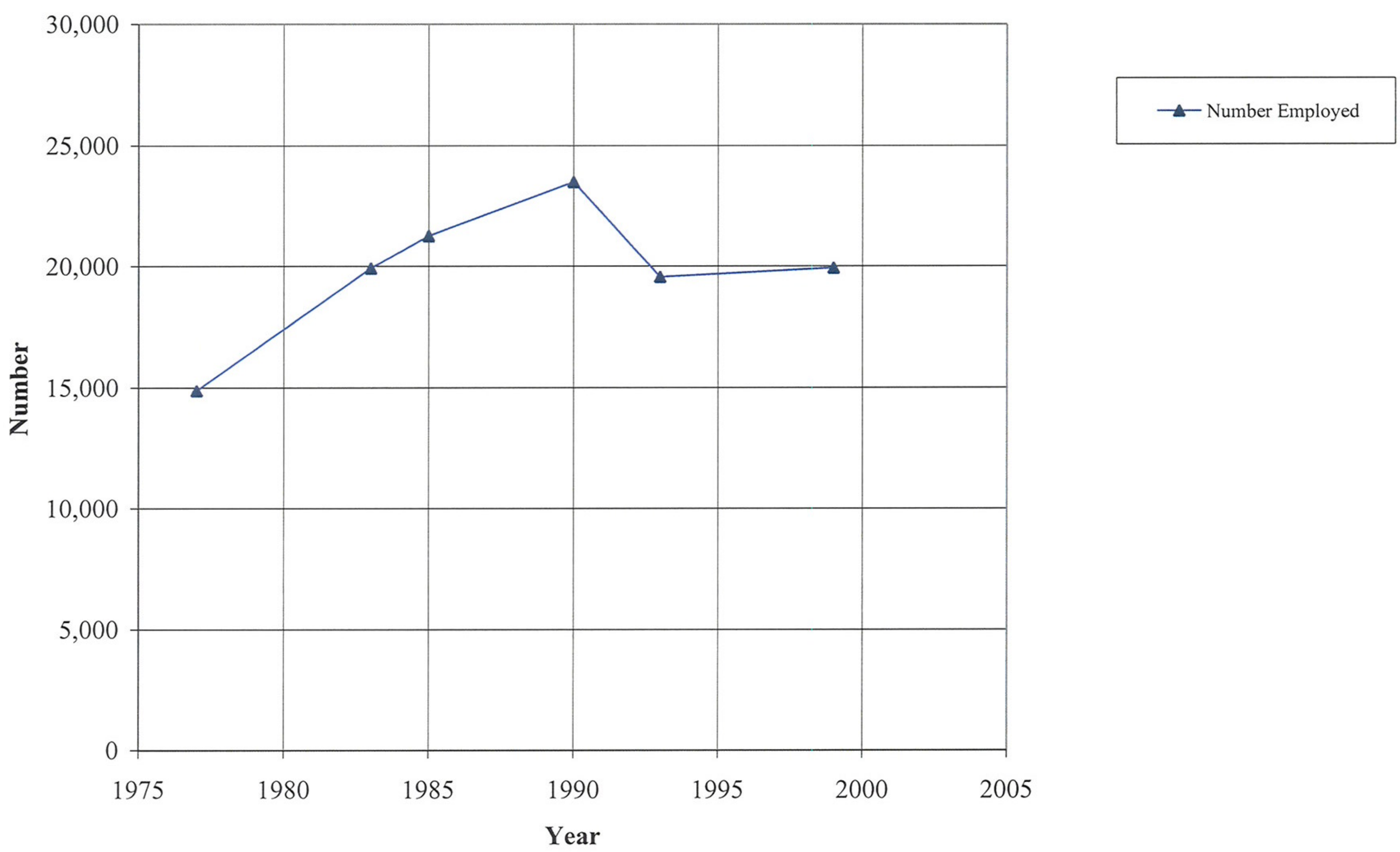


Figure 7-4. Hotel and Motel Trend in Putnam County

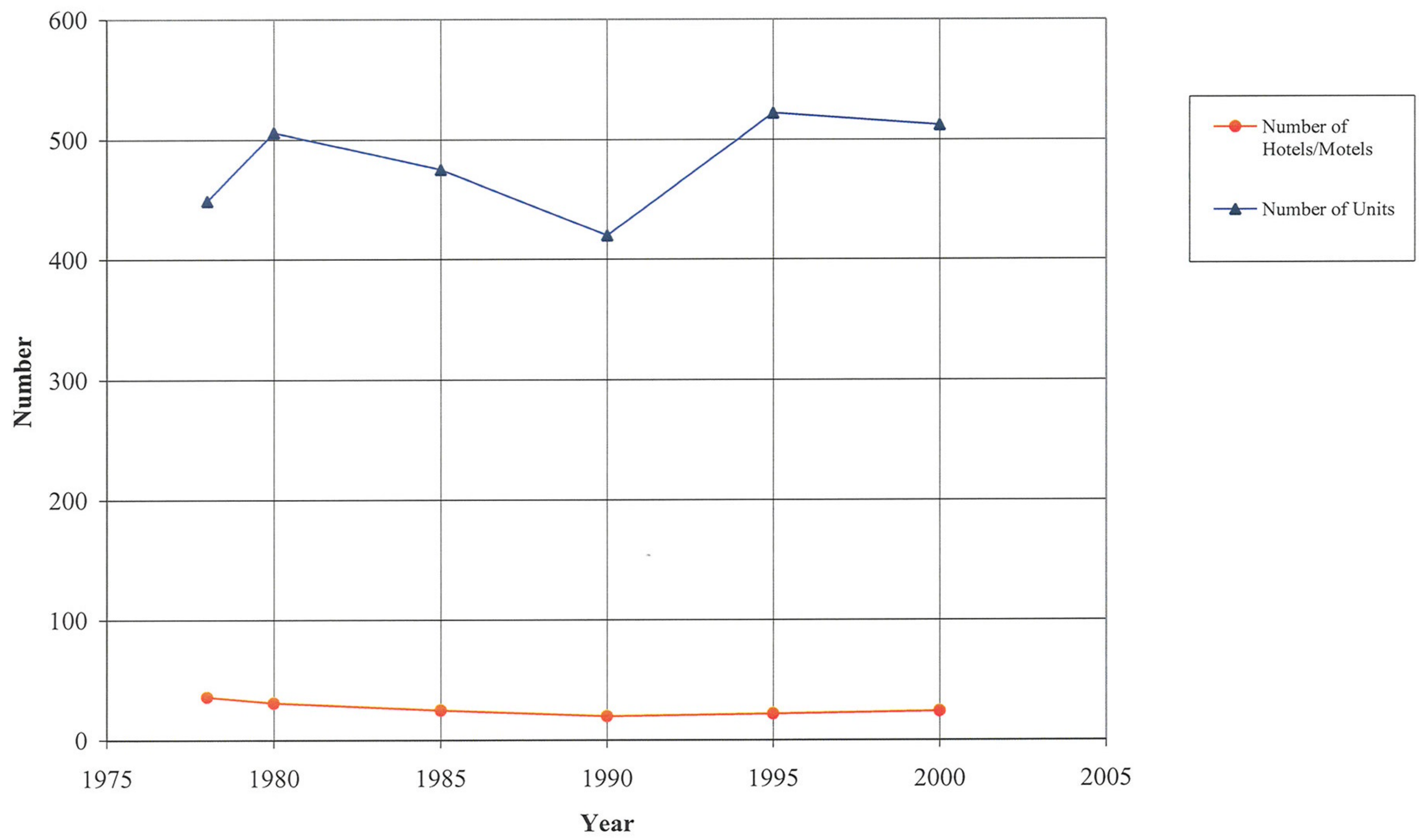


Figure 7-5. Vehicle Miles Traveled (VMT) Estimates for Motor Vehicles for Putnam County

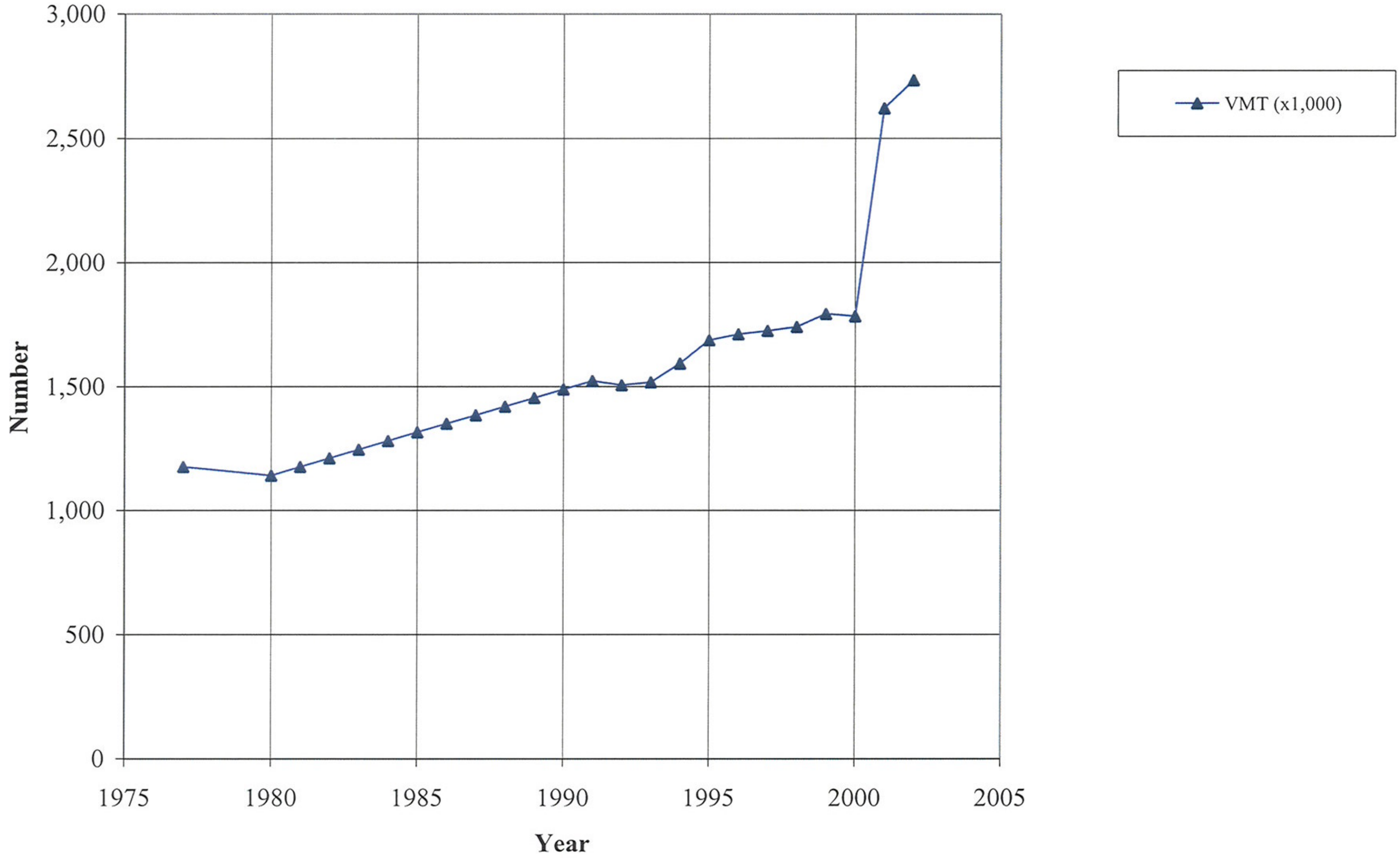


Figure 7-6. Manufacturing and Agriculture Trends in Putnam County

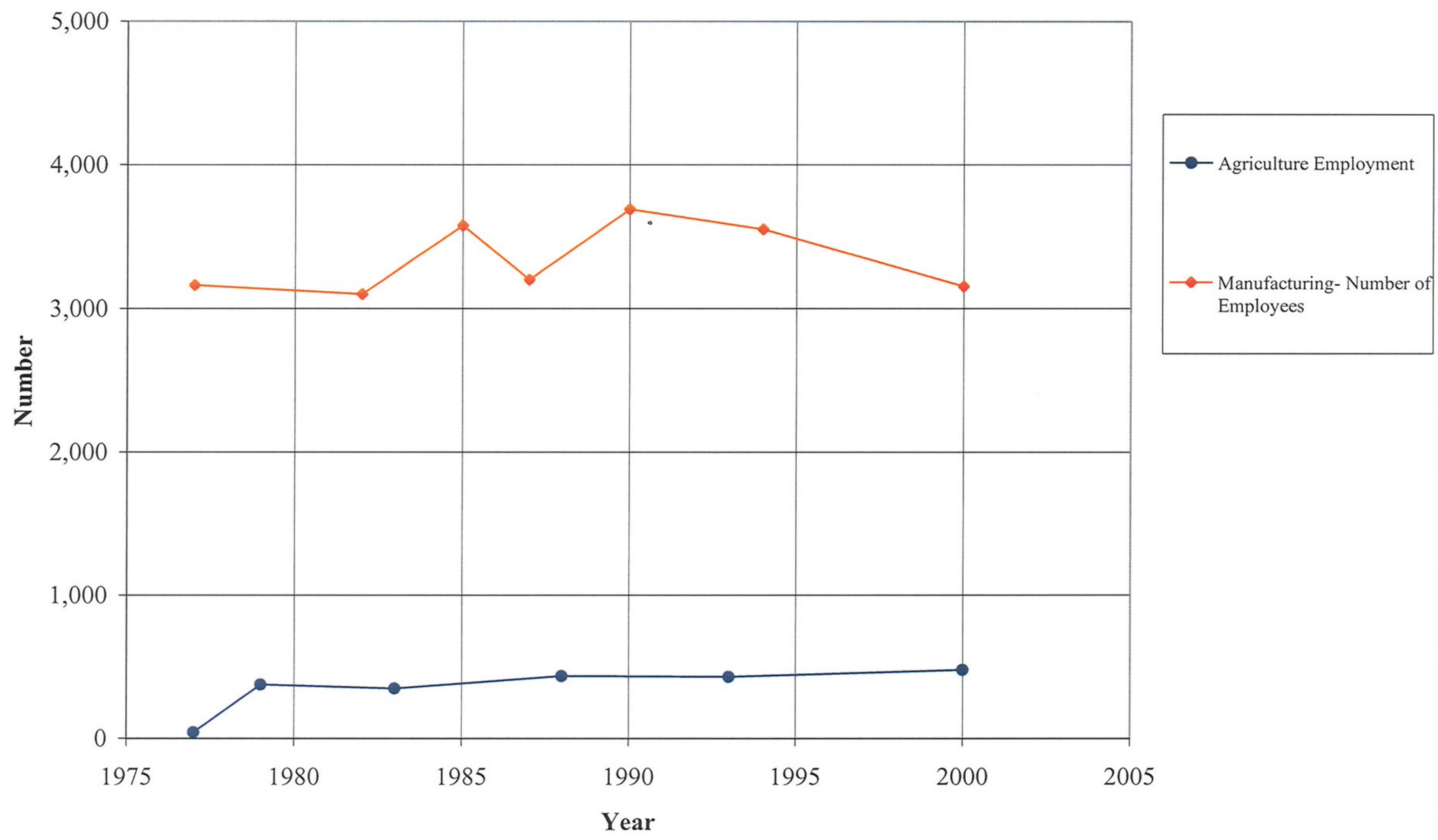


Figure 7-7. Electrical Power Generation Capacity in Putnam County

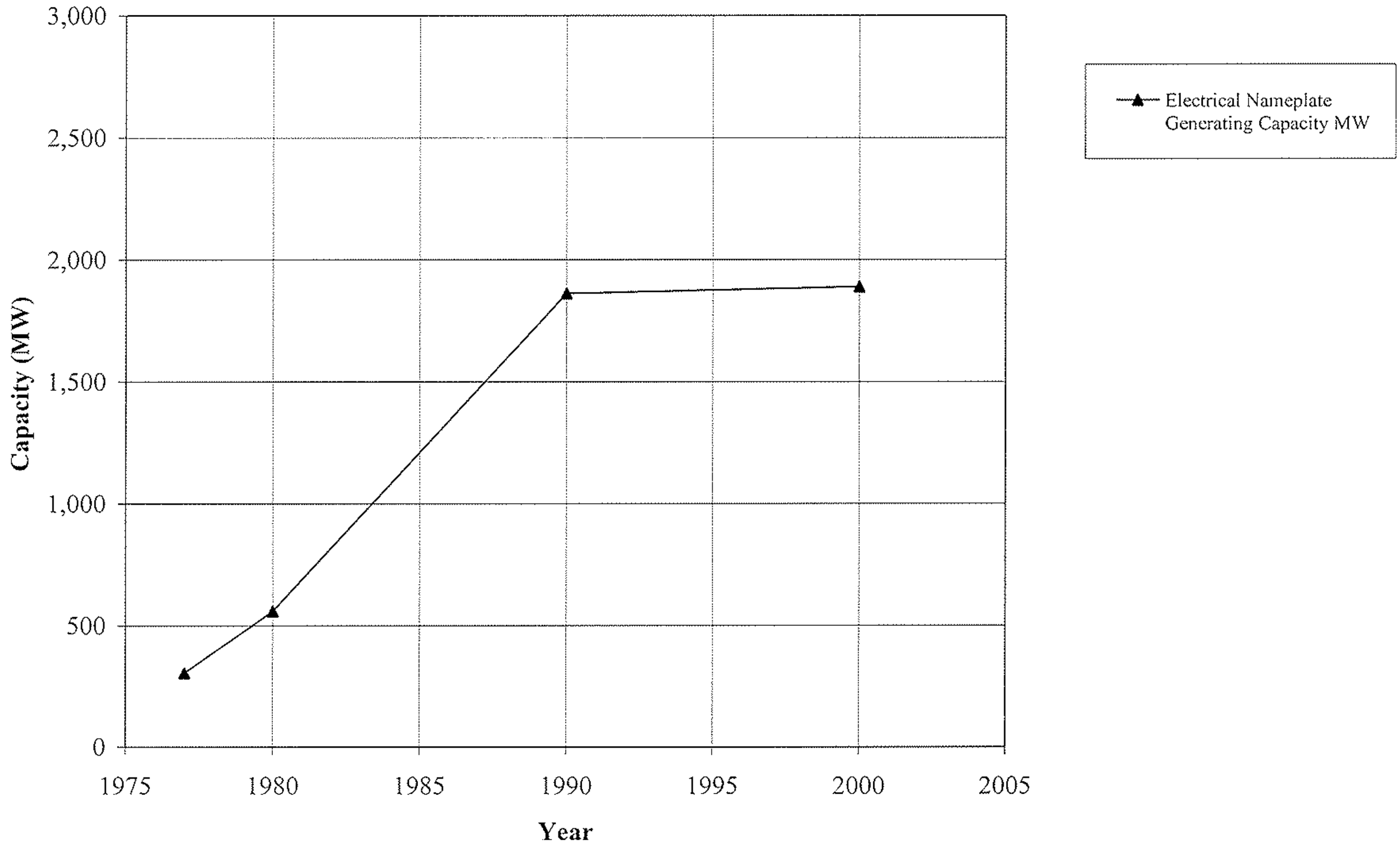


Figure 7-8. Mobile Source Emissions (Tons per Day) of CO, VOC, and NO_x in Putnam County

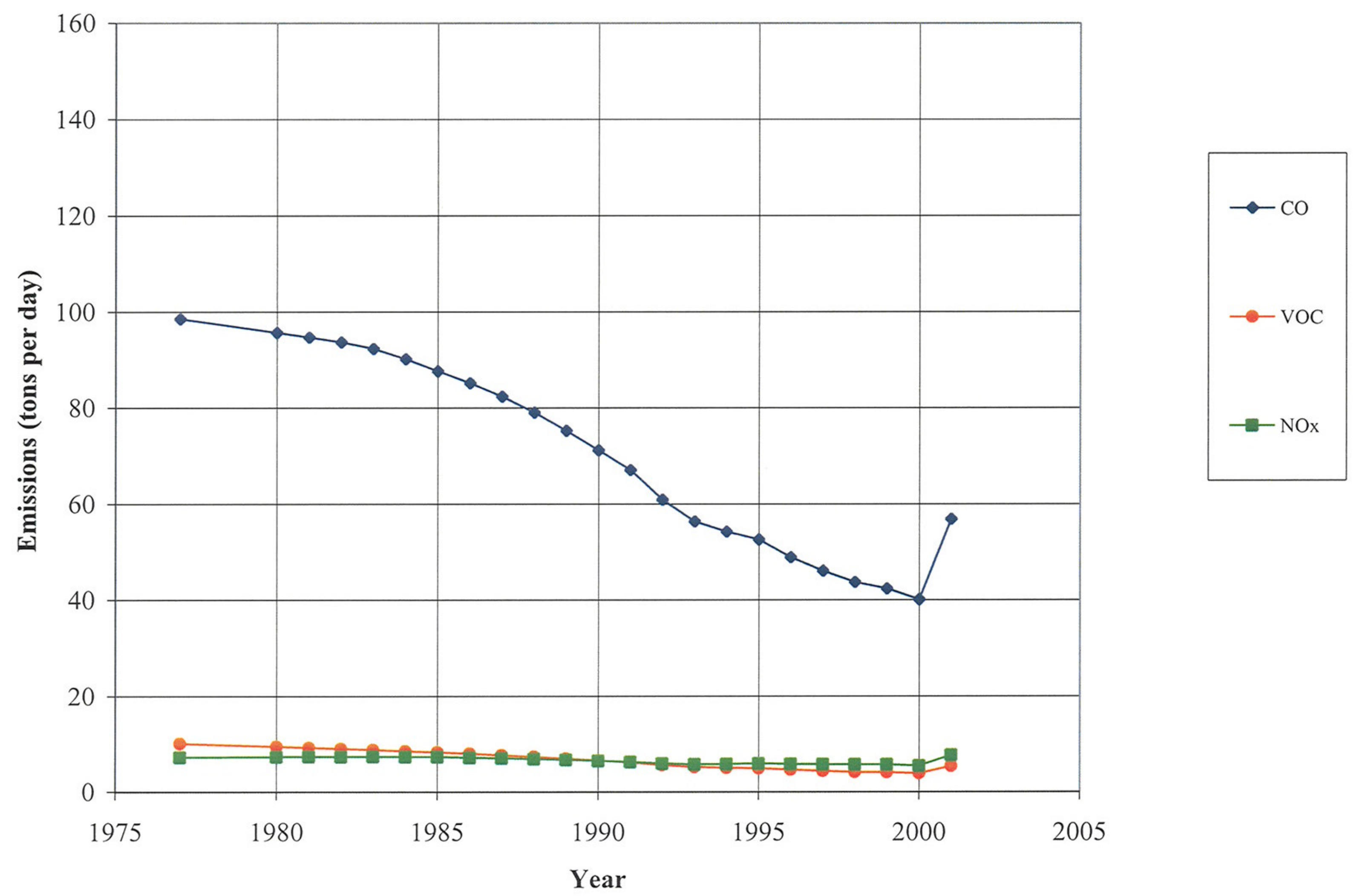


Figure 7-9. Measured 24-Hour Average PM_{10} Concentrations (1988 to 2004) and Total Suspended Particulate Concentrations (1981 to 1987) (2nd Highest Values)

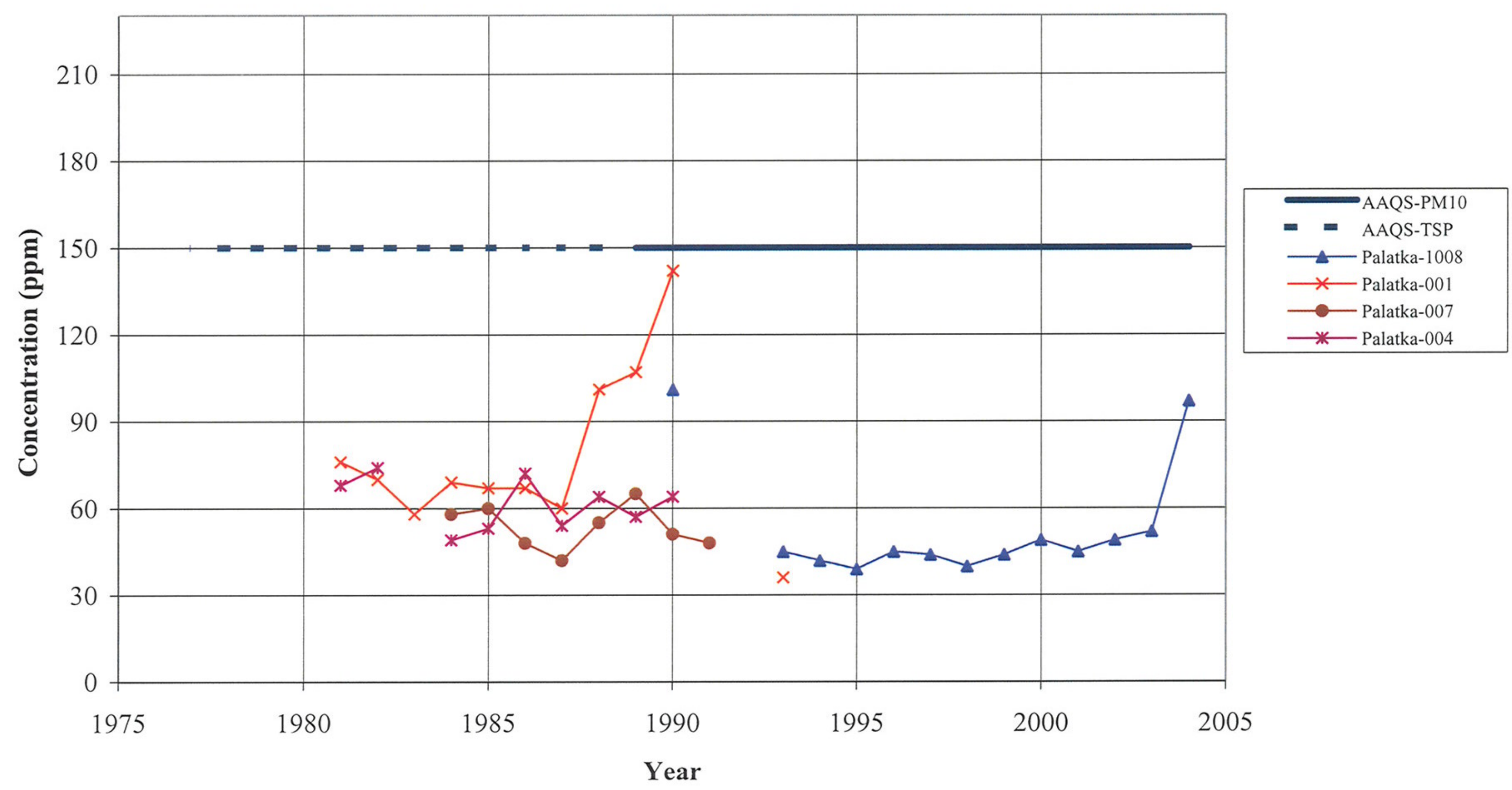


Figure 7-10. Measured Annual Average PM_{10} Concentrations (1988 to 2004) and Total Suspended Particulate Concentrations (1981 to 1987)

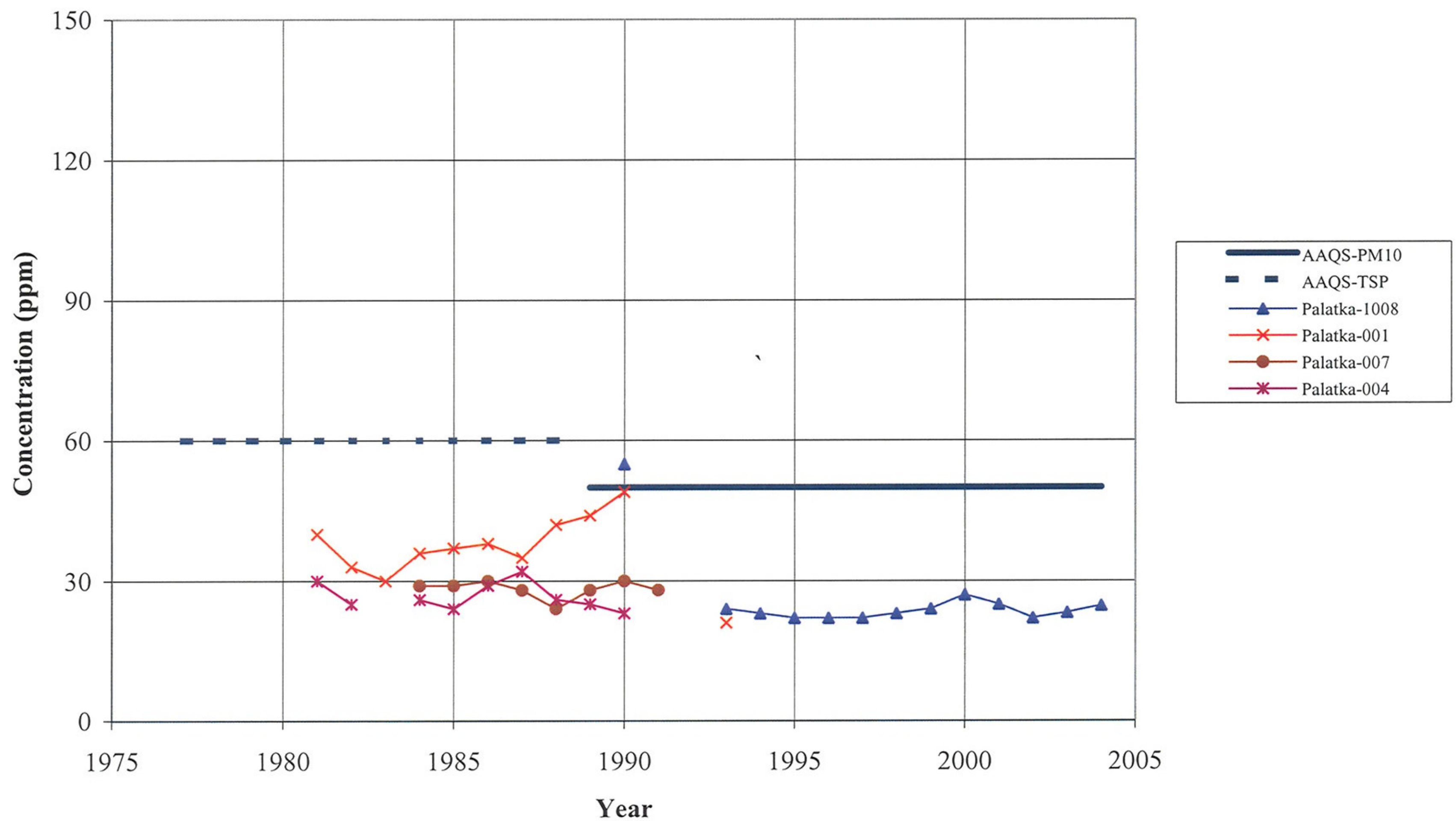


Figure 7-11. Measured 1-Hour Average Carbon Monoxide Concentrations (2nd Highest Values) from 1981 to 2004

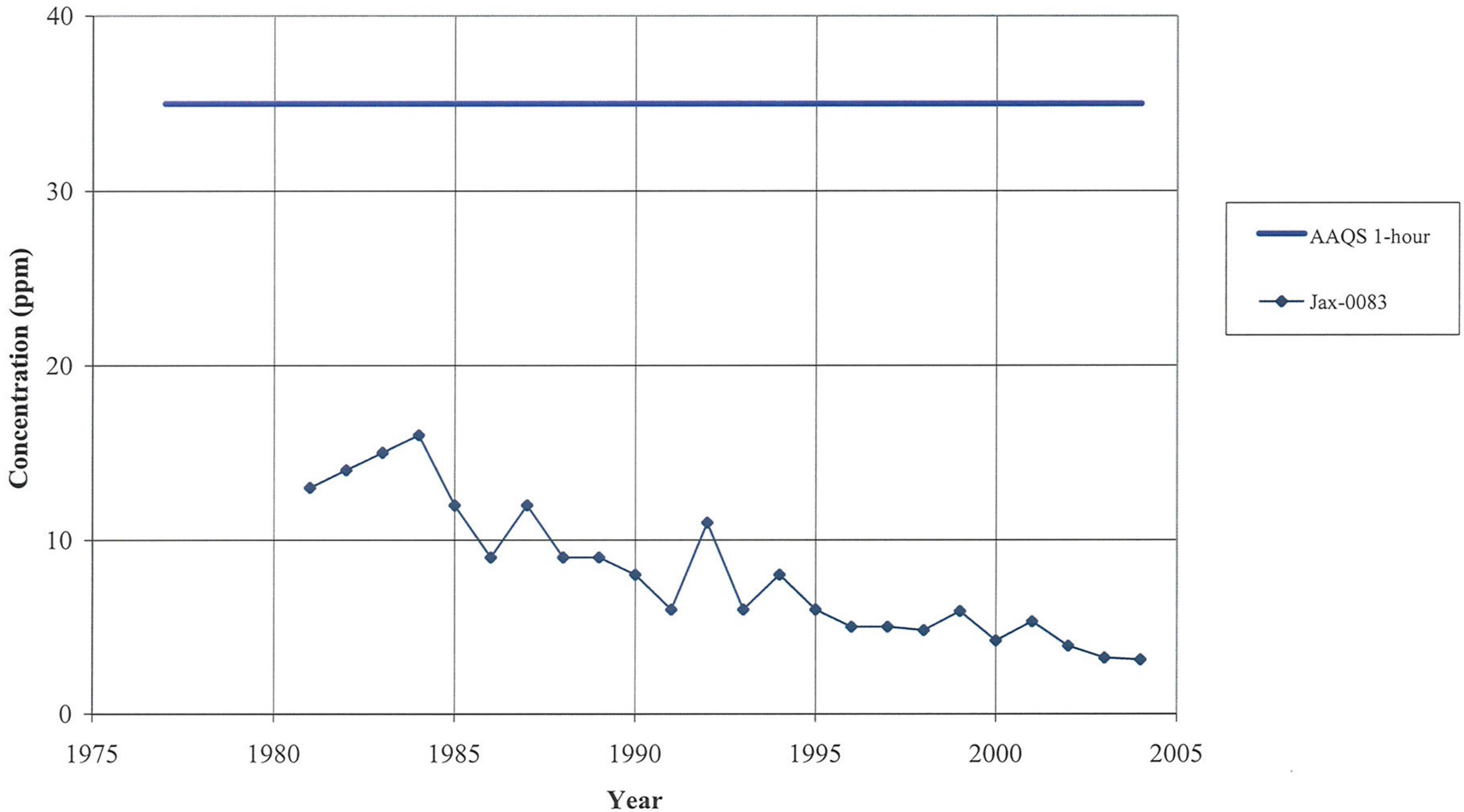


Figure 7-12. Measured 8-Hour Average Carbon Monoxide Concentrations (2nd Highest Values) from 1981 to 2004

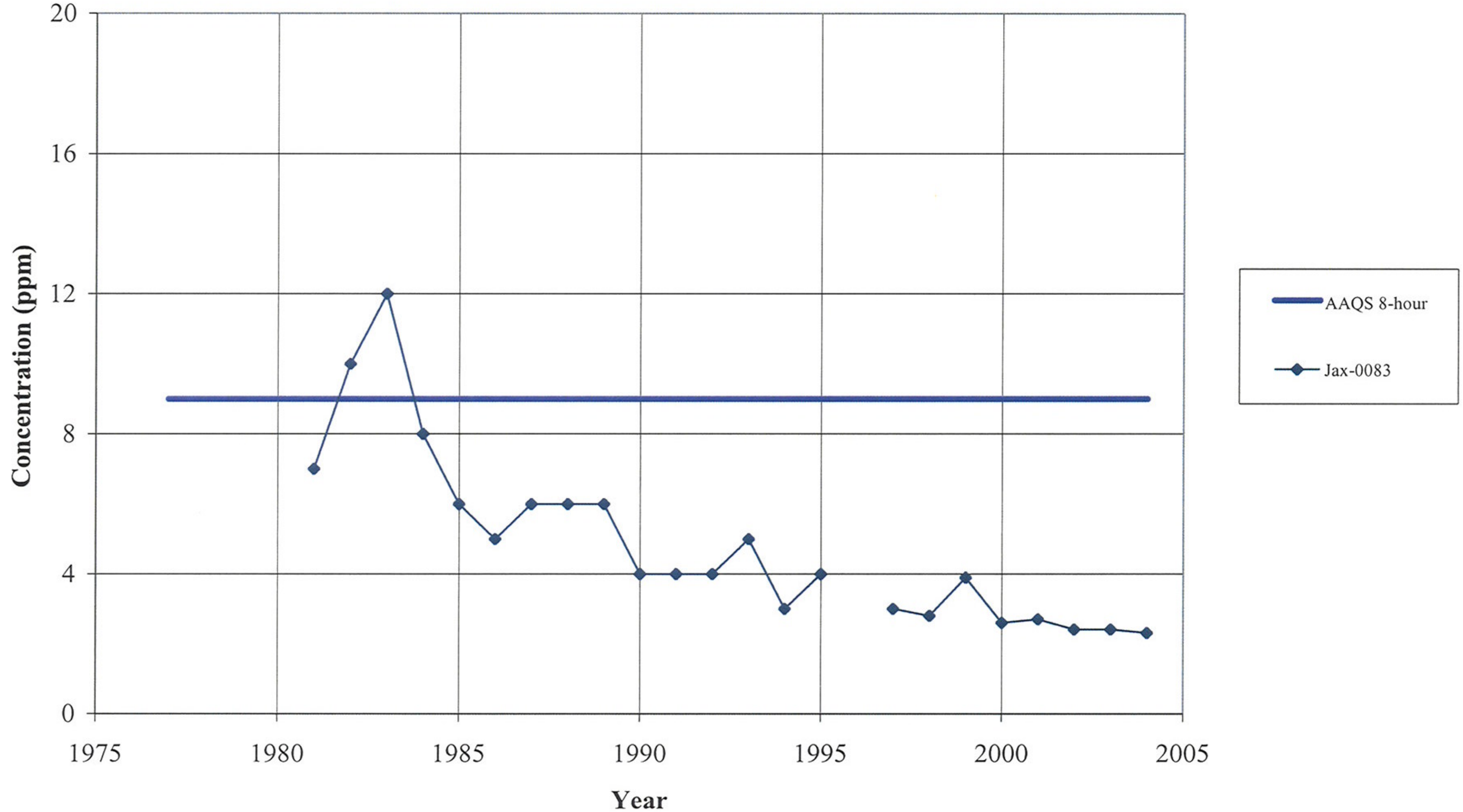


Figure 7-13. Measured 1-Hour Average Ozone Concentrations (2nd Highest Values) from 1981 to 2004

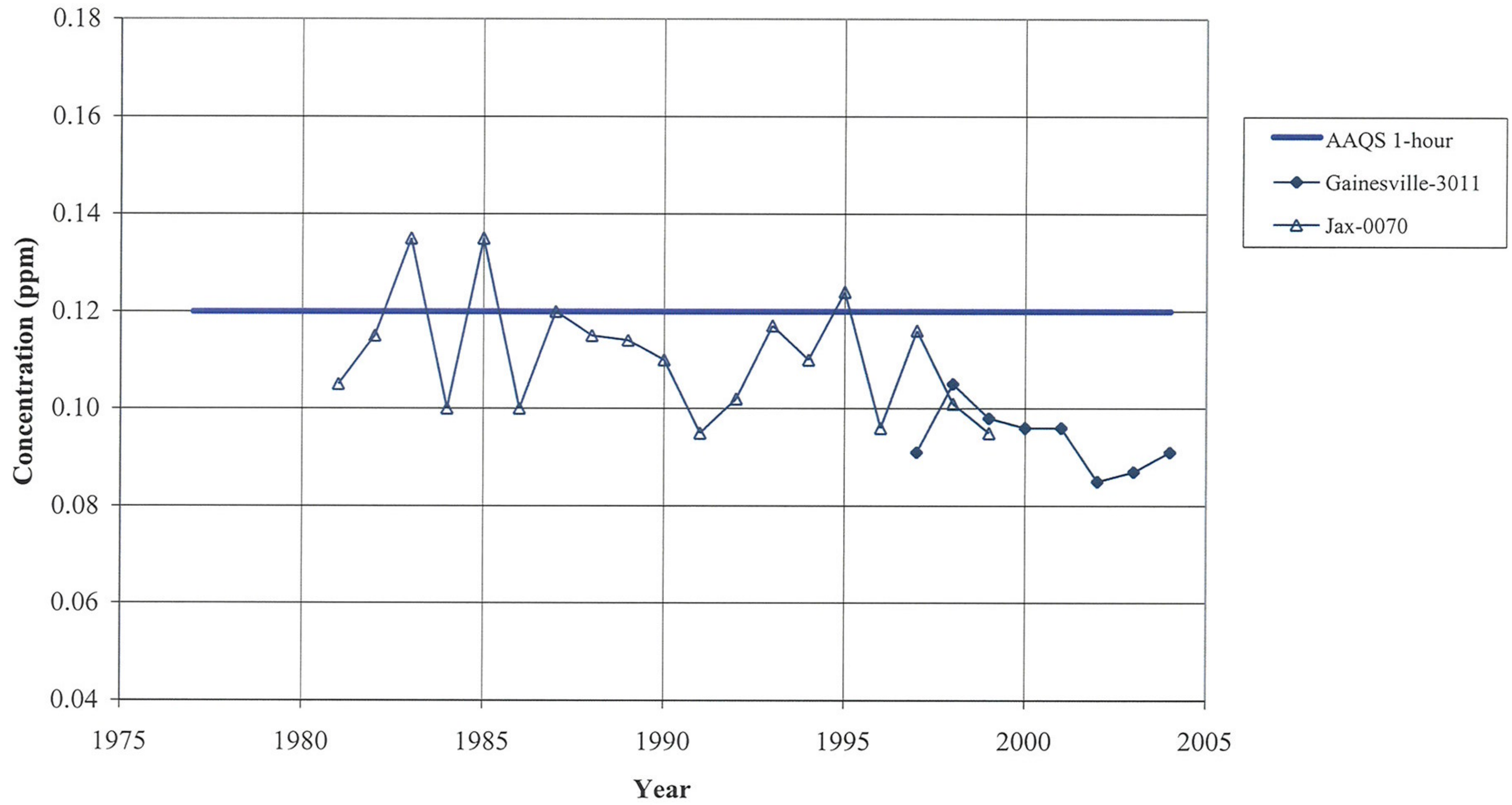
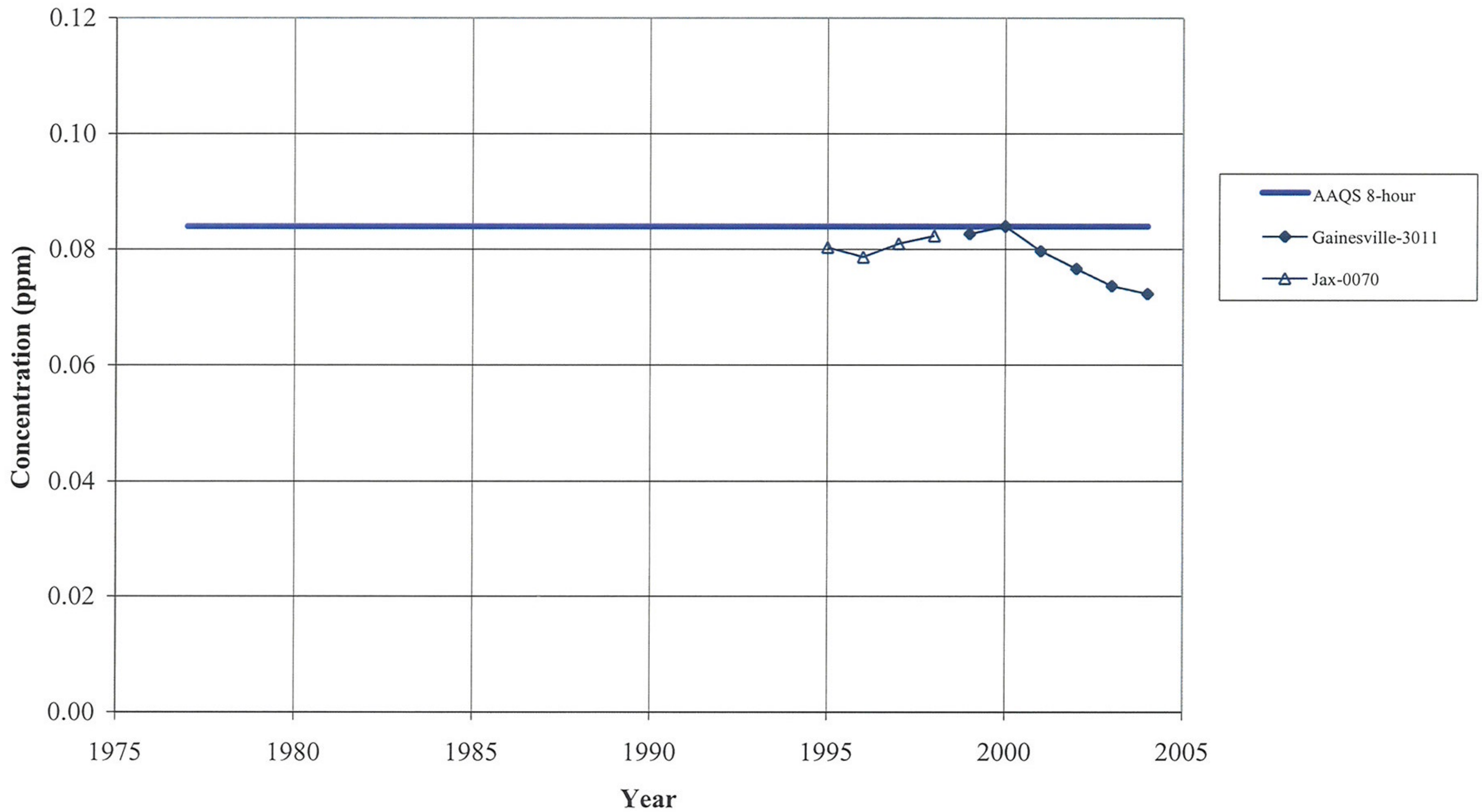


Figure 7-14. Measured 8-Hour Average Ozone Concentrations (3-Year Average of the 4th Highest Values) from 1995 to 2004



Department of Environmental Protection

Division of Air Resource Management

APPLICATION FOR AIR PERMIT - LONG FORM

I. APPLICATION INFORMATION

Air Construction Permit – Use this form to apply for an air construction permit for a proposed project:
- subject to prevention of significant deterioration (PSD) review, nonattainment area (NAA) new source review, or maximum achievable control technology (MACT) review; or
- where the applicant proposes to assume a restriction on the potential emissions of one or more pollutants to escape a federal program requirement such as PSD review, NAA new source review, Title V, or MACT; or
- at an existing federally enforceable state air operation permit (FESOP) or Title V permitted facility.

Air Operation Permit – Use this form to apply for:
- an initial federally enforceable state air operation permit (FESOP); or
- an initial/revised/renewal Title V air operation permit.

Air Construction Permit & Revised/Renewal Title V Air Operation Permit (Concurrent Processing Option) – Use this form to apply for both an air construction permit and a revised or renewal Title V air operation permit incorporating the proposed project.

To ensure accuracy, please see form instructions.

Identification of Facility

1. Facility Owner/Company Name: **Seminole Electric Cooperative, Inc.**
2. Site Name: **Seminole Generating Station**
3. Facility Identification Number: **1070025**
4. Facility Location
   Street Address or Other Locator: **890 North U.S. Highway 17**
   City: **7 miles north of Palatka** County: **Putnam** Zip Code: **32177**
5. Relocatable Facility? ☐ Yes ☒ No
6. Existing Title V Permitted Facility? ☒ Yes ☐ No

Application Contact

1. Application Contact Name: **James R. Frauen, Manager of Environmental Affairs**
2. Application Contact Mailing Address
   Organization/Firm: **Seminole Electric Cooperative, Inc.**
   Street Address: **16313 North Dale Mabry Highway**
   City: **Tampa** State: **FL** Zip Code: **33618**
3. Application Contact Telephone Numbers...
   Telephone: **(813) 963-0994** ext. Fax: **(813) 264- 7906**
4. Application Contact Email Address: **JFrauen@seminole-electric.com**

Application Processing Information (DEP Use)

1. Date of Receipt of Application:	
2. Project Number(s):	
3. PSD Number (if applicable):	
4. Siting Number (if applicable):	

APPLICATION INFORMATION

Purpose of Application

This application for air permit is submitted to obtain: (Check one)

Air Construction Permit

☒ Air construction permit.

Air Operation Permit

☐ Initial Title V air operation permit.
☐ Title V air operation permit revision.
☐ Title V air operation permit renewal.
☐ Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is required.
☐ Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is not required.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit (Concurrent Processing)

☐ Air construction permit and Title V permit revision, incorporating the proposed project.
☐ Air construction permit and Title V permit renewal, incorporating the proposed project.

Note: By checking one of the above two boxes, you, the applicant, are requesting concurrent processing pursuant to Rule 62-213.405, F.A.C. In such case, you must also check the following box:

☐ I hereby request that the department waive the processing time requirements of the air construction permit to accommodate the processing time frames of the Title V air operation permit.

Application Comment

This application addresses the addition of SGS Unit 3, advanced supercritical pulverized coal technology with state-of-the-art emission controls, an emergency generator, ZLD spray dryers and mechanical draft cooling tower. The project will result in about 820 MW gross electrical power output (750 MW net). The air pollution control equipment will consist of a wet FGD for SO_2 removal, selective catalytic reduction (SCR) for control of nitrogen oxides (NO_X), an electrostatic precipitator (ESP) for collection and removal of fine particles, a wet ESP (WESP) for control of sulfuric acid mist (SAM), and mercury removal through application of the above technologies.

As part of this application package, Seminole proposes to formally offset potential NO_X, SO_2 and SAM emissions from Unit 3 by accepting licensing conditions that incorporate the use of the Units 1 and 2 control system upgrades and additions that were fully described in a previous application, dated February 13, 2006. Seminole also proposes a facility-wide mercury limit after Unit 3 comes online at a level below historic baseline. Accordingly, Seminole will add a new Unit 3 while decreasing emissions of SO_2, NOx, SAM and mercury.

APPLICATION INFORMATION

Scope of Application

Emissions Unit ID Number	Description of Emissions Unit	Air Permit Type	Air Permit Proc. Fee
001	Steam Electric Generator No. 1	AC1A	See Below
002	Steam Electric Generator No. 2	AC1A	See Below
003	Steam Electric Generator No.3	AC1A	See Below
004	Material Handling/Coal	AC1A	See Below
005	Material Handling/Limestone/FGD Sludge	AC1A	See Below
006	Emergency Diesel Generator	AC1A	See Below
014	Cooling Tower	AC1A	See Below
015	ZLD Spray Dryer		
	Units Below Previously Submitted with Units 1 and 2 Application Package		
009	CBO™ Feed Fly Ash Silo	N/A	N/A
010	CBO™ Product Fly Ash Storage Dome	N/A	N/A
011	CBO™ Product Fly Ash Loadout Storage Silo	N/A	N/A
012	CBO™ Product Fly Ash Fugitives	N/A	N/A
013	CBO™ Process Fluidized Bed Combustor	N/A	N/A

Application Processing Fee

Check one: Attached - Amount: $______________ **x** Not Applicable

APPLICATION INFORMATION

Owner/Authorized Representative Statement

Complete if applying for an air construction permit or an initial FESOP.

1.	Owner/Authorized Representative Name : **Michael P. Opalinski**
2.	Owner/Authorized Representative Mailing Address... Organization/Firm: **Seminole Electric Cooperative, Inc.** Street Address: **16313 North Dale Mabry Highway** City: **Tampa** State: **FL** Zip Code: **33618**
3.	Owner/Authorized Representative Telephone Numbers... Telephone: **(813) 963-994** ext. Fax: **(813) 264-7906**
4.	Owner/Authorized Representative Email Address: **MOpalinski@seminole-electric.com**
5.	Owner/Authorized Representative Statement: *I, the undersigned, am the owner or authorized representative of the facility addressed in this air permit application. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof and all other requirements identified in this application to which the facility is subject. I understand that a permit, if granted by the department, cannot be transferred without authorization from the department, and I will promptly notify the department upon sale or legal transfer of the facility or any permitted emissions unit.* M.P. Opalinski — Signature 3/2/06 — Date

APPLICATION INFORMATION

Application Responsible Official Certification

Complete if applying for an initial/revised/renewal Title V permit or concurrent processing of an air construction permit and a revised/renewal Title V permit. If there are multiple responsible officials, the "application responsible official" need not be the "primary responsible official."

1. Application Responsible Official Name:
2. Application Responsible Official Qualification (Check one or more of the following options, as applicable): ☐ For a corporation, the president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative of such person if the representative is responsible for the overall operation of one or more manufacturing, production, or operating facilities applying for or subject to a permit under Chapter 62-213, F.A.C. ☐ For a partnership or sole proprietorship, a general partner or the proprietor, respectively. ☐ For a municipality, county, state, federal, or other public agency, either a principal executive officer or ranking elected official. ☐ The designated representative at an Acid Rain source.
3. Application Responsible Official Mailing Address... Organization/Firm: Street Address: City: State: Zip Code:
4. Application Responsible Official Telephone Numbers... Telephone: ( ) - ext. Fax: ( ) -
5. Application Responsible Official Email Address:
6. Application Responsible Official Certification: I, the undersigned, am a responsible official of the Title V source addressed in this air permit application. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof and all other applicable requirements identified in this application to which the Title V source is subject. I understand that a permit, if granted by the department, cannot be transferred without authorization from the department, and I will promptly notify the department upon sale or legal transfer of the facility or any permitted emissions unit. Finally, I certify that the facility and each emissions unit are in compliance with all applicable requirements to which they are subject, except as identified in compliance plan(s) submitted with this application. Signature Date

Professional Engineer Certification

1.	Professional Engineer Name: **Scott H. Osbourn** Registration Number: **57557**
2.	Professional Engineer Mailing Address... Organization/Firm: **Golder Associates Inc.**** Street Address: **5100 West Lemon St., Suite 114** City: **Tampa** State: **FL** Zip Code: **33609**
3.	Professional Engineer Telephone Numbers... Telephone: **(813) 287-1717** ext.**211** Fax: **(813) 287-1716**
4.	Professional Engineer Email Address: **sosbourn@golder.com**
5.	Professional Engineer Statement:

I, the undersigned, hereby certify, except as particularly noted herein, that:*

(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this application for air permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and

(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.

(3) If the purpose of this application is to obtain a Title V air operation permit (check here ☐, if so), I further certify that each emissions unit described in this application for air permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance plan and schedule is submitted with this application.

(4) If the purpose of this application is to obtain an air construction permit (check here ☒, if so) or concurrently process and obtain an air construction permit and a Title V air operation permit revision or renewal for one or more proposed new or modified emissions units (check here ☐, if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.

(5) If the purpose of this application is to obtain an initial air operation permit or operation permit revision or renewal for one or more newly constructed or modified emissions units (check here ☐, if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.

Signature — Date: 3/6/06

(seal) SCOTT OSBOURN LICENSE NO. 57557 STATE OF FLORIDA PROFESSIONAL ENGINEER

* Attach any exception to certification statement.
** **Board of Professional Engineers Certificate of Authorization #00001670**

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Location and Type

<table>
<tr><td colspan="2">1. Facility UTM Coordinates...
Zone 17 East (km) 438.80
North (km) 3289.20</td><td colspan="2">2. Facility Latitude/Longitude...
Latitude (DD/MM/SS)
Longitude (DD/MM/SS)</td></tr>
<tr><td>3. Governmental Facility Code:
0</td><td>4. Facility Status Code:
A</td><td>5. Facility Major Group SIC Code:
49</td><td>6. Facility SIC(s):</td></tr>
<tr><td colspan="4">7. Facility Comment :</td></tr>
</table>

Facility Contact

1. Facility Contact Name: Ms. Brenda Shiver, Environmental Compliance Engineer
2. Facility Contact Mailing Address... Organization/Firm: Seminole Electric Cooperative, Inc. Street Address: 890 North U.S. Hwy 17 City: Palatka State: FL Zip Code: 32177-8647
3. Facility Contact Telephone Numbers: Telephone: (386) 328-9255 ext.2174 Fax: (386) 328-5571
4. Facility Contact Email Address: BShiver@seminole-electric.com

Facility Primary Responsible Official

Complete if an "application responsible official" is identified in Section I. that is not the facility "primary responsible official."

1. Facility Primary Responsible Official Name:
2. Facility Primary Responsible Official Mailing Address... Organization/Firm: Street Address: City: State: Zip Code:
3. Facility Primary Responsible Official Telephone Numbers... Telephone: ( ) - ext. Fax: ( ) -
4. Facility Primary Responsible Official Email Address:

FACILITY INFORMATION

Facility Regulatory Classifications

Check all that would apply *following* completion of all projects and implementation of all other changes proposed in this application for air permit. Refer to instructions to distinguish between a "major source" and a "synthetic minor source."

1. ☐ Small Business Stationary Source	☐ Unknown
2. ☐ Synthetic Non-Title V Source	
3. ☒ Title V Source	
4. ☒ Major Source of Air Pollutants, Other than Hazardous Air Pollutants (HAPs)	
5. ☐ Synthetic Minor Source of Air Pollutants, Other than HAPs	
6. ☒ Major Source of Hazardous Air Pollutants (HAPs)	
7. ☐ Synthetic Minor Source of HAPs	
8. ☒ One or More Emissions Units Subject to NSPS (40 CFR Part 60)	
9. ☒ One or More Emissions Units Subject to Emission Guidelines (40 CFR Part 60)	
10. ☐ One or More Emissions Units Subject to NESHAP (40 CFR Part 61 or Part 63)	
11. ☐ Title V Source Solely by EPA Designation (40 CFR 70.3(a)(5))	
12. Facility Regulatory Classifications Comment: **Units 1, 2 and 3 subject to CAMR rule.** **Emergency generator subject to notification requirements of 40 CFR Part 63, Subpart ZZZZ.**	
13.	

FACILITY INFORMATION

List of Pollutants Emitted by Facility

1. Pollutant Emitted	2. Pollutant Classification	3. Emissions Cap [Y or N]?
CO	A	
NOX	A	
PM10	A	
PM	A	
SO2	A	
VOC	A	
SAM	A	
Mercury	B	Y
Fluorides		

B. EMISSIONS CAPS

Facility-Wide or Multi-Unit Emissions Caps

1. Pollutant Subject to Emissions Cap	2. Facility Wide Cap [Y or N]? (all units)	3. Emissions Unit ID No.s Under Cap (if not all units)	4. Hourly Cap (lb/hr)	5. Annual Cap (ton/yr)	6. Basis for Emissions Cap
Mercury		001,002 and 003		119 lb/yr	OTHER

7. Facility-Wide or Multi-Unit Emissions Cap Comment:

Requested by applicant to confirm facility-wide reduction after Unit 3 comes online.

C. FACILITY ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1. Facility Plot Plan: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☒ Attached, Document ID:**See PSD Report** ☐ Previously Submitted, Date:____
2. Process Flow Diagram(s): (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☒ Attached, Document ID:**See PSD Report** ☐ Previously Submitted, Date:_____
3. Precautions to Prevent Emissions of Unconfined Particulate Matter: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☒ Attached, Document ID:**B-7** ☐ Previously Submitted, Date:_____

Additional Requirements for Air Construction Permit Applications

1. Area Map Showing Facility Location: ☐ Attached, Document ID:_____ ☒ Not Applicable (existing permitted facility)
2. Description of Proposed Construction or Modification: ☒ Attached, Document ID:**See PSD Report**
3. Rule Applicability Analysis: ☒ Attached, Document ID:**See PSD Report**
4. List of Exempt Emissions Units (Rule 62-210.300(3)(a) or (b)1., F.A.C.): ☒ Attached, Document ID:**See PSD Report** ☐ Not Applicable (no exempt units at facility)
5. Fugitive Emissions Identification (Rule 62-212.400(2), F.A.C.): ☐ Attached, Document ID:_____ ☒ Not Applicable
6. Preconstruction Air Quality Monitoring and Analysis (Rule 62-212.400(5)(f), F.A.C.): ☐ Attached, Document ID:_____ ☒ Not Applicable
7. Ambient Impact Analysis (Rule 62-212.400(5)(d), F.A.C.): ☒ Attached, Document ID: **See PSD Report** ☐ Not Applicable
8. Air Quality Impact since 1977 (Rule 62-212.400(5)(h)5., F.A.C.): ☒ Attached, Document ID: ☐ Not Applicable
9. Additional Impact Analyses (Rules 62-212.400(5)(e)1. and 62-212.500(4)(e), F.A.C.): **X** Attached, Document ID: **See PSD Report** Not Applicable
10. Alternative Analysis Requirement (Rule 62-212.500(4)(g), F.A.C.): ☐ Attached, Document ID:_____ ☒ Not Applicable

FACILITY INFORMATION

Additional Requirements for FESOP Applications

1. List of Exempt Emissions Units (Rule 62-210.300(3)(a) or (b)1., F.A.C.): ☐ Attached, Document ID:_____ ☐ Not Applicable (no exempt units at facility)	

Additional Requirements for Title V Air Operation Permit Applications

1.	List of Insignificant Activities (Required for initial/renewal applications only): ☐ Attached, Document ID:_____ ☐ Not Applicable (revision application)
2.	Identification of Applicable Requirements (Required for initial/renewal applications, and for revision applications if this information would be changed as a result of the revision being sought): ☐ Attached, Document ID:_____ ☐ Not Applicable (revision application with no change in applicable requirements)
3.	Compliance Report and Plan (Required for all initial/revision/renewal applications): ☐ Attached, Document ID:_____ Note: A compliance plan must be submitted for each emissions unit that is not in compliance with all applicable requirements at the time of application and/or at any time during application processing. The department must be notified of any changes in compliance status during application processing.
4.	List of Equipment/Activities Regulated under Title VI (If applicable, required for initial/renewal applications only): ☐ Attached, Document ID:_____ ☐ Equipment/Activities On site but Not Required to be Individually Listed ☐ Not Applicable
5.	Verification of Risk Management Plan Submission to EPA (If applicable, required for initial/renewal applications only) : ☐ Attached, Document ID:_____ ☐ Not Applicable
6.	Requested Changes to Current Title V Air Operation Permit: ☐ Attached, Document ID:_____ ☐ Not Applicable

Additional Requirements Comment

III. EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Application - For Title V air operation permitting only, emissions units are classified as regulated, unregulated, or insignificant. If this is an application for Title V air operation permit, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each regulated and unregulated emissions unit addressed in this application for air permit. Some of the subsections comprising the Emissions Unit Information Section of the form are optional for unregulated emissions units. Each such subsection is appropriately marked. Insignificant emissions units are required to be listed at Section II, Subsection C.

Air Construction Permit or FESOP Application - For air construction permitting or federally enforceable state air operation permitting, emissions units are classified as either subject to air permitting or exempt from air permitting. The concept of an "unregulated emissions unit" does not apply. If this is an application for air construction permit or FESOP, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air permitting are required to be listed at Section II, Subsection C.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit Application – Where this application is used to apply for both an air construction permit and a revised/renewal Title V air operation permit, each emissions unit is classified as either subject to air permitting or exempt from air permitting for air construction permitting purposes and as regulated, unregulated, or insignificant for Title V air operation permitting purposes. **The air construction permitting classification must be used to complete the Emissions Unit Information Section of this application for air permit.** A separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air construction permitting and insignificant emissions units are required to be listed at Section II, Subsection C.

If submitting the application form in hard copy, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application must be indicated in the space provided at the top of each page.

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. Regulated or Unregulated Emissions Unit? (Check one, if applying for an initial, revised or renewal Title V air operation permit. Skip this item if applying for an air construction permit or FESOP only.)

   ☒ The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

   ☐ The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in this Section: (Check one)

   ☒ This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

   ☐ This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

   ☐ This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Description of Emissions Unit Addressed in this Section:
   Steam Electric Generator No. 1

3. Emissions Unit Identification Number: **001**

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
A			**49**	☒ Yes ☐ No

9. Package Unit:
   Manufacturer: Model Number:

10. Generator Nameplate Rating: **735.9** MW

11. Emissions Unit Comment:
    Unit No. 1 is a "regulated" emissions unit.
    Generator nameplate rating will be 735.9 after upgrades are complete, which were requested by separate application on February 13, 2006.

Emissions Unit Control Equipment

1. Control Equipment/Method(s) Description:

Existing Control Equipment:

Electrostatic Precipitator (10)
Wet Limestone Flue Gas Desulfurization or FGD (67)

Proposed Control Equipment:

Low NOx Burners (205)
Low Excess-Air Firing (204)
Selective Catalytic Reduction or SCR (139)
Alkali Injection (70)

2. Control Device or Method Code(s): **10, 67, 70, 139, 204 and 205**

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate:	
2. Maximum Production Rate:	
3. Maximum Heat Input Rate: 7,172 million Btu/hr	
4. Maximum Incineration Rate: pounds/hr tons/day	
5. Requested Maximum Operating Schedule: 24 hours/day 52 weeks/year	7 days/week 8,760 hours/year
6. Operating Capacity/Schedule Comment:	

C. EMISSION POINT (STACK/VENT) INFORMATION
(Optional for unregulated emissions units.)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram: **EU 001**	2. Emission Point Type Code: **1**	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking:		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:		
5. Discharge Type Code: **V**	6. Stack Height: **695** feet	7. Exit Diameter: **26.5** feet
8. Exit Temperature: **128** °F	9. Actual Volumetric Flow Rate: **1,987,064** acfm	10. Water Vapor: %
11. Maximum Dry Standard Flow Rate: dscfm	12. Nonstack Emission Point Height: feet	
13. Emission Point UTM Coordinates... Zone: East (km): North (km):	14. Emission Point Latitude/Longitude... Latitude (DD/MM/SS) Longitude (DD/MM/SS)	
15. Emission Point Comment:		

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 4

1. Segment Description (Process/Fuel Type): **Bituminous Coal**		
2. Source Classification Code (SCC): **1-01-002-02**	3. SCC Units: **Tons Burned**	
4. Maximum Hourly Rate: **326.00**	5. Maximum Annual Rate: **2,855,760**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: *****	8. Maximum % Ash: **11.0**	9. Million Btu per SCC Unit: **22**
10. Segment Comment: *** Representative maximum 70/30 blend= 4.7% sulfur, based on 3.8% sulfur for coal and 6.8% sulfur for pet coke. Individual shipments of coal can exceed 3.8% and pet coke is limited to 7%. Million Btu per SCC Unit is based on 11,300 Btu/lb, the mimimum expected, or worst-case value. Max hourly and annual rates based on nominal fuel heating value and unit max heat imput of 7,172 MMBtu/hr.**		

Segment Description and Rate: Segment 2 of 4

1. Segment Description (Process/Fuel Type): **Petroleum coke**		
2. Source Classification Code (SCC): **1-01-008-01**	3. SCC Units: **Tons Burned**	
4. Maximum Hourly Rate: **93.00**	5. Maximum Annual Rate: **814,680**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: **7.0**	8. Maximum % Ash: **1.0**	9. Million Btu per SCC Unit: **26**
10. Segment Comment: **Max pet coke content of coal/pet coke blend is 30 percent by wt.**		

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 3 of 4

1. Segment Description (Process/Fuel Type): **Distillate Oil (Nos. 1 and 2)**		
2. Source Classification Code (SCC): **1-01-005-01**	3. SCC Units: **1000 Gallons Burned**	
4. Maximum Hourly Rate: **3.32**	5. Maximum Annual Rate: **1,664.2**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: **0.5**	8. Maximum % Ash: **0.1**	9. Million Btu per SCC Unit: **136**
10. Segment Comment: **Distillate oil is used for startups, flame stabilization, emergency reserve capacity during statewide energy shortages, and limited supplemental load.**		

Segment Description and Rate: Segment 4 of 4

1. Segment Description (Process/Fuel Type): **On-specification Used Oil**		
2. Source Classification Code (SCC): **1-01-013-02**	3. SCC Units: **1000 Gallons Burned**	
4. Maximum Hourly Rate: **3.30**	5. Maximum Annual Rate: **500**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: **0.50**	8. Maximum % Ash: **0.10**	9. Million Btu per SCC Unit: **142**
10. Segment Comment: **On-spec used oil max levels: arsenic- 5 ppm; cadmium- 2 ppm; chromium- 10 ppm; lead- 100 ppm; total halogens- 1,000 ppm; flash point- 100 F; and PCBs- < 50 ppm.**		

E. EMISSIONS UNIT POLLUTANTS

List of Pollutants Emitted by Emissions Unit

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
SO2	67		EL
PM/PM10	10		EL
NOX	139	204 and 205	EL
CO			NS
VOC			NS
SAM	70		NS
Hg	139/67	10	EL

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **SO2**	2. Total Percent Efficiency of Control: **95%**
3. Potential Emissions: **5,397** lb/hour **23,637** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.38 lb/MMBtu** Reference: **Proposed emissions**	7. Emissions Method Code: **0**
8. Calculation of Emissions: **See PSD Report.** **The lb/hr and ton/yr emissions above are for Units 1 and 2 combined. The weighted average emission rate of 0.38 lb/MMBtu (24-hr average) equates to no net increase in SO2 emissions for the overall project, at a 100 percent capacity factor. The results of air quality modeling for the existing SGS facility indicate that, at the allowable SO2 emission rate of 0.38 lb/MMBtu, emissions from SGS, after Unit 3 comes online, result in no impact above increments (see PSD Report).**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 3

1. Basis for Allowable Emissions Code: **ESCPSD**	2. Future Effective Date of Allowable Emissions: **5/12**
3. Allowable Emissions and Units: **0.38 lb/MMBtu**	4. Equivalent Allowable Emissions: **5,397** lb/hour **23,637** tons/year
5. Method of Compliance: **Continuous Emissions Monitoring System (CEMS).**	
6. Allowable Emissions Comment (Description of Operating Method): **The lb/hr and ton/yr emissions are for Units 1 and 2 combined, and the proposed lb/MMBtu limit is a weighted-average limit between Units 1 and 2.**	

Allowable Emissions Allowable Emissions 2 of 3

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions 3 of 3

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **NOX**	2. Total Percent Efficiency of Control: **65 %**
3. Potential Emissions: **4,784** lb/hour **20,953** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.33 lb/MMBtu** Reference: **Proposed emissions**	7. Emissions Method Code: **0**
8. Calculation of Emissions: **The lb/hr and ton/yr emissions above are for Units 1 and 2 combined. The weighted-average emission rate of 0.33 lb/MMBtu equates to a no net increase in NOx emissions for the overall project, at a 100 percent capacity factor. The results of air quality modeling for the existing SGS facility indicate that at the allowable NOx emission rate, emissions from SGS, after Unit 3 comes online, result in no significant impact on regional haze.**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 3

1. Basis for Allowable Emissions Code: **ESCPSD**	2. Future Effective Date of Allowable Emissions: **5/12**
3. Allowable Emissions and Units: **0.33 lb/MMBtu**	4. Equivalent Allowable Emissions: **4,784** lb/hour **20,953** tons/year
5. Method of Compliance: **Continuous Emissions Monitoring System (CEMS)**	
6. Allowable Emissions Comment (Description of Operating Method): **Allowable emissions are a weighted-average between Units 1 and 2.**	

Allowable Emissions Allowable Emissions 2 of 3

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions 3 of 3

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **SAM**	2. Total Percent Efficiency of Control: **60** %
3. Potential Emissions: **449** lb/hour **1,965** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.03 lb/MMBtu** Reference: **Test Data**	7. Emissions Method Code:
8. Calculation of Emissions: **See PSD Report.** **The lb/hr and ton/yr emissions above are for Units 1 and 2 combined. The weighted-average emission rate of .031lb/MMBtu equates to no net increase in SAM emissions for the overall project, at a 100 percent capacity factor.**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions: **5/12**
3. Allowable Emissions and Units: **1,965** tons/yr	4. Equivalent Allowable Emissions: lb/hour **1,965** tons/year
5. Method of Compliance: **See PSD Report.**	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **Hg**	2. Total Percent Efficiency of Control: **90 %**
3. Potential Emissions: **0.0083** lb/hour **0.036** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **7.05 lb/Trillion Btu** Reference: **Test Data**	7. Emissions Method Code:
8. Calculation of Emissions: **See PSD Report.** **Hg emissions of 0.036 ton/yr are from Units 1 and 2 combined.**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions: **5/12**
3. Allowable Emissions and Units: **119 lb/yr**	4. Equivalent Allowable Emissions: **0.0083** lb/hour **0.036** tons/year
5. Method of Compliance: **See PSD Report.**	
6. Allowable Emissions Comment (Description of Operating Method): **A cap of 119 lb/yr for Units 1, 2 and 3 combined represents 90% control for all three units, and is a decrease from the baseline of 131 lb/yr.**	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

G. VISIBLE EMISSIONS INFORMATION

Complete if this emissions unit is or would be subject to a unit-specific visible emissions limitation.

Visible Emissions Limitation: Visible Emissions Limitation 1 of 1

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

Visible Emissions Limitation: Visible Emissions Limitation _____ of _____

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: ☐ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

H. CONTINUOUS MONITOR INFORMATION

Complete if this emissions unit is or would be subject to continuous monitoring.

Continuous Monitoring System: Continuous Monitor 1 of 4

1. Parameter Code: SO2	2. Pollutant(s): SO2
3. CMS Requirement: ☒ Rule ☐ Other	
4. Monitor Information... Manufacturer: Thermo-Environmental Instruments, inc. Model Number: 43B Serial Number: 43B-46935-277	
5. Installation Date: 05/31/1994	6. Performance Specification Test Date: 10/19/1994
7. Continuous Monitor Comment: 40 CFR 60, Subpart Da and 40 CFR Part 75.	

Continuous Monitoring System: Continuous Monitor 2 of 4

1. Parameter Code: NOX	2. Pollutant(s): NOX
3. CMS Requirement: ☒ Rule ☐ Other	
4. Monitor Information... Manufacturer: Thermo-Environmental, Inc. Model Number: 42D Serial Number: 42D-46961-277	
5. Installation Date: 05/31/1994	6. Performance Specification Test Date: 10/19/1994
7. Continuous Monitor Comment: 40 CFR 60, Subpart Da and 40 CFR Part 75.	

H. CONTINUOUS MONITOR INFORMATION

Complete if this emissions unit is or would be subject to continuous monitoring.

Continuous Monitoring System: Continuous Monitor 3 of 4

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement: Rule	☐ Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

Continuous Monitoring System: Continuous Monitor 4 of 4

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement: Rule	☐ Other
4. Monitor Information... Manufacturer Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

I. EMISSIONS UNIT ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1. Process Flow Diagram (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: B-2A through B-2C ☒ Previously Submitted, Date 2/13/06

2. Fuel Analysis or Specification (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: B-6 ☒ Previously Submitted, Date 2/13/06

3. Detailed Description of Control Equipment (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: B-3 ☒ Previously Submitted, Date 2/13/06

4. Procedures for Startup and Shutdown (Required for all operation permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: B-8 and B-9 ☒ Previously Submitted, Date 2/13/06
   ☐ Not Applicable (construction application)

5. Operation and Maintenance Plan (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: ☒ Previously Submitted, Date July 2004
   ☐ Not Applicable

6. Compliance Demonstration Reports/Records
   ☐ Attached, Document ID: _____
   Test Date(s)/Pollutant(s) Tested: _____

   ☐ Previously Submitted, Date: _____
   Test Date(s)/Pollutant(s) Tested: _____

   ☐ To be Submitted, Date (if known): _____
   Test Date(s)/Pollutant(s) Tested: _____

   ☐ Not Applicable

   Note: For FESOP applications, all required compliance demonstration records/reports must be submitted at the time of application. For Title V air operation permit applications, all required compliance demonstration reports/records must be submitted at the time of application, or a compliance plan must be submitted at the time of application.

7. Other Information Required by Rule or Statute
   ☐ Attached, Document ID: _____ ☒ Not Applicable

Additional Requirements for Air Construction Permit Applications

1.	Control Technology Review and Analysis (Rules 62-212.400(6) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)) ☐ Attached, Document ID: **See PSD Report** ☒ Not Applicable
2.	Good Engineering Practice Stack Height Analysis (Rule 62-212.400(5)(h)6., F.A.C., and Rule 62-212.500(4)(f), F.A.C.) ☐ Attached, Document ID: ☒ Not Applicable
3.	Description of Stack Sampling Facilities (Required for proposed new stack sampling facilities only) ☐ Attached, Document ID: ☒ Not Applicable

Additional Requirements for Title V Air Operation Permit Applications

1.	Identification of Applicable Requirements ☐ Attached, Document ID: ____ ☐ Not Applicable
2.	Compliance Assurance Monitoring ☐ Attached, Document ID: ____ ☐ Not Applicable
3.	Alternative Methods of Operation ☐ Attached, Document ID: ____ ☐ Not Applicable
4.	Alternative Modes of Operation (Emissions Trading) ☐ Attached, Document ID: ____ ☐ Not Applicable
5.	Acid Rain Part Application ☐ Certificate of Representation (EPA Form No. 7610-1) ☐ Copy Attached, Document ID: ____ ☐ Acid Rain Part (Form No. 62-210.900(1)(a)) ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date: ____ ☐ Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date: ____ ☐ New Unit Exemption (Form No. 62-210.900(1)(a)2.) ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date: ____ ☐ Retired Unit Exemption (Form No. 62-210.900(1)(a)3.) ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date: ____ ☐ Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.) ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date: ____ ☐ Phase II NOx Averaging Plan (Form No. 62-210.900(1)(a)5.) ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date: ____ ☐ Not Applicable

Additional Requirements Comment

III. EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Application - For Title V air operation permitting only, emissions units are classified as regulated, unregulated, or insignificant. If this is an application for Title V air operation permit, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each regulated and unregulated emissions unit addressed in this application for air permit. Some of the subsections comprising the Emissions Unit Information Section of the form are optional for unregulated emissions units. Each such subsection is appropriately marked. Insignificant emissions units are required to be listed at Section II, Subsection C.

Air Construction Permit or FESOP Application - For air construction permitting or federally enforceable state air operation permitting, emissions units are classified as either subject to air permitting or exempt from air permitting. The concept of an "unregulated emissions unit" does not apply. If this is an application for air construction permit or FESOP, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air permitting are required to be listed at Section II, Subsection C.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit Application – Where this application is used to apply for both an air construction permit and a revised/renewal Title V air operation permit, each emissions unit is classified as either subject to air permitting or exempt from air permitting for air construction permitting purposes and as regulated, unregulated, or insignificant for Title V air operation permitting purposes. **The air construction permitting classification must be used to complete the Emissions Unit Information Section of this application for air permit.** A separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air construction permitting and insignificant emissions units are required to be listed at Section II, Subsection C.

If submitting the application form in hard copy, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application must be indicated in the space provided at the top of each page.

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. Regulated or Unregulated Emissions Unit? (Check one, if applying for an initial, revised or renewal Title V air operation permit. Skip this item if applying for an air construction permit or FESOP only.)

☒ The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

☐ The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in this Section: (Check one)

☒ This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

☐ This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

☐ This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Description of Emissions Unit Addressed in this Section:
Steam Electric Generator No. 2

3. Emissions Unit Identification Number: **002**

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
A			**49**	☒ Yes ☐ No

9. Package Unit:
Manufacturer: Model Number:

10. Generator Nameplate Rating: **735.9** MW

11. Emissions Unit Comment:
Unit No. 2 is a "regulated" emissions unit.
Generator nameplate rating will be 735.9 MW after the upgrades are complete, which were requested by separate application on February 13, 2006.

Emissions Unit Control Equipment

1. Control Equipment/Method(s) Description: **Existing Control Equipment:** **Electrostatic Precipitator (10)** **Wet Limestone Flue Gas Desulfurization or FGD (67)** **Proposed Control Equipment:** **Low NOx Burners (205)** **Low Excess-Air Firing (204)** **Selective Catalytic Reduction or SCR (139)** **Alkali Injection (70)**	
2. Control Device or Method Code(s): **10, 67, 70, 139, 204, and 205**	

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate:		
2. Maximum Production Rate:		
3. Maximum Heat Input Rate: 7,172 million Btu/hr		
4. Maximum Incineration Rate:	pounds/hr tons/day	
5. Requested Maximum Operating Schedule:	24 hours/day 52 weeks/year	7 days/week 8,760 hours/year
6. Operating Capacity/Schedule Comment:		

C. EMISSION POINT (STACK/VENT) INFORMATION
(Optional for unregulated emissions units.)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram: **EU 002**	2. Emission Point Type Code: **1**
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking:	
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:	

5. Discharge Type Code: **V**	6. Stack Height: **695** feet	7. Exit Diameter: **26.5** feet
8. Exit Temperature: **128** °F	9. Actual Volumetric Flow Rate: **1,987,064** acfm	10. Water Vapor: %

11. Maximum Dry Standard Flow Rate: dscfm	12. Nonstack Emission Point Height: feet
13. Emission Point UTM Coordinates... Zone: East (km): North (km):	14. Emission Point Latitude/Longitude... Latitude (DD/MM/SS) Longitude (DD/MM/SS)
15. Emission Point Comment:	

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 4

1. Segment Description (Process/Fuel Type): **Bituminous Coal**		
2. Source Classification Code (SCC): **1-01-002-02**	3. SCC Units: **Tons Burned**	
4. Maximum Hourly Rate: **326**	5. Maximum Annual Rate: **2,855,760**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: *****	8. Maximum % Ash: **11.0**	9. Million Btu per SCC Unit: **22**
10. Segment Comment: *** Representative maximum 70/30 blend= 4.7% sulfur, based on 3.8% sulfur for coal and 6.8% sulfur for pet coke. Individual shipments of coal can exceed 3.8% and pet coke is limited to 7%. Million Btu per SCC Unit is based on 11,300 Btu/lb, the mimimum expected, or worst-case value. Max hourly and annual rates based on nominal fuel heating value and unit max heat imput of 7,172 MMBtu/hr.**		

Segment Description and Rate: Segment 2 of 4

1. Segment Description (Process/Fuel Type): **Petroleum Coke**		
2. Source Classification Code (SCC): **1-01-008-01**	3. SCC Units: **Tons Burned**	
4. Maximum Hourly Rate: **93.00**	5. Maximum Annual Rate: **814,680**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: **7.0**	8. Maximum % Ash: **1.0**	9. Million Btu per SCC Unit: **26**
10. Segment Comment: **Max pet coke content of coal/pet coke blend is 30 percent by wt.**		

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 3 of 4

1. Segment Description (Process/Fuel Type): **Distillate Oil (Nos. 1 and 2)**		
2. Source Classification Code (SCC): **1-01-005-01**	3. SCC Units: **1000 Gallons Burned**	
4. Maximum Hourly Rate: **3.32**	5. Maximum Annual Rate: **1,664.2**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: **0.5**	8. Maximum % Ash: **0.1**	9. Million Btu per SCC Unit: **136**
10. Segment Comment: **Distillate oil is used for startups, flame stabilization, emergency reserve capacity during statewide energy shortages, and limited supplemental load.**		

Segment Description and Rate: Segment 4 of 4

1. Segment Description (Process/Fuel Type): **On-specification Used Oil**		
2. Source Classification Code (SCC): **1-01-013-02**	3. SCC Units: **1000 Gallons Burned**	
4. Maximum Hourly Rate: **3.30**	5. Maximum Annual Rate: **500**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: **0.50**	8. Maximum % Ash: **0.10**	9. Million Btu per SCC Unit: **142**
10. Segment Comment: **On-spec used oil max levels: arsenic- 5 ppm; cadmium- 2 ppm; chromium- 10 ppm; lead- 100 ppm; total halogens- 1,000 ppm; flash point- 100 F; and PCBs- < 50 ppm.**		

E. EMISSIONS UNIT POLLUTANTS

List of Pollutants Emitted by Emissions Unit

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
SO2	67		EL
PM/PM10	10		EL
NOX	139	204 and 205	EL
CO			NS
VOC			NS
SAM	70		NS
Hg	139/67	10	EL

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **SO2**	2. Total Percent Efficiency of Control: **95%**
3. Potential Emissions: **5,397** lb/hour **23,637** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.38 lb/MMBtu** Reference: **Proposed emissions**	7. Emissions Method Code: **0**
8. Calculation of Emissions: **See PSD Report.** **The lb/hr and ton/yr emissions above are for Units 1 and 2 combined. The weighted average emission rate of 0.38 lb/MMBtu (24-hr average) equates to no net increase in SO2 emissions for the overall project, at a 100 percent capacity factor. The results of air quality modeling for the existing SGS facility indicate that, at the allowable SO2 emission rate of 0.38 lb/MMBtu, emissions from SGS, after Unit 3 comes online, result in no impact above increments (see PSD Report).**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 3

1. Basis for Allowable Emissions Code: **ESCPSD**	2. Future Effective Date of Allowable Emissions: **5/12**
3. Allowable Emissions and Units: **0.38 lb/MMBtu**	4. Equivalent Allowable Emissions: **5,397** lb/hour **23,637** tons/year
5. Method of Compliance: **Continuous Emissions Monitoring System (CEMS).**	
6. Allowable Emissions Comment (Description of Operating Method): **The lb/hr and ton/yr emissions are for Units 1 and 2 combined and the proposed lb/MMBtu limit is a weighed-average limit between Units 1 and 2.**	

Allowable Emissions Allowable Emissions 2 of 3

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions 3 of 3

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

<u>Potential/Estimated Fugitive Emissions</u>

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **NOX**

2. Total Percent Efficiency of Control: **65 %**

3. Potential Emissions: **4,784** lb/hour **20,953** tons/year

4. Synthetically Limited? ☐ Yes ☒ No

5. Range of Estimated Fugitive Emissions (as applicable): to tons/year

6. Emission Factor: **0.33 lb/MMBtu**
Reference: **Proposed emissions**

7. Emissions Method Code: **0**

8. Calculation of Emissions:

See PSD Report.

The lb/hr and ton/yr emissions above are for Units 1 and 2 combined. The weighted-average emission of 0.33 lb/MMBtu equates to no net increase in NOx emissions for the overall project, at a 100 percent capacity factor. The results of air quality modeling for the existing SGS facility indicated that, at the allowable NOx emission rate, emissions from SGS, after Unit 3 comes online, result in no significant impact on regional haze.

9. Pollutant Potential/Estimated Fugitive Emissions Comment:

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 3

1. Basis for Allowable Emissions Code: **ESCPSD**	2. Future Effective Date of Allowable Emissions: **5/12**
3. Allowable Emissions and Units: **0.33 lb/MMBtu**	4. Equivalent Allowable Emissions: **4,784** lb/hour **20,953** tons/year
5. Method of Compliance: **Continuous Emissions Monitoring System (CEMS)**	
6. Allowable Emissions Comment (Description of Operating Method): **Allowable emissions are a weighted-average between Units 1 and 2.**	

Allowable Emissions Allowable Emissions 2 of 3

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions 3 of 3

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **SAM**	2. Total Percent Efficiency of Control: **60** %
3. Potential Emissions: **449** lb/hour **1,965** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.03 lb/MMBtu** Reference: **Test Data**	7. Emissions Method Code:
8. Calculation of Emissions: **See PSD Report.** **The lb/hr and ton/yr emissions above are for Units 1 and 2 combined. The weighted-average emission rate of .03 lb/MMBtu equates to no net increase in SAM emissions for the overall project, at a 100 percent capacity factor.**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions: **5/12**
3. Allowable Emissions and Units: **1,965** tons/yr	4. Equivalent Allowable Emissions: Lb/hour **1,965** tons/year
5. Method of Compliance: **See PSD Report.**	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **Hg**	2. Total Percent Efficiency of Control: **90** %
3. Potential Emissions: **0.0083** lb/hour **0.036** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **7.05 lb/Trillion Btu** Reference: **Test Data**	7. Emissions Method Code:
8. Calculation of Emissions: **See PSD Report.** **Hg emissions of 0.036 ton/yr are from Units 1 and 2 combined.**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **119 lb/yr**	4. Equivalent Allowable Emissions: **0.0083** lb/hour **0.036** tons/year
5. Method of Compliance: **See PSD Report.**	
6. Allowable Emissions Comment (Description of Operating Method): **A cap of 119 lb/yr for Units 1, 2 and 3 combined represents 90% control for all three units, and is a decrease from the current baseline of 131 lb/yr.**	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

G. VISIBLE EMISSIONS INFORMATION

Complete if this emissions unit is or would be subject to a unit-specific visible emissions limitation.

Visible Emissions Limitation: Visible Emissions Limitation 1 of 1

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

Visible Emissions Limitation: Visible Emissions Limitation _____ of _____

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: ☐ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

H. CONTINUOUS MONITOR INFORMATION

Complete if this emissions unit is or would be subject to continuous monitoring.

Continuous Monitoring System: Continuous Monitor 1 of 4

1. Parameter Code: **SO2**	2. Pollutant(s): **SO2**
3. CMS Requirement: ☒ Rule ☐ Other	
4. Monitor Information... Manufacturer: **Thermo-Environmental Instruments, inc.** Model Number: **43B** Serial Number: **43B-46935-277**	
5. Installation Date: **05/31/1994**	6. Performance Specification Test Date: **10/19/1994**
7. Continuous Monitor Comment: **40 CFR 60, Subpart Da and 40 CFR Part 75.**	

Continuous Monitoring System: Continuous Monitor 2 of 4

1. Parameter Code: **NOX**	2. Pollutant(s): **NOX**
3. CMS Requirement: ☒ Rule ☐ Other	
4. Monitor Information... Manufacturer: **Thermo-Environmental, Inc.** Model Number: **42D** Serial Number: **42D-46961-277**	
5. Installation Date: **05/11/1994**	6. Performance Specification Test Date: **10/19/1994**
7. Continuous Monitor Comment: **40 CFR 60, Subpart Da and 40 CFR Part 75.**	

H. CONTINUOUS MONITOR INFORMATION

Complete if this emissions unit is or would be subject to continuous monitoring.

Continuous Monitoring System: Continuous Monitor 3 of 4

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement: ☒ Rule ☐ Other	
4. Monitor Information... Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

Continuous Monitoring System: Continuous Monitor 4 of 4

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement: ☒ Rule ☐ Other	
4. Monitor Information... Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

I. EMISSIONS UNIT ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1. Process Flow Diagram (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: **B-2A through B-2C** ☒ Previously Submitted, Date **2/13/06**

2. Fuel Analysis or Specification (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: **B-6** ☒ Previously Submitted, Date **2/13/06**

3. Detailed Description of Control Equipment (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: **B-3** ☒ Previously Submitted, Date **2/13/06**

4. Procedures for Startup and Shutdown (Required for all operation permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: **B-8 and B-9** ☒ Previously Submitted, Date **2/13/06**
   ☐ Not Applicable (construction application)

5. Operation and Maintenance Plan (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: _____ ☒ Previously Submitted, Date **July 2004**
   ☐ Not Applicable

6. Compliance Demonstration Reports/Records
   ☐ Attached, Document ID: _____
   Test Date(s)/Pollutant(s) Tested: _____

   ☐ Previously Submitted, Date: _____
   Test Date(s)/Pollutant(s) Tested: _____

   ☐ To be Submitted, Date (if known): _____
   Test Date(s)/Pollutant(s) Tested: _____

   ☐ Not Applicable

   Note: For FESOP applications, all required compliance demonstration records/reports must be submitted at the time of application. For Title V air operation permit applications, all required compliance demonstration reports/records must be submitted at the time of application, or a compliance plan must be submitted at the time of application.

7. Other Information Required by Rule or Statute
   ☐ Attached, Document ID: _____ ☒ Not Applicable

Additional Requirements for Air Construction Permit Applications

1.	Control Technology Review and Analysis (Rules 62-212.400(6) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)) ☐ Attached, Document ID: **See PSD Report** ☒ Not Applicable
2.	Good Engineering Practice Stack Height Analysis (Rule 62-212.400(5)(h)6., F.A.C., and Rule 62-212.500(4)(f), F.A.C.) ☐ Attached, Document ID: ☒ Not Applicable
3.	Description of Stack Sampling Facilities (Required for proposed new stack sampling facilities only) ☐ Attached, Document ID: ☒ Not Applicable

Additional Requirements for Title V Air Operation Permit Applications

1.	Identification of Applicable Requirements ☐ Attached, Document ID: _____ ☐ Not Applicable
2.	Compliance Assurance Monitoring ☐ Attached, Document ID: _____ ☐ Not Applicable
3.	Alternative Methods of Operation ☐ Attached, Document ID: _____ ☐ Not Applicable
4.	Alternative Modes of Operation (Emissions Trading) ☐ Attached, Document ID: _____ ☐ Not Applicable

5.	Acid Rain Part Application
	☐ Certificate of Representation (EPA Form No. 7610-1)
	  ☐ Copy Attached, Document ID: _____
	☐ Acid Rain Part (Form No. 62-210.900(1)(a))
	  ☐ Attached, Document ID: _____
	  ☐ Previously Submitted, Date: _____
	☐ Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)
	  ☐ Attached, Document ID: _____
	  ☐ Previously Submitted, Date: _____
	☐ New Unit Exemption (Form No. 62-210.900(1)(a)2.)
	  ☐ Attached, Document ID: _____
	  ☐ Previously Submitted, Date: _____
	☐ Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)
	  ☐ Attached, Document ID: _____
	  ☐ Previously Submitted, Date: _____
	☐ Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.)
	  ☐ Attached, Document ID: _____
	  ☐ Previously Submitted, Date: _____
	☐ Phase II NOx Averaging Plan (Form No. 62-210.900(1)(a)5.)
	  ☐ Attached, Document ID: _____
	  ☐ Previously Submitted, Date: _____
	☐ Not Applicable

Additional Requirements Comment

III. EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Application - For Title V air operation permitting only, emissions units are classified as regulated, unregulated, or insignificant. If this is an application for Title V air operation permit, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each regulated and unregulated emissions unit addressed in this application for air permit. Some of the subsections comprising the Emissions Unit Information Section of the form are optional for unregulated emissions units. Each such subsection is appropriately marked. Insignificant emissions units are required to be listed at Section II, Subsection C.

Air Construction Permit or FESOP Application - For air construction permitting or federally enforceable state air operation permitting, emissions units are classified as either subject to air permitting or exempt from air permitting. The concept of an "unregulated emissions unit" does not apply. If this is an application for air construction permit or FESOP, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air permitting are required to be listed at Section II, Subsection C.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit Application – Where this application is used to apply for both an air construction permit and a revised/renewal Title V air operation permit, each emissions unit is classified as either subject to air permitting or exempt from air permitting for air construction permitting purposes and as regulated, unregulated, or insignificant for Title V air operation permitting purposes. **The air construction permitting classification must be used to complete the Emissions Unit Information Section of this application for air permit.** A separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air construction permitting and insignificant emissions units are required to be listed at Section II, Subsection C.

If submitting the application form in hard copy, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application must be indicated in the space provided at the top of each page.

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. Regulated or Unregulated Emissions Unit? (Check one, if applying for an initial, revised or renewal Title V air operation permit. Skip this item if applying for an air construction permit or FESOP only.)

☒ The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

☐ The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in this Section: (Check one)

☒ This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

☐ This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

☐ This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Description of Emissions Unit Addressed in this Section:
Steam Electric Generator No. 3

3. Emissions Unit Identification Number: **003**

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
C	**1/08**	**5/12**	**49**	☒ Yes ☐ No

9. Package Unit:
Manufacturer: Model Number:

10. Generator Nameplate Rating: **750 (net)** MW

11. Emissions Unit Comment:

Unit No. 3 is a "regulated" emissions unit.
Generator nameplate rating will be 750 MW (net) and approximately 820 MW (gross).

Emissions Unit Control Equipment

1. Control Equipment/Method(s) Description:

Proposed Control Equipment:

Low NOx Burners (205)
Low Excess-Air Firing (204)
Selective Catalytic Reduction or SCR (139)
Electrostatic Precipitator or ESP (10)
Wet Limestone Flue Gas Desulfurization or FGD (67)
Wet ESP (146)

2. Control Device or Method Code(s): **10, 67, 70, 139, 146, 204 and 205**

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate:	
2. Maximum Production Rate:	
3. Maximum Heat Input Rate: 7,500 million Btu/hr	
4. Maximum Incineration Rate: pounds/hr tons/day	
5. Requested Maximum Operating Schedule: 24 hours/day 52 weeks/year	 7 days/week 8,760 hours/year
6. Operating Capacity/Schedule Comment:	

C. EMISSION POINT (STACK/VENT) INFORMATION
(Optional for unregulated emissions units.)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram: **EU 003**		2. Emission Point Type Code: **1**
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking:		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:		
5. Discharge Type Code: **V**	6. Stack Height: **675** feet	7. Exit Diameter: **26.0** feet
8. Exit Temperature: **126** °F	9. Actual Volumetric Flow Rate: **1,970,000** acfm	10. Water Vapor: %
11. Maximum Dry Standard Flow Rate: dscfm		12. Nonstack Emission Point Height: feet
13. Emission Point UTM Coordinates... Zone: East (km): North (km):		14. Emission Point Latitude/Longitude... Latitude (DD/MM/SS) Longitude (DD/MM/SS)
15. Emission Point Comment:		

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 3

1. Segment Description (Process/Fuel Type): **Bituminous Coal**		
2. Source Classification Code (SCC): **1-01-002-02**	3. SCC Units: **Tons Burned**	
4. Maximum Hourly Rate: **318.3**	5. Maximum Annual Rate: **2,788,625**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: *****	8. Maximum % Ash: **11.0**	9. Million Btu per SCC Unit: **23.56**
10. Segment Comment: *** Representative maximum 70/30 blend= 4.7% sulfur, based on 3.8% sulfur for coal and 6.8% sulfur for pet coke. Individual shipments of coal can exceed 3.8% and pet coke is limited to 7%. Million Btu per SCC Unit is based on 11,300 Btu/lb, the mimimum expected, or worst-case value. Max hourly and annual rates based on nominal fuel heating value and unit max heat imput of 7,500 MMBtu/hr.**		

Segment Description and Rate: Segment 2 of 3

1. Segment Description (Process/Fuel Type): **Petroleum coke**		
2. Source Classification Code (SCC): **1-01-008-01**	3. SCC Units: **Tons Burned**	
4. Maximum Hourly Rate: **95.5**	5. Maximum Annual Rate: **836,587**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: **7.0**	8. Maximum % Ash: **1.0**	9. Million Btu per SCC Unit: **26.0**
10. Segment Comment: **Max pet coke content of coal/pet coke blend is 30 percent by wt. The minimum average heating value was assumed at 12,900 Btu/lb (HHV).**		

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 3 of 3

1. Segment Description (Process/Fuel Type): **Distillate Oil (Nos. 1 and 2)**		
2. Source Classification Code (SCC): **1-01-005-01**	3. SCC Units: **1000 Gallons Burned**	
4. Maximum Hourly Rate: **3.32**	5. Maximum Annual Rate: **1,664.2**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: **0.5**	8. Maximum % Ash: **0.10**	9. Million Btu per SCC Unit: **136**
10. Segment Comment: **Distillate oil is used for startups, flame stabilization, emergency reserve capacity during statewide energy shortages, and limited supplemental load.**		

Segment Description and Rate: Segment of

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

E. EMISSIONS UNIT POLLUTANTS

List of Pollutants Emitted by Emissions Unit

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
SO2	67		EL
PM/PM10	10		EL
NOX	139	204 and 205	EL
CO			EL
VOC			EL
SAM	146	70	EL
Hg	139/67	146/10	EL
HF	146/10		EL

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **SO2**	2. Total Percent Efficiency of Control: **98%**
3. Potential Emissions: **1,238** lb/hour **5,420** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.165 lb/MMBtu** Reference: **Proposed emissions**	7. Emissions Method Code: **0**

8. Calculation of Emissions:

*** Representative maximum 70/30 blend= 4.7% sulfur, based on 3.8% sulfur for coal and 6.8% sulfur for pet coke. Individual shipments of coal can exceed 3.8% and pet coke is limited to 7%. Assumes 98% scrubbing efficiency; and a heat input of 7,500 MMBtu/hr.**

These emissions will be offset by corresponding reductions on Units 1 and 2.

9. Pollutant Potential/Estimated Fugitive Emissions Comment:

Potential emissions set equal to allowable emissions.

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 3

1. Basis for Allowable Emissions Code: **ESCPSD**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **0.165 lb/MMBtu**	4. Equivalent Allowable Emissions: **1,238** lb/hour **5,420** tons/year
5. Method of Compliance: **Continuous Emissions Monitoring System (CEMS).**	
6. Allowable Emissions Comment (Description of Operating Method): **24-hr block average.**	

Allowable Emissions Allowable Emissions 2 of 3

1. Basis for Allowable Emissions Code: **RULE**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **1.4 lb/MWh or 95% removal**	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method): **Revised NSPS Subpart Da**	

Allowable Emissions Allowable Emissions 3 of 3

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **NOX**	2. Total Percent Efficiency of Control: **80 %**
3. Potential Emissions: **525** lb/hour **2,300** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.07 lb/MMBtu** Reference: **Proposed emissions**	7. Emissions Method Code: **0**
8. Calculation of Emissions: **See PSD Report (Table 2-2).** **Proposed emission rate based on a 30-day rolling average. Estimated control efficiency assumes uncontrolled rate of 0.35 lb/MMBtu from the Low NOx burners and OFA system.** **These emissions will be offset by corresponding reductions at Units 1 and 2.**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 3

1. Basis for Allowable Emissions Code: **RULE**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **0.07 lb/MMBtu**	4. Equivalent Allowable Emissions: **525** lb/hour **2,300** tons/year
5. Method of Compliance: **Continuous Emissions Monitoring System (CEMS)**	
6. Allowable Emissions Comment (Description of Operating Method): **This limit will show compliance with the revised NSPS Subpart Da and net out of PSD review.**	

Allowable Emissions Allowable Emissions 2 of 3

1. Basis for Allowable Emissions Code: **RULE**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **1.6 lb/MWh**	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method): **Revised NSPS Subpart Da**	

Allowable Emissions Allowable Emissions 3 of 3

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **PM/PM10**	2. Total Percent Efficiency of Control: **99.60** %
3. Potential Emissions: **113** lb/hour **493** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.015 lb/MMBtu** Reference: **BACT Limit**	7. Emissions Method Code:
8. Calculation of Emissions: **See PSD Report (Table 2-2).**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: **Potential Emissions set equal to allowable emissions.**	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: RULE	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **0.015 lb/MMBtu**	4. Equivalent Allowable Emissions: **113** lb/hour **493** tons/year
5. Method of Compliance: **Initial Test—EPA Reference Method 5B**	
6. Allowable Emissions Comment (Description of Operating Method): **Revised NSPS Subpart Da and BACT.**	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **CO**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **1,125** lb/hour **4,928** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.15 lb/MMBtu** Reference: **BACT Limit**	7. Emissions Method Code:
8. Calculation of Emissions: **See PSD Report (Table 2-2).**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: **Potential emissions set equal to allowable emissions.**	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **RULE**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **0.15 lb/MMBtu**	4. Equivalent Allowable Emissions: **1,125** lb/hour **4,928** tons/year
5. Method of Compliance: **Initial Test—EPA Reference Method 10**	
6. Allowable Emissions Comment (Description of Operating Method): **BACT**	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **VOC**	2. Total Percent Efficiency of Control: %
3. Potential Emissions: **19.60** lb/hour **85.7** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.004 lb/MMBtu** Reference: **BACT Limit**	7. Emissions Method Code:
8. Calculation of Emissions: **See PSD Report (Table 2-2).**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: **Potential emissions set equal to allowable emissions.**	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **RULE**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **0.004 lb/MMBtu**	4. Equivalent Allowable Emissions: **30.0** lb/hour **131.4** tons/year
5. Method of Compliance: **Initial Test- EPA Reference Methods 18 or 25A (Baseload)**	
6. Allowable Emissions Comment (Description of Operating Method): **BACT**	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **SAM**	2. Total Percent Efficiency of Control: **90** %
3. Potential Emissions: **37.5** lb/hour **164** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.005 lb/MMBtu** Reference:	7. Emissions Method Code:
8. Calculation of Emissions: **See PSD Report (Table 2-2).** **These emissions will be offset by corresponding reductions on Units 1 and 2.**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: **Potential emissions are set equal to allowable emissions.**	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: ESCPSD	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **0.005 lb/MMBtu**	4. Equivalent Allowable Emissions: **37.5** Lb/hour **164** tons/year
5. Method of Compliance: **Initial Test- EPA Reference Method 8A (Controlled Condensate Method)**	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **Hg**	2. Total Percent Efficiency of Control: **90** %
3. Potential Emissions: **0.005** lb/hour **0.023** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **7.05 E-06 lb/MW-hr** Reference: **Proposed Limit**	7. Emissions Method Code:
8. Calculation of Emissions: **See PSD Report.** **These emissions will be offset by corresponding reductions on Units 1 and 2.**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: **Potential emissions are set equal to allowable emissions.**	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **7.05 E-06 lb/MW-hr**	4. Equivalent Allowable Emissions: **0.005** Lb/hour **0.023** tons/year
5. Method of Compliance: **CEMS or alternate allowed under 40 CFR Part 75**	
6. Allowable Emissions Comment (Description of Operating Method): **Annual average.** **A cap of 119 lb/yr for Units 1, 2 and 3 represents 90% control for all three units, and shows compliance with recent Emission Guidelines in the Clean Air Mercury Rule.**	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	

6. Allowable Emissions Comment (Description of Operating Method):

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **HF**	2. Total Percent Efficiency of Control: **90** %
3. Potential Emissions: **1.72** lb/hour **7.5** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.00023 lb/MMBtu** Reference: **BACT**	7. Emissions Method Code:
8. Calculation of Emissions: **See PSD Report.**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment: **Potential emissions are set equal to allowable emissions.**	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: RULE	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **0.00023 lb/MMBtu**	4. Equivalent Allowable Emissions: **1.72** Lb/hour **7.5** tons/year
5. Method of Compliance: **Initial—EPA Reference Methods 13A or 13B; Continuous—meeting SO2 emission limit.**	
6. Allowable Emissions Comment (Description of Operating Method): **BACT**	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

G. VISIBLE EMISSIONS INFORMATION

Complete if this emissions unit is or would be subject to a unit-specific visible emissions limitation.

Visible Emissions Limitation: Visible Emissions Limitation 1 of 1

1. Visible Emissions Subtype: **VE**	2. Basis for Allowable Opacity: ☒ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: **20** % Exceptional Conditions: **27** % Maximum Period of Excess Opacity Allowed: **6** min/hour	
4. Method of Compliance: **Continuous Opacity Monitoring System (COMS).**	
5. Visible Emissions Comment: **40 CFR 60, Subpart Da while firing all fuels; standards do not apply during periods of startup, shutdown or malfunction.**	

Visible Emissions Limitation: Visible Emissions Limitation _____ of _____

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: ☐ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

H. CONTINUOUS MONITOR INFORMATION

Complete if this emissions unit is or would be subject to continuous monitoring.

Continuous Monitoring System: Continuous Monitor 1 of 4

1. Parameter Code: **SO2**	2. Pollutant(s): **SO2**
3. CMS Requirement:	☒ Rule ☐ Other
4. Monitor Information... Manufacturer: **To be determined.** Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment: **40 CFR 60, Subpart Da and 40 CFR Part 75.**	

Continuous Monitoring System: Continuous Monitor 2 of 4

1. Parameter Code: **NOX**	2. Pollutant(s): **NOX**
3. CMS Requirement:	☒ Rule ☐ Other
4. Monitor Information... Manufacturer: **To be determined.** Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment: **40 CFR 60, Subpart Da and 40 CFR Part 75.**	

H. CONTINUOUS MONITOR INFORMATION

Complete if this emissions unit is or would be subject to continuous monitoring.

Continuous Monitoring System: Continuous Monitor 3 of 4

1. Parameter Code: VE	2. Pollutant(s): VE
3. CMS Requirement:	☒ Rule ☐ Other
4. Monitor Information... Manufacturer: To be determined. Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment: 40 CFR 60, Subpart Da and 40 CFR Part 75.	

Continuous Monitoring System: Continuous Monitor 4 of 4

1. Parameter Code:	2. Pollutant(s): CO2
3. CMS Requirement:	☒ Rule ☐ Other
4. Monitor Information... Manufacturer: To be determined. Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment: 40 CFR Part 75.	

I. EMISSIONS UNIT ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1. Process Flow Diagram (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☒ Attached, Document ID: **See Fig 1-1** ☐ Previously Submitted, Date _____

2. Fuel Analysis or Specification (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: **B-6** ☒ Previously Submitted, Date **2/13/06**

3. Detailed Description of Control Equipment (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☒ Attached, Document ID: **See PSD Report** ☐ Previously Submitted, Date _____

4. Procedures for Startup and Shutdown (Required for all operation permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: Previously Submitted, Date
   X Not Applicable (construction application)

5. Operation and Maintenance Plan (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: ☐ Previously Submitted, Date
   ☐ Not Applicable

6. Compliance Demonstration Reports/Records
   ☐ Attached, Document ID: _____
   Test Date(s)/Pollutant(s) Tested: _____
   ☐ Previously Submitted, Date: _____
   Test Date(s)/Pollutant(s) Tested: _____
   ☐ To be Submitted, Date (if known): _____
   Test Date(s)/Pollutant(s) Tested: _____
   ☐ Not Applicable
   Note: For FESOP applications, all required compliance demonstration records/reports must be submitted at the time of application. For Title V air operation permit applications, all required compliance demonstration reports/records must be submitted at the time of application, or a compliance plan must be submitted at the time of application.

7. Other Information Required by Rule or Statute
   ☐ Attached, Document ID: _____ ☒ Not Applicable

Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(6) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e))
   X Attached, Document ID: **See PSD Report** Not Applicable
2. Good Engineering Practice Stack Height Analysis (Rule 62-212.400(5)(h)6., F.A.C., and Rule 62-212.500(4)(f), F.A.C.)
   X Attached, Document ID: **See PSD Report** Not Applicable
3. Description of Stack Sampling Facilities (Required for proposed new stack sampling facilities only)
   ☐ Attached, Document ID: ☒ Not Applicable

Additional Requirements for Title V Air Operation Permit Applications

1. Identification of Applicable Requirements
   ☐ Attached, Document ID: _____ ☐ Not Applicable
2. Compliance Assurance Monitoring
   ☐ Attached, Document ID: _____ ☐ Not Applicable
3. Alternative Methods of Operation
   ☐ Attached, Document ID: _____ ☐ Not Applicable
4. Alternative Modes of Operation (Emissions Trading)
   ☐ Attached, Document ID: _____ ☐ Not Applicable
5. Acid Rain Part Application
   ☐ Certificate of Representation (EPA Form No. 7610-1)
      ☐ Copy Attached, Document ID: _____
   ☐ Acid Rain Part (Form No. 62-210.900(1)(a))
      ☐ Attached, Document ID: _____
      ☐ Previously Submitted, Date: _____
   ☐ Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)
      ☐ Attached, Document ID: _____
      ☐ Previously Submitted, Date: _____
   ☐ New Unit Exemption (Form No. 62-210.900(1)(a)2.)
      ☐ Attached, Document ID: _____
      ☐ Previously Submitted, Date: _____
   ☐ Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)
      ☐ Attached, Document ID: _____
      ☐ Previously Submitted, Date: _____
   ☐ Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.)
      ☐ Attached, Document ID: _____
      ☐ Previously Submitted, Date: _____
   ☐ Phase II NOx Averaging Plan (Form No. 62-210.900(1)(a)5.)
      ☐ Attached, Document ID: _____
      ☐ Previously Submitted, Date: _____
   ☐ Not Applicable

Additional Requirements Comment

III. EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Application - For Title V air operation permitting only, emissions units are classified as regulated, unregulated, or insignificant. If this is an application for Title V air operation permit, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each regulated and unregulated emissions unit addressed in this application for air permit. Some of the subsections comprising the Emissions Unit Information Section of the form are optional for unregulated emissions units. Each such subsection is appropriately marked. Insignificant emissions units are required to be listed at Section II, Subsection C.

Air Construction Permit or FESOP Application - For air construction permitting or federally enforceable state air operation permitting, emissions units are classified as either subject to air permitting or exempt from air permitting. The concept of an "unregulated emissions unit" does not apply. If this is an application for air construction permit or FESOP, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air permitting are required to be listed at Section II, Subsection C.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit Application – Where this application is used to apply for both an air construction permit and a revised/renewal Title V air operation permit, each emissions unit is classified as either subject to air permitting or exempt from air permitting for air construction permitting purposes and as regulated, unregulated, or insignificant for Title V air operation permitting purposes. **The air construction permitting classification must be used to complete the Emissions Unit Information Section of this application for air permit.** A separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air construction permitting and insignificant emissions units are required to be listed at Section II, Subsection C.

If submitting the application form in hard copy, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application must be indicated in the space provided at the top of each page.

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. Regulated or Unregulated Emissions Unit? (Check one, if applying for an initial, revised or renewal Title V air operation permit. Skip this item if applying for an air construction permit or FESOP only.)

   ☒ The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

   ☐ The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in this Section: (Check one)

   ☒ This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

   ☐ This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

   ☐ This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Description of Emissions Unit Addressed in this Section:
   Unit 3 Cooling Tower

3. Emissions Unit Identification Number: **EU 014**

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
C		**5/12**		☐ Yes ☒ No

9. Package Unit:
   Manufacturer: Model Number:

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:
   This emission unit is a 26-cell mechanical draft cooling tower (see PSD Report).

Emissions Unit Control Equipment

1. Control Equipment/Method(s) Description: **Drift Eliminators (014)**
2. Control Device or Method Code(s): **014**

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate:		
2. Maximum Production Rate:		
3. Maximum Heat Input Rate:	million Btu/hr	
4. Maximum Incineration Rate:	pounds/hr tons/day	
5. Requested Maximum Operating Schedule:	**24** hours/day **52** weeks/year	**7** days/week **8,760** hours/year
6. Operating Capacity/Schedule Comment:		

C. EMISSION POINT (STACK/VENT) INFORMATION
(Optional for unregulated emissions units.)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram: **See PSD Report**	2. Emission Point Type Code:	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking: **Exhausts through 26 stacks.**		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:		
5. Discharge Type Code: **V**	6. Stack Height: **37** feet	7. Exit Diameter: **34** feet
8. Exit Temperature: **90** °F	9. Actual Volumetric Flow Rate: **1,259,541** acfm	10. Water Vapor: %
11. Maximum Dry Standard Flow Rate: **671,755** dscfm	12. Nonstack Emission Point Height: feet	
13. Emission Point UTM Coordinates... Zone: East (km): North (km):	14. Emission Point Latitude/Longitude... Latitude (DD/MM/SS) Longitude (DD/MM/SS)	
15. Emission Point Comment: **Stack Diameter and Volume are per cell for 26-cell cooling tower. See PSD Report.**		

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment ____ of ____

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

Segment Description and Rate: Segment ____ of ____

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

E. EMISSIONS UNIT POLLUTANTS

List of Pollutants Emitted by Emissions Unit

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
PM			EL
PM_{10}			EL

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **PM**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **2.16** lb/hour **9.5** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **See PSD Report** Reference: **B&M, 2005; Golder, 2005.**	7. Emissions Method Code: **2**
8. Calculation of Emissions: **See PSD Report, Section 2.0 and Appendix A.**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **Design Drift Rate = 0.0005%**	4. Equivalent Allowable Emissions: **2.16** lb/hour **9.5** tons/year
5. Method of Compliance: **None, design basis.**	
6. Allowable Emissions Comment (Description of Operating Method): **See PSD Report, Section 2.0 and Appendix A.**	

Allowable Emissions Allowable Emissions ____ of ____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions ____ of ____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **PM_{10}**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **1.25** lb/hour **5.5** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **See PSD Report** Reference: **B&M, 2005; Golder, 2005.**	7. Emissions Method Code: **2**
8. Calculation of Emissions: **PM_{10} = 38.3% of PM at a TDS of 2,400; see PSD Report, Section 2.0 and Appendix A.**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **Design Drift Rate = 0.0005%**	4. Equivalent Allowable Emissions: **1.25** lb/hour **5.5** tons/year
5. Method of Compliance: **None, design basis.**	
6. Allowable Emissions Comment (Description of Operating Method): **See PSD Report, Section 2.0 and Appendix A.**	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

G. VISIBLE EMISSIONS INFORMATION

Complete if this emissions unit is or would be subject to a unit-specific visible emissions limitation.

Visible Emissions Limitation: Visible Emissions Limitation _____ of _____

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: ☐ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

Visible Emissions Limitation: Visible Emissions Limitation _____ of _____

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: ☐ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

H. CONTINUOUS MONITOR INFORMATION

Complete if this emissions unit is or would be subject to continuous monitoring.

Continuous Monitoring System: Continuous Monitor _____ of _____

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement: ☐ Rule ☐ Other	
4. Monitor Information... Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

Continuous Monitoring System: Continuous Monitor _____ of _____

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement: ☐ Rule ☐ Other	
4. Monitor Information... Manufacturer: Model Number: Serial Number:	
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

I. EMISSIONS UNIT ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1. Process Flow Diagram (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☒ Attached, Document ID: **PSD Report** ☐ Previously Submitted, Date _____
2. Fuel Analysis or Specification (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date _____
3. Detailed Description of Control Equipment (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☒ Attached, Document ID: **PSD Report** ☐ Previously Submitted, Date _____
4. Procedures for Startup and Shutdown (Required for all operation permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date _____
   ☒ Not Applicable (construction application)
5. Operation and Maintenance Plan (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date _____
   ☒ Not Applicable
6. Compliance Demonstration Reports/Records
   ☐ Attached, Document ID: _____
   Test Date(s)/Pollutant(s) Tested: _____

   ☐ Previously Submitted, Date: _____
   Test Date(s)/Pollutant(s) Tested: _____

   ☐ To be Submitted, Date (if known): _____
   Test Date(s)/Pollutant(s) Tested: _____

   ☒ Not Applicable

   Note: For FESOP applications, all required compliance demonstration records/reports must be submitted at the time of application. For Title V air operation permit applications, all required compliance demonstration reports/records must be submitted at the time of application, or a compliance plan must be submitted at the time of application.
7. Other Information Required by Rule or Statute
   ☐ Attached, Document ID: _____ ☒ Not Applicable

Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(6) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)) ☒ Attached, Document ID: **PSD Report** ☐ Not Applicable	
2. Good Engineering Practice Stack Height Analysis (Rule 62-212.400(5)(h)6., F.A.C., and Rule 62-212.500(4)(f), F.A.C.) ☐ Attached, Document ID: ☒ Not Applicable	
3. Description of Stack Sampling Facilities (Required for proposed new stack sampling facilities only) ☐ Attached, Document ID: _____ ☒ Not Applicable	

Additional Requirements for Title V Air Operation Permit Applications

1. Identification of Applicable Requirements ☐ Attached, Document ID: _____ ☐ Not Applicable	
2. Compliance Assurance Monitoring ☐ Attached, Document ID: _____ ☐ Not Applicable	
3. Alternative Methods of Operation ☐ Attached, Document ID: _____ ☐ Not Applicable	
4. Alternative Modes of Operation (Emissions Trading) ☐ Attached, Document ID: _____ ☐ Not Applicable	
5. Acid Rain Part Application ☐ Certificate of Representation (EPA Form No. 7610-1) ☐ Copy Attached, Document ID: _____ ☐ Acid Rain Part (Form No. 62-210.900(1)(a)) ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date: _____ ☐ Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date: _____ ☐ New Unit Exemption (Form No. 62-210.900(1)(a)2.) ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date: _____ ☐ Retired Unit Exemption (Form No. 62-210.900(1)(a)3.) ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date: _____ ☐ Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.) ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date: _____ ☐ Phase II NOx Averaging Plan (Form No. 62-210.900(1)(a)5.) ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date: _____ ☐ Not Applicable	

Additional Requirements Comment

III. EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Application - For Title V air operation permitting only, emissions units are classified as regulated, unregulated, or insignificant. If this is an application for Title V air operation permit, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each regulated and unregulated emissions unit addressed in this application for air permit. Some of the subsections comprising the Emissions Unit Information Section of the form are optional for unregulated emissions units. Each such subsection is appropriately marked. Insignificant emissions units are required to be listed at Section II, Subsection C.

Air Construction Permit or FESOP Application - For air construction permitting or federally enforceable state air operation permitting, emissions units are classified as either subject to air permitting or exempt from air permitting. The concept of an "unregulated emissions unit" does not apply. If this is an application for air construction permit or FESOP, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air permitting are required to be listed at Section II, Subsection C.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit Application – Where this application is used to apply for both an air construction permit and a revised/renewal Title V air operation permit, each emissions unit is classified as either subject to air permitting or exempt from air permitting for air construction permitting purposes and as regulated, unregulated, or insignificant for Title V air operation permitting purposes. **The air construction permitting classification must be used to complete the Emissions Unit Information Section of this application for air permit.** A separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air construction permitting and insignificant emissions units are required to be listed at Section II, Subsection C.

If submitting the application form in hard copy, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application must be indicated in the space provided at the top of each page.

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. Regulated or Unregulated Emissions Unit? (Check one, if applying for an initial, revised or renewal Title V air operation permit. Skip this item if applying for an air construction permit or FESOP only.)

   ☒ The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

   ☐ The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in this Section: (Check one)

   ☒ This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

   ☐ This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

   ☐ This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Description of Emissions Unit Addressed in this Section:
   Zero Liquid Discharge (ZLD) System Spray Dryers. These diesel fuel-fired units are not a boiler or a process heater.

3. Emissions Unit Identification Number: **EU 015**

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
C				☐ Yes ☒ No

9. Package Unit:
   Manufacturer: Model Number:

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:

Emissions Unit Control Equipment

1. Control Equipment/Method(s) Description: **Good Combustion Practice – Diesel fuel fired** **Baghouse (018)**
2. Control Device or Method Code(s): **018**

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1.	Maximum Process or Throughput Rate:
2.	Maximum Production Rate:
3.	Maximum Heat Input Rate: **50** million Btu/hr
4.	Maximum Incineration Rate: pounds/hr tons/day
5.	Requested Maximum Operating Schedule: **24** hours/day **7** days/week **52** weeks/year **8,760** hours/year
6.	Operating Capacity/Schedule Comment: **The zero liquid discharge (ZLD) system will utilize three spray dryers to remove the final moisture from the wastewater treatment effluent. This process involves the atomization of concentrated wastewater into a spray of droplets and contacting the droplets with hot air in a drying chamber. The sprays can be produced by either rotary (wheel) or nozzle atomizers. Evaporation of moisture from the droplets and formation of dry particles proceed under controlled temperature and airflow conditions. The particles are discharged continuously from the drying chamber and collected in a particulate removal device. The spray dryer will use distillate oil for heating the air necessary to dry the concentrated wastewater. Small amounts of CO and VOC will be emitted in the combustion process. Good combustion practices are proposed for the three spray dryers associated with the Unit 3 Project. There are no other available or feasible control technologies that would further reduce CO and VOC emissions other than good combustion practices.**

C. EMISSION POINT (STACK/VENT) INFORMATION
(Optional for unregulated emissions units.)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram: **See PSD Report**	2. Emission Point Type Code:
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking:	
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:	

5. Discharge Type Code: **V**	6. Stack Height: **105** feet	7. Exit Diameter: **2.34** feet
8. Exit Temperature: °F	9. Actual Volumetric Flow Rate: **11,605** acfm	10. Water Vapor: %

11. Maximum Dry Standard Flow Rate: dscfm	12. Nonstack Emission Point Height: feet
13. Emission Point UTM Coordinates... Zone: East (km): North (km):	14. Emission Point Latitude/Longitude... Latitude (DD/MM/SS) Longitude (DD/MM/SS)
15. Emission Point Comment:	

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): **Diesel fuel combustion**			
2. Source Classification Code (SCC):		3. SCC Units: **1000 gallons**	
4. Maximum Hourly Rate: **0.37**	5. Maximum Annual Rate: **3,242**		6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: **0.5**	8. Maximum % Ash:		9. Million Btu per SCC Unit: **135.1**
10. Segment Comment: **Maximum annual rate based on 8,760 hr / yr operation.**			

Segment Description and Rate: Segment _____ of _____

1. Segment Description (Process/Fuel Type):			
2. Source Classification Code (SCC):		3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:		6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:		9. Million Btu per SCC Unit:
10. Segment Comment:			

E. EMISSIONS UNIT POLLUTANTS

List of Pollutants Emitted by Emissions Unit

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
CO			NS
PM/PM10			EL
NOx			NS
SO2			EL
VOC			NS

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **CO**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **1.9** lb/hour **8.11** tons/year	4. Synthetically Limited? ☒ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **5.0 lb/1,000 gal** Reference: **AP-42, Tables 1.3-1 and 1.3-3**	7. Emissions Method Code: **5**
8. Calculation of Emissions:	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **NOx**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **7.4** lb/hour **32.4** tons/year	4. Synthetically Limited? ☒ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **20.0 lb/1,000 gal** Reference: **AP-42, Tables 1.3-1 and 1.3-3**	7. Emissions Method Code: **5**
8. Calculation of Emissions:	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **SO2**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **3.7** lb/hour **16.2** tons/year	4. Synthetically Limited? ☒ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.5% S fuel oil** Reference:	7. Emissions Method Code: **5**
8. Calculation of Emissions:	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: **3.7** lb/hour **16.2** tons/year
5. Method of Compliance: **0.5% sulfur distillate fuel oil**	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **PM/PM10**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **0.9** lb/hour **3.9** tons/year	4. Synthetically Limited? ☒ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.9 lb/hr** Reference: **Burns & McDonnell, 2005**	7. Emissions Method Code: **5**
8. Calculation of Emissions: **A baghouse will be used to limit PM emissions to 0.3 lb/hr/dryer. The fabric filter will have an efficiency of greater than 99.5 percent. Fabric filter technology is demonstrated and cost effective for the proposed project. There are no other particulate control devices that would provide greater control. Typical design features for a wastewater fabric filter are a maximum air to cloth ratio of 4 to 1, fiberglass bags (although Nomex and Teflon can be used) and pulsed jet cleaning.**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **0.9 lb/hr**	4. Equivalent Allowable Emissions: **0.9** lb/hour **3.9** tons/year
5. Method of Compliance: **Diesel fuel combustion**	
6. Allowable Emissions Comment (Description of Operating Method): **The lb/hr limit represents 3 spray dryer units (i.e., 0.3 lb/hr/dryer).**	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **VOC**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **0.1** lb/hour **0.55** tons/year	4. Synthetically Limited? ☒ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.34 lb/1,000 gal** Reference: **AP-42, Tables 1.3-1 and 1.3-3.**	7. Emissions Method Code: **5**
8. Calculation of Emissions:	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

G. VISIBLE EMISSIONS INFORMATION

Complete if this emissions unit is or would be subject to a unit-specific visible emissions limitation.

Visible Emissions Limitation: Visible Emissions Limitation _____ of _____

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: ☐ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

Visible Emissions Limitation: Visible Emissions Limitation _____ of _____

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: ☐ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

H. CONTINUOUS MONITOR INFORMATION

Complete if this emissions unit is or would be subject to continuous monitoring.

Continuous Monitoring System: Continuous Monitor _____ of _____

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	☐ Rule ☐ Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

Continuous Monitoring System: Continuous Monitor _____ of _____

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	☐ Rule ☐ Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

I. EMISSIONS UNIT ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1.	Process Flow Diagram (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☒ Attached, Document ID: **PSD Report** ☐ Previously Submitted, Date _____
2.	Fuel Analysis or Specification (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☒ Attached, Document ID: **PSD Report** ☐ Previously Submitted, Date _____
3.	Detailed Description of Control Equipment (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☒ Attached, Document ID: **PSD Report** ☐ Previously Submitted, Date _____
4.	Procedures for Startup and Shutdown (Required for all operation permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date _____ ☒ Not Applicable (construction application)
5.	Operation and Maintenance Plan (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date _____ ☒ Not Applicable
6.	Compliance Demonstration Reports/Records ☐ Attached, Document ID: _____ Test Date(s)/Pollutant(s) Tested: _____ ☐ Previously Submitted, Date: _____ Test Date(s)/Pollutant(s) Tested: _____ ☐ To be Submitted, Date (if known): _____ Test Date(s)/Pollutant(s) Tested: _____ ☒ Not Applicable Note: For FESOP applications, all required compliance demonstration records/reports must be submitted at the time of application. For Title V air operation permit applications, all required compliance demonstration reports/records must be submitted at the time of application, or a compliance plan must be submitted at the time of application.
7.	Other Information Required by Rule or Statute ☐ Attached, Document ID: _____ ☒ Not Applicable

Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(6) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)) ☒ Attached, Document ID: PSD Report ☐ Not Applicable	
2. Good Engineering Practice Stack Height Analysis (Rule 62-212.400(5)(h)6., F.A.C., and Rule 62-212.500(4)(f), F.A.C.) ☒ Attached, Document ID: ☐ Not Applicable	
3. Description of Stack Sampling Facilities (Required for proposed new stack sampling facilities only) ☐ Attached, Document ID: ____ ☒ Not Applicable	

Additional Requirements for Title V Air Operation Permit Applications

1. Identification of Applicable Requirements ☐ Attached, Document ID: ____ ☐ Not Applicable	
2. Compliance Assurance Monitoring ☐ Attached, Document ID: ____ ☐ Not Applicable	
3. Alternative Methods of Operation ☐ Attached, Document ID: ____ ☐ Not Applicable	
4. Alternative Modes of Operation (Emissions Trading) ☐ Attached, Document ID: ____ ☐ Not Applicable	
5. Acid Rain Part Application ☐ Certificate of Representation (EPA Form No. 7610-1) ☐ Copy Attached, Document ID: ____ ☐ Acid Rain Part (Form No. 62-210.900(1)(a)) ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date: ____ ☐ Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date: ____ ☐ New Unit Exemption (Form No. 62-210.900(1)(a)2.) ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date: ____ ☐ Retired Unit Exemption (Form No. 62-210.900(1)(a)3.) ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date: ____ ☐ Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.) ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date: ____ ☐ Phase II NOx Averaging Plan (Form No. 62-210.900(1)(a)5.) ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date: ____ ☒ Not Applicable	

Additional Requirements Comment

III. EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Application - For Title V air operation permitting only, emissions units are classified as regulated, unregulated, or insignificant. If this is an application for Title V air operation permit, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each regulated and unregulated emissions unit addressed in this application for air permit. Some of the subsections comprising the Emissions Unit Information Section of the form are optional for unregulated emissions units. Each such subsection is appropriately marked. Insignificant emissions units are required to be listed at Section II, Subsection C.

Air Construction Permit or FESOP Application - For air construction permitting or federally enforceable state air operation permitting, emissions units are classified as either subject to air permitting or exempt from air permitting. The concept of an "unregulated emissions unit" does not apply. If this is an application for air construction permit or FESOP, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air permitting are required to be listed at Section II, Subsection C.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit Application – Where this application is used to apply for both an air construction permit and a revised/renewal Title V air operation permit, each emissions unit is classified as either subject to air permitting or exempt from air permitting for air construction permitting purposes and as regulated, unregulated, or insignificant for Title V air operation permitting purposes. **The air construction permitting classification must be used to complete the Emissions Unit Information Section of this application for air permit.** A separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air construction permitting and insignificant emissions units are required to be listed at Section II, Subsection C.

If submitting the application form in hard copy, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application must be indicated in the space provided at the top of each page.

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. Regulated or Unregulated Emissions Unit? (Check one, if applying for an initial, revised or renewal Title V air operation permit. Skip this item if applying for an air construction permit or FESOP only.)

   ☒ The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.
   ☐ The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in this Section: (Check one)

   ☒ This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

   ☐ This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

   ☐ This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Description of Emissions Unit Addressed in this Section:
   One – 1,825 kW Emergency Generator. Diesel fuel fired internal combustion engine.

3. Emissions Unit Identification Number: **EU 06**

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
C		**5/12**		☐ Yes ☒ No

9. Package Unit:
   Manufacturer: Model Number:

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:

Emissions Unit Control Equipment

1. Control Equipment/Method(s) Description: **Good Combustion Practice – Diesel fuel fired.**
2. Control Device or Method Code(s): **NA**

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate:	
2. Maximum Production Rate:	
3. Maximum Heat Input Rate: **16.63** million Btu/hr	
4. Maximum Incineration Rate: pounds/hr tons/day	
5. Requested Maximum Operating Schedule: hours/day **52** weeks/year	days/week **160** hours/year
6. Operating Capacity/Schedule Comment: **The emergency generator will be subject 40 CFR 63 Subpart ZZZZ, the Reciprocating Internal Combustion Engine (RICE) MACT Rule since it will be located at a major source of HAP emissions and will have a site rating of greater that 500 hp (i.e., rated at 2,600 hp). The emergency generators will only be subject to the notification requirements of the RICE MACT (i.e., no emissions limitations will apply) since it would qualify for the following rule exemption:** ***Emergency Generator - Any stationary RICE that operates in an emergency situation. Examples include stationary RICE used to produce power for critical networks or equipment (including power supplied to portions of a facility) when electric power from the local utility is interrupted, or stationary RICE used to pump water in case of fire or flood, etc. Emergency stationary RICE may be operated for the purpose of maintenance checks and readiness testing provided that the tests are recommended by the manufacturer, the vendor, or the insurance company associated with the engine. Required testing of such units should be minimized, but there is no time limit on the use of the emergency stationary RICE in emergency situations and for routine testing and maintenance. Emergency stationary RICE may also operate an additional 50 hours per year in non-emergency situations.***	

C. EMISSION POINT (STACK/VENT) INFORMATION
(Optional for unregulated emissions units.)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram: **See PSD Report**	2. Emission Point Type Code:	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking:		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:		
5. Discharge Type Code: **V**	6. Stack Height: feet	7. Exit Diameter: feet
8. Exit Temperature: °F	9. Actual Volumetric Flow Rate: acfm	10. Water Vapor: %
11. Maximum Dry Standard Flow Rate: dscfm	12. Nonstack Emission Point Height: feet	
13. Emission Point UTM Coordinates... Zone: East (km): North (km):	14. Emission Point Latitude/Longitude... Latitude (DD/MM/SS) Longitude (DD/MM/SS)	
15. Emission Point Comment:		

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): **Diesel fuel combustion**		
2. Source Classification Code (SCC):	3. SCC Units: **1000 gallons**	
4. Maximum Hourly Rate: **0.123**	5. Maximum Annual Rate: **19.7**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: **0.5**	8. Maximum % Ash:	9. Million Btu per SCC Unit: **135.1**
10. Segment Comment: **Maximum annual rate based on 160 hr / yr operation.**		

Segment Description and Rate: Segment _____ of _____

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

E. EMISSIONS UNIT POLLUTANTS

List of Pollutants Emitted by Emissions Unit

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
CO			NS
PM/PM10			NS
NOx			NS
SO2			EL
VOC			NS

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: CO	2. Total Percent Efficiency of Control:
3. Potential Emissions: 1.8 lb/hour 0.15 tons/year	4. Synthetically Limited? ☒ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: 0.32 g/hp-hr Reference: Caterpiller, 2004	7. Emissions Method Code: 5
8. Calculation of Emissions:	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **NOx**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **50.1** lb/hour **4.01** tons/year	4. Synthetically Limited? ☒ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **8.74 g/ph-hr** Reference: **Caterpillar, 2004**	7. Emissions Method Code: **5**
8. Calculation of Emissions:	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **SO2**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **1.23** lb/hour **0.098** tons/year	4. Synthetically Limited? ☒ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.5% S fuel oil** Reference:	7. Emissions Method Code: **5**
8. Calculation of Emissions:	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **0.5% S fuel oil**	4. Equivalent Allowable Emissions: **1.23** lb/hour **0.098** tons/year
5. Method of Compliance: **Diesel fuel combustion**	
6. Allowable Emissions Comment (Description of Operating Method): **Fuel sampling and analysis.**	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **PM/PM10**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **0.4** lb/hour **0.04** tons/year	4. Synthetically Limited? ☒ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.078 g/hp-hr** Reference: **Caterpillar, 2004**	7. Emissions Method Code: **5**
8. Calculation of Emissions:	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

<u>Potential/Estimated Fugitive Emissions</u>

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **VOC**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **0.8** lb/hour **0.06** tons/year	4. Synthetically Limited? ☒ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.14 g/hp-hr** Reference: **Caterpillar, 2004**	7. Emissions Method Code: **5**
8. Calculation of Emissions:	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

G. VISIBLE EMISSIONS INFORMATION

Complete if this emissions unit is or would be subject to a unit-specific visible emissions limitation.

Visible Emissions Limitation: Visible Emissions Limitation _____ of _____

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: ☐ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

Visible Emissions Limitation: Visible Emissions Limitation _____ of _____

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: ☐ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

H. CONTINUOUS MONITOR INFORMATION

Complete if this emissions unit is or would be subject to continuous monitoring.

Continuous Monitoring System: Continuous Monitor _____ of _____

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	☐ Rule ☐ Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

Continuous Monitoring System: Continuous Monitor _____ of _____

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	☐ Rule ☐ Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

I. EMISSIONS UNIT ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1. Process Flow Diagram (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☒ Attached, Document ID: **PSD Report** ☐ Previously Submitted, Date _____

2. Fuel Analysis or Specification (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☒ Attached, Document ID: **PSD Report** ☐ Previously Submitted, Date _____

3. Detailed Description of Control Equipment (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date _____

4. Procedures for Startup and Shutdown (Required for all operation permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date _____
   ☒ Not Applicable (construction application)

5. Operation and Maintenance Plan (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date _____
   ☒ Not Applicable

6. Compliance Demonstration Reports/Records
   ☐ Attached, Document ID: _____
   Test Date(s)/Pollutant(s) Tested: _____

   ☐ Previously Submitted, Date: _____
   Test Date(s)/Pollutant(s) Tested: _____

   ☐ To be Submitted, Date (if known): _____
   Test Date(s)/Pollutant(s) Tested: _____

   ☒ Not Applicable

   Note: For FESOP applications, all required compliance demonstration records/reports must be submitted at the time of application. For Title V air operation permit applications, all required compliance demonstration reports/records must be submitted at the time of application, or a compliance plan must be submitted at the time of application.

7. Other Information Required by Rule or Statute
   ☐ Attached, Document ID: _____ ☒ Not Applicable

Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(6) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)) ☒ Attached, Document ID: PSD Report ☐ Not Applicable	
2. Good Engineering Practice Stack Height Analysis (Rule 62-212.400(5)(h)6., F.A.C., and Rule 62-212.500(4)(f), F.A.C.) ☐ Attached, Document ID: ☒ Not Applicable	
3. Description of Stack Sampling Facilities (Required for proposed new stack sampling facilities only) ☐ Attached, Document ID: ____ ☒ Not Applicable	

Additional Requirements for Title V Air Operation Permit Applications

1. Identification of Applicable Requirements ☐ Attached, Document ID: ____ ☐ Not Applicable	
2. Compliance Assurance Monitoring ☐ Attached, Document ID: ____ ☐ Not Applicable	
3. Alternative Methods of Operation ☐ Attached, Document ID: ____ ☐ Not Applicable	
4. Alternative Modes of Operation (Emissions Trading) ☐ Attached, Document ID: ____ ☐ Not Applicable	
5. Acid Rain Part Application ☐ Certificate of Representation (EPA Form No. 7610-1) ☐ Copy Attached, Document ID: ____ ☐ Acid Rain Part (Form No. 62-210.900(1)(a)) ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date: ____ ☐ Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date: ____ ☐ New Unit Exemption (Form No. 62-210.900(1)(a)2.) ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date: ____ ☐ Retired Unit Exemption (Form No. 62-210.900(1)(a)3.) ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date: ____ ☐ Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.) ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date: ____ ☐ Phase II NOx Averaging Plan (Form No. 62-210.900(1)(a)5.) ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date: ____ ☒ Not Applicable	

Additional Requirements Comment

III. EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Application - For Title V air operation permitting only, emissions units are classified as regulated, unregulated, or insignificant. If this is an application for Title V air operation permit, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each regulated and unregulated emissions unit addressed in this application for air permit. Some of the subsections comprising the Emissions Unit Information Section of the form are optional for unregulated emissions units. Each such subsection is appropriately marked. Insignificant emissions units are required to be listed at Section II, Subsection C.

Air Construction Permit or FESOP Application - For air construction permitting or federally enforceable state air operation permitting, emissions units are classified as either subject to air permitting or exempt from air permitting. The concept of an "unregulated emissions unit" does not apply. If this is an application for air construction permit or FESOP, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air permitting are required to be listed at Section II, Subsection C.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit Application – Where this application is used to apply for both an air construction permit and a revised/renewal Title V air operation permit, each emissions unit is classified as either subject to air permitting or exempt from air permitting for air construction permitting purposes and as regulated, unregulated, or insignificant for Title V air operation permitting purposes. **The air construction permitting classification must be used to complete the Emissions Unit Information Section of this application for air permit.** A separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air construction permitting and insignificant emissions units are required to be listed at Section II, Subsection C.

If submitting the application form in hard copy, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application must be indicated in the space provided at the top of each page.

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. Regulated or Unregulated Emissions Unit? (Check one, if applying for an initial, revised or renewal Title V air operation permit. Skip this item if applying for an air construction permit or FESOP only.)

☒ The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

☐ The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in this Section: (Check one)

☐ This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

☒ This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

☐ This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Description of Emissions Unit Addressed in this Section:
Unit 3 Material Handling -- includes fuel (coal, pet coke) handling, limestone handling, fly ash, bottom ash and FGD sludge handling.

3. Emissions Unit Identification Number: **EU 004 and 005**

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
C		**5/12**		☐ Yes ☒ No

9. Package Unit:
Manufacturer: Model Number:

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:
This emission unit includes all of the activities in Table 2-8 of the PSD Report, as well as detailed in Tables MH-1 through MH-6 in Appendix A.

Emissions Unit Control Equipment

1. Control Equipment/Method(s) Description: **Baghouses (018)** **Covered Conveying Systems** **Wet Suppression (143)** **Best Management Practices**
2. Control Device or Method Code(s): **018, 143**

C. EMISSION POINT (STACK/VENT) INFORMATION
(Optional for unregulated emissions units.)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram: **See PSD Report**	2. Emission Point Type Code:
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking: **Includes material receiving areas, conveying systems, transfer points and storage areas.**	
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:	

5. Discharge Type Code:	6. Stack Height: Feet	7. Exit Diameter: feet
8. Exit Temperature: °F	9. Actual Volumetric Flow Rate: Acfm	10. Water Vapor: %

11. Maximum Dry Standard Flow Rate: dscfm	12. Nonstack Emission Point Height: feet
13. Emission Point UTM Coordinates... Zone: East (km): North (km):	14. Emission Point Latitude/Longitude... Latitude (DD/MM/SS) Longitude (DD/MM/SS)
15. Emission Point Comment:	

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment _____ of _____

1. Segment Description (Process/Fuel Type):			
2. Source Classification Code (SCC):		3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:		6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:		9. Million Btu per SCC Unit:
10. Segment Comment:			

Segment Description and Rate: Segment _____ of _____

1. Segment Description (Process/Fuel Type):			
2. Source Classification Code (SCC):		3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:		6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:		9. Million Btu per SCC Unit:
10. Segment Comment:			

E. EMISSIONS UNIT POLLUTANTS

List of Pollutants Emitted by Emissions Unit

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
PM			EL
PM_{10}			EL

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **PM**	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **See PSD Report** Reference: **B&M, 2005; Golder, 2005.**	7. Emissions Method Code: **2**
8. Calculation of Emissions: **See PSD Report, Section 2.0 and Appendix A.**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **RULE**	2. Future Effective Date of Allowable Emissions: **5/12**
3. Allowable Emissions and Units: **20% Opacity**	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance: **Visible observation.**	
6. Allowable Emissions Comment (Description of Operating Method): **Allowable emissions are applicable at each baghouse.**	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

<u>Potential/Estimated Fugitive Emissions</u>

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **PM_{10}**	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **See PSD Report** Reference: **B&M, 2005; Golder, 2005.**	7. Emissions Method Code: **2**
8. Calculation of Emissions: **See PSD Report, Appendix A- Tables MH-1 through MH-6.**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **RULE**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **20% Opacity**	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance: **Visible observation.**	
6. Allowable Emissions Comment (Description of Operating Method): **Allowable emissions are applicable at each baghouse.**	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions _____ of _____

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

G. VISIBLE EMISSIONS INFORMATION

Complete if this emissions unit is or would be subject to a unit-specific visible emissions limitation.

Visible Emissions Limitation: Visible Emissions Limitation _____ of _____

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: ☐ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

Visible Emissions Limitation: Visible Emissions Limitation _____ of _____

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: ☐ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

H. CONTINUOUS MONITOR INFORMATION

Complete if this emissions unit is or would be subject to continuous monitoring.

Continuous Monitoring System: Continuous Monitor _____ of _____

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	☐ Rule ☐ Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

Continuous Monitoring System: Continuous Monitor _____ of _____

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	☐ Rule ☐ Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

I. EMISSIONS UNIT ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1. Process Flow Diagram (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☒ Attached, Document ID: **PSD Report** ☐ Previously Submitted, Date _____
2. Fuel Analysis or Specification (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date _____
3. Detailed Description of Control Equipment (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☒ Attached, Document ID: **PSD Report** ☐ Previously Submitted, Date _____
4. Procedures for Startup and Shutdown (Required for all operation permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date _____ ☒ Not Applicable (construction application)
5. Operation and Maintenance Plan (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date _____ ☒ Not Applicable
6. Compliance Demonstration Reports/Records ☐ Attached, Document ID: _____ Test Date(s)/Pollutant(s) Tested: _____ ☐ Previously Submitted, Date: _____ Test Date(s)/Pollutant(s) Tested: _____ ☐ To be Submitted, Date (if known): _____ Test Date(s)/Pollutant(s) Tested: _____ ☒ Not Applicable Note: For FESOP applications, all required compliance demonstration records/reports must be submitted at the time of application. For Title V air operation permit applications, all required compliance demonstration reports/records must be submitted at the time of application, or a compliance plan must be submitted at the time of application.
7. Other Information Required by Rule or Statute ☐ Attached, Document ID: _____ ☒ Not Applicable

Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(6) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)) ☒ Attached, Document ID: **PSD Report** ☐ Not Applicable	
2. Good Engineering Practice Stack Height Analysis (Rule 62-212.400(5)(h)6., F.A.C., and Rule 62-212.500(4)(f), F.A.C.) ☐ Attached, Document ID: ☒ Not Applicable	
3. Description of Stack Sampling Facilities (Required for proposed new stack sampling facilities only) ☐ Attached, Document ID: _____ ☒ Not Applicable	

Additional Requirements for Title V Air Operation Permit Applications

1. Identification of Applicable Requirements ☐ Attached, Document ID: _____ ☐ Not Applicable	
2. Compliance Assurance Monitoring ☐ Attached, Document ID: _____ ☐ Not Applicable	
3. Alternative Methods of Operation ☐ Attached, Document ID: _____ ☐ Not Applicable	
4. Alternative Modes of Operation (Emissions Trading) ☐ Attached, Document ID: _____ ☐ Not Applicable	
5. Acid Rain Part Application ☐ Certificate of Representation (EPA Form No. 7610-1) ☐ Copy Attached, Document ID: _____ ☐ Acid Rain Part (Form No. 62-210.900(1)(a)) ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date: _____ ☐ Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date: _____ ☐ New Unit Exemption (Form No. 62-210.900(1)(a)2.) ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date: _____ ☐ Retired Unit Exemption (Form No. 62-210.900(1)(a)3.) ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date: _____ ☐ Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.) ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date: _____ ☐ Phase II NOx Averaging Plan (Form No. 62-210.900(1)(a)5.) ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date: _____ ☐ Not Applicable	

Additional Requirements Comment

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate:	
2. Maximum Production Rate:	
3. Maximum Heat Input Rate: million Btu/hr	
4. Maximum Incineration Rate: pounds/hr tons/day	
5. Requested Maximum Operating Schedule: 24 hours/day 52 weeks/year	 7 days/week 8,760 hours/year
6. Operating Capacity/Schedule Comment:	

APPENDIX A

EXPECTED PERFORMANCE AND EMISSION INFORMATION

MERCURY TEST DATA

December 28, 2005

Mr. James S. Alves
Hopping Green & Sams
123 South Calhoun Street
Tallahassee, Florida 32301

Subject: Letter- Form Report: Mercury (Hg) Sorbent Trap Sampling Results on Units 1 and 2 at Seminole Electric's Palatka Power Plant.

Dear Mr. Alves:

The following letter-form report is submitted by RMB Consulting & Research, Inc. (RMB) to Seminole Electric Cooperative, Inc. (SECI) through Hopping Green & Sams in accordance with our agreement to conduct Hg sorbent trap sampling on Seminole Units 1 and 2. RMB conducted Hg emissions testing on Seminole Units 1 and 2 the week of November 27, 2005. RMB conducted three independent sampling runs on Unit 1 and simultaneously conducted three independent runs on Unit 2. Each sampling run ranged from 20 to 22 hours in duration. RMB performed the sorbent trap testing in accordance with the methodology developed by EPRI (i.e. two-section carbon traps) and proposed by EPA as Method 324. The EPRI version of the sorbent trap monitoring system (QSEMS TM) is a simple manual testing method that provides reliable time integrated Hg concentration measurements.

RMB's Will Roberson was responsible for sorbent trap sampling and data reduction. Frontier Geosciences' Lucas Hawkins was responsible for sorbent traps preparation and sorbent trap analysis. Table 1 below summarizes the sorbent trap testing results for total vapor phase Hg that recently was conducted at Seminole Electric's Palatka Power Plant.

Table 1. Final Sorbent Trap Hg Testing Results Summary

Unit #	Run ID	Start Date - Time	Stop Date - Time	Avg Concentration (ug/dscm)	Equivalent Emission Rate ($lb/Btu \times 10^{12}$)
1	~20hr Run 1	11/28/2005 - 1407	11/29/05 - 0927	1.70	**1.50**
	~22hr Run 2	11/29/2005 - 1124	11/30/05 - 0920	1.56	**1.41**
	~22hr Run 3	11/30/2005 - 1131	12/01/05 - 0925	1.64	**1.51**
2	~20hr Run 1	11/28/2005 - 1427	11/29/05 - 0929	1.83	**1.72**
	~22hr Run 2	11/29/2005 - 1124	11/30/05 - 0919	1.41	**1.30**
	~22hr Run 3	11/30/2005 - 1130	12/01/05 - 0927	1.27	**1.17**

Perhaps a brief explanation of the computation procedure would be informative. The Hg sorbent sampling method produces two direct measurements: (1) mass of Hg collected, typically reported in nanograms (ng) and (2) volume of flue gas sampled, reported in either liters or cubic meters (m^3). Additional sampling details are provided in Attachment 1. Perhaps the most important observation to be gleaned from the results presented in Attachment 1 is the excellent agreement between paired sampling runs. Accordingly, we can have high confidence in the results of the individual tests.

RMB wanted to convert the Hg sorbent sampling results to heat input-based ($lb/10^{12}$ Btu) results because (1) the 2003 Seminole Ontario Hydro sampling results were reported in those units and (2) most of EPA's MACT-based rulemaking deliberations were carried out in heat input units. To convert from sorbent sampling units (e.g., $\mu g/m^3$) to heat input units, RMB used EPA's F-factor equation[1] and the average CO_2 concentration as measured by the each unit's stack continuous emission monitoring system (CEMS). Concentrations of CO_2 and other process data are presented in Attachment 2. The process data confirm that both units operated basically at steady-steady, full load conditions during the Hg sorbent testing program.

RMB believes that the Seminole Hg sorbent testing program was very successful. First, our pair-trains sampling results give us confidence in the measured results. Second, the magnitudes of the measured Hg emissions are consistent with previous Ontario Hydro measurements, but the sorbent sampling results reflect much longer operating periods (i.e., 20 -22 hours instead of 2 hours).

If you have any questions concerning the results of the letter-form report, please do not hesitate to call me at (919) 510-0376. RMB appreciates the opportunity to again provide its services to SECI.

Respectfully submitted,

Ralph L. Roberson, P.E.

Attachments (2)

1 See, for example, EPA Method 19, Appendix A, 40 C.F.R. 60.

Attachment 1

Detailed Sampling Data

Unit 1 Detailed Test and Calculation Summary

Unit #	Run ID	Start Date - Time	Stop Date/Time	Sample ID	Section 1 (ng)	Section 2 (ng)	Breakthrough (%)	Total Mass (ng)	Std Volume (L)	Concentration (ug/m^3)	Relative Deviation	Avg Concentratio (ug/m^3)
1	~20hr Run L1	11/28/2005 - 1407	11/29/05 - 0927	S2506	682	62.3	9.13	744.3	438.755	1.70	0.1	1.70
	~20hr Run R1	11/28/2005 - 1407	11/29/05 - 0927	S2507	563	48.2	8.56	611.2	359.447	1.70		
	~22hr Run L2	11/29/2005 - 1124	11/30/05 - 0920	S2510	518	16.6	3.20	534.6	356.585	1.50	3.7	1.56
	~22hr Run R2	11/29/2005 - 1124	11/30/05 - 0920	S2511	719	37.8	5.26	756.8	468.444	1.62		
	~22hr Run L3	11/30/2005 - 1131	12/01/05 - 0925	S2514	897	82.3	9.18	979.3	616.196	1.59	3.0	1.64
	~22hr Run R3	11/30/2005 - 1131	12/01/05 - 0925	S2515	749	40.8	5.45	789.8	467.585	1.69		

Unit 2 Detailed Test and Calculation Summary

Unit #	Run ID	Start Date - Time	Stop Date/Time	Sample ID	Section 1 (ng)	Section 2 (ng)	Breakthrough (%)	Total Mass (ng)	Std Volume (L)	Concentration (ug/m^3)	Relative Deviation	Avg Concentratior (ug/m^3)
2	~20hr Run L1	11/28/2005 - 1427	11/29/05 - 0929	S2516	871	76.2	8.75	947.2	525.691	1.80	1.5	1.83
	~20hr Run R1	11/28/2005 - 1427	11/29/05 - 0929	S2517	907	111	12.24	1018	547.983	1.86		
	~22hr Run L2	11/29/2005 - 1124	11/30/05 - 0919	S2508	481	20	4.16	501	347.678	1.44	2.1	1.41
	~22hr Run R2	11/29/2005 - 1124	11/30/05 - 0919	S2509	593	36.3	6.12	629.3	455.729	1.38		
	~22hr Run L3	11/30/2005 - 1130	12/01/05 - 0927	S2512	697	53	7.60	750	583.511	1.29	0.9	1.27
	~22hr Run R3	11/30/2005 - 1130	12/01/05 - 0927	S2513	689	58.6	8.51	747.6	592.038	1.26		

Attachment 2
Informational Process Data

Unit 1 Process Data Averages During Runs

	SO_2 (ppm)	NO_x (lb/mmBtu)	CO_2 (%)	Load (Mwge)	Flow (mmscfh)
Run 1	211.85	0.516	10.9	648	105.3250
Run 2	212.44	0.513	10.7	651	103.9031
Run 3	216.29	0.476	10.5	670	107.1792

Unit 2 Process Data Averages During Runs

	SO_2 (ppm)	NO_x (lb/mmBtu)	CO_2 (%)	Load (Mwge)	Flow (mmscfh)
Run 1	192.21	0.441	10.3	631	102.9229
Run 2	207.67	0.472	10.5	648	103.3610
Run 3	221.32	0.518	10.6	676	106.1877

Unit 1 Hourly Process Data

Date 11/28/2005	SO_2 (ppm)	SO_2 (lb/hr)	NO_x (ppm)	NO_x (lb/mmBtu)	CO_2 (%)	Load (Mwge)	Flow (mmscfh)
9:00	226.63	4008.0	282.8	0.553	11.0	668	106.5379
10:00	218.97	3878.1	278.5	0.539	11.1	671	106.6909
11:00	208.34	3670.6	262.7	0.528	10.7	667	106.1334
12:00	190.45	3379.4	264.0	0.516	11.0	664	106.8920
13:00	204.41	3626.5	271.2	0.525	11.1	663	106.8756
14:00	210.66	3746.9	270.4	0.519	11.2	661	107.1481
15:00	218.83	3881.2	268.9	0.521	11.1	666	106.8447
16:00	192.01	3395.4	269.0	0.530	10.9	655	106.5259
17:00	222.31	3941.0	269.1	0.526	11.0	661	106.7919
18:00	220.76	3955.6	276.3	0.540	11.0	665	107.9394
19:00	228.56	4127.6	278.4	0.544	11.0	666	108.7913
20:00	220.19	3934.7	279.3	0.546	11.0	665	107.6481
21:00	207.63	3722.8	280.0	0.557	10.8	662	108.0107
22:00	213.44	3806.7	273.9	0.550	10.7	660	107.4408
23:00	189.26	3308.0	267.1	0.536	10.7	644	105.2933

Date 11/29/2005	SO_2 (ppm)	SO_2 (lb/hr)	NO_x (ppm)	NO_x (lb/mmBtu)	CO_2 (%)	Load (Mwge)	Flow (mmscfh)
0:00	206.29	3419.0	234.0	0.479	10.5	599	99.8409
1:00	210.74	3518.3	241.9	0.486	10.7	607	100.5723
2:00	210.73	3672.6	261.8	0.516	10.9	651	104.9883
3:00	196.78	3377.5	256.9	0.511	10.8	634	103.3969
4:00	219.15	3561.2	235.0	0.468	10.8	599	97.8917
5:00	206.11	3381.4	235.0	0.459	11.0	612	98.8291
6:00	208.27	3538.1	236.1	0.461	11.0	631	102.3381
7:00	210.42	3622.1	255.2	0.499	11.0	647	103.6959
8:00	215.62	3934.5	271.1	0.530	11.0	670	109.9250
9:00	212.40	3851.9	276.2	0.535	11.1	672	109.2481
10:00	228.75	4126.2	270.5	0.529	11.0	672	108.6638
11:00	223.34	4024.0	271.9	0.531	11.0	670	108.5397
12:00	219.89	3951.2	268.3	0.524	11.0	666	108.2466
13:00	228.65	4108.1	265.8	0.519	11.0	664	108.2331
14:00	200.38	3575.7	249.4	0.520	10.3	666	107.4972
15:00	210.17	3811.8	257.1	0.526	10.5	666	109.2588
16:00	231.54	4138.0	262.4	0.532	10.6	667	107.6608
17:00	217.04	3873.6	266.6	0.535	10.7	667	107.5133
18:00	202.92	3614.1	267.9	0.538	10.7	668	107.2927
19:00	205.79	3664.5	267.8	0.538	10.7	668	107.2725
20:00	212.37	3795.7	261.2	0.535	10.5	668	107.6698
21:00	210.44	3761.0	257.8	0.528	10.5	669	107.6634
22:00	217.17	3891.8	264.3	0.541	10.5	672	107.9548
23:00	215.87	3800.5	263.2	0.534	10.6	669	106.0563

Unit 1 Hourly Process Data

Date 11/30/2005	SO_2 (ppm)	SO_2 (lb/hr)	NO_x (ppm)	NO_x (lb/mmBtu)	CO_2 (%)	Load (Mwge)	Flow (mmscfh)
0:00	206.85	3536.6	256.7	0.525	10.5	650	102.9957
1:00	208.07	3381.1	233.9	0.474	10.6	614	97.8893
2:00	211.83	3388.5	229.1	0.465	10.6	609	96.3647
3:00	203.24	3137.9	226.8	0.460	10.6	586	93.0093
4:00	213.96	3383.9	234.1	0.475	10.6	595	95.2756
5:00	206.22	3331.5	237.9	0.478	10.7	620	97.3190
6:00	198.24	3206.3	239.2	0.480	10.7	624	97.4330
7:00	202.35	3344.4	244.0	0.486	10.8	637	99.5647
8:00	222.17	3823.8	252.2	0.502	10.8	668	103.6821
9:00	217.41	3752.3	265.5	0.533	10.7	668	103.9698
10:00	212.65	3717.5	261.3	0.535	10.5	669	105.3130
11:00	221.35	3876.5	256.9	0.526	10.5	671	105.5008
12:00	222.42	3884.4	254.3	0.521	10.5	671	105.2056
13:00	218.21	3831.2	243.1	0.493	10.6	671	105.7682
14:00	228.10	4008.5	243.3	0.493	10.6	670	105.8644
15:00	230.05	3992.6	250.3	0.507	10.6	671	104.5492
16:00	204.71	3582.3	249.1	0.500	10.7	670	105.4174
17:00	226.25	4055.5	227.0	0.465	10.5	671	107.9822
18:00	207.61	3748.6	229.0	0.469	10.5	676	108.7698
19:00	196.87	3534.6	231.6	0.479	10.4	671	108.1570
20:00	203.87	3672.3	228.6	0.472	10.4	670	108.5109
21:00	205.55	3694.4	221.4	0.453	10.5	672	108.2719
22:00	221.76	4000.5	223.3	0.453	10.6	676	108.6736
23:00	213.37	3851.7	223.7	0.458	10.5	677	108.7441

Date 12/1/2005	SO_2 (ppm)	SO_2 (lb/hr)	NO_x (ppm)	NO_x (lb/mmBtu)	CO_2 (%)	Load (Mwge)	Flow (mmscfh)
0:00	212.67	3845.3	223.2	0.457	10.5	675	108.9209
1:00	206.07	3414.8	198.9	0.407	10.5	624	99.8247
2:00	215.80	3807.8	213.0	0.436	10.5	663	106.2960
3:00	219.08	3921.6	223.8	0.462	10.4	670	107.8344
4:00	224.96	4054.2	228.4	0.472	10.4	670	108.5667
5:00	216.68	3910.6	235.3	0.486	10.4	673	108.7211
6:00	206.05	3698.1	235.3	0.486	10.4	675	108.1172
7:00	217.09	3918.9	234.2	0.489	10.3	676	108.7455
8:00	227.85	4118.0	233.0	0.486	10.3	673	108.8750
9:00	226.29	4034.1	232.9	0.481	10.4	672	107.3928
10:00	218.34	3899.6	229.3	0.474	10.4	672	107.5925

Unit 2 Hourly Process Data

Date 11/28/2005	SO_2 (ppm)	SO_2 (lb/hr)	NO_x (ppm)	NO_x (lb/mmBtu)	CO_2 (%)	Load (Mwge)	Flow (mmscfh)
9:00	188.07	0.535	210.9	0.432	10.5	640	101.5534
10:00	188.08	0.535	211.6	0.433	10.5	643	102.1424
11:00	198.84	0.566	212.4	0.435	10.5	641	102.8176
12:00	206.02	0.592	215.1	0.445	10.4	643	102.8113
13:00	209.60	0.596	223.0	0.456	10.5	652	104.1116
14:00	187.05	0.532	214.5	0.439	10.5	643	102.5032
15:00	202.06	0.575	213.9	0.438	10.5	643	103.0373
16:00	203.53	0.585	214.2	0.443	10.4	646	103.3113
17:00	201.30	0.573	219.1	0.448	10.5	655	104.4602
18:00	208.81	0.594	229.5	0.470	10.5	683	108.8972
19:00	194.29	0.553	232.0	0.475	10.5	679	108.9370
20:00	210.30	0.598	236.2	0.483	10.5	675	109.4409
21:00	155.43	0.442	227.1	0.465	10.5	671	107.9973
22:00	214.78	0.611	220.3	0.451	10.5	657	105.8255
23:00	206.02	0.592	219.4	0.453	10.4	652	105.4994

Date 11/29/2005	SO_2 (ppm)	SO_2 (lb/hr)	NO_x (ppm)	NO_x (lb/mmBtu)	CO_2 (%)	Load (Mwge)	Flow (mmscfh)
0:00	196.61	0.565	213.0	0.440	10.4	650	103.3647
1:00	170.61	0.490	196.9	0.407	10.4	612	98.2992
2:00	172.88	0.522	183.9	0.399	9.9	541	91.6306
3:00	196.48	0.599	186.6	0.409	9.8	535	92.4821
4:00	178.67	0.550	196.6	0.436	9.7	563	96.9426
5:00	183.71	0.560	202.7	0.445	9.8	602	102.0594
6:00	187.47	0.560	207.7	0.446	10.0	632	104.7458
7:00	189.36	0.566	209.2	0.450	10.0	637	106.1137
8:00	206.18	0.598	210.1	0.438	10.3	658	107.5345
9:00	186.75	0.542	202.9	0.423	10.3	628	102.1253
10:00	184.16	0.534	192.1	0.401	10.3	585	96.1730
11:00	208.20	0.604	208.0	0.434	10.3	616	100.5623
12:00	197.56	0.573	212.7	0.444	10.3	620	101.2945
13:00	213.14	0.612	221.9	0.459	10.4	657	105.4918
14:00	209.55	0.596	223.9	0.458	10.5	673	107.4373
15:00	199.20	0.567	217.8	0.446	10.5	674	107.6376
16:00	207.04	0.584	239.1	0.485	10.6	692	109.7583
17:00	209.19	0.584	251.8	0.506	10.7	701	109.8705
18:00	202.38	0.560	259.1	0.516	10.8	702	109.7884
19:00	221.19	0.606	264.9	0.522	10.9	704	109.1544
20:00	220.39	0.610	262.5	0.522	10.8	701	109.1409
21:00	218.58	0.610	255.6	0.513	10.7	688	107.2153
22:00	216.43	0.616	234.7	0.480	10.5	664	105.2913
23:00	209.01	0.600	231.3	0.478	10.4	667	105.3611

Unit 2 Hourly Process Data

Date 11/30/2005	SO_2 (ppm)	SO_2 (lb/hr)	NO_x (ppm)	NO_x (lb/mmBtu)	CO_2 (%)	Load (Mwge)	Flow (mmscfh)
0:00	194.68	0.565	214.9	0.448	10.3	607.0	98.6368
1:00	203.46	0.590	208.7	0.435	10.3	593.0	95.7864
2:00	202.14	0.592	211.5	0.446	10.2	595.0	96.7652
3:00	203.01	0.595	210.9	0.444	10.2	575.0	94.1919
4:00	206.60	0.605	210.2	0.443	10.2	572.0	94.6345
5:00	210.06	0.609	216.5	0.452	10.3	599.0	97.3348
6:00	209.05	0.600	215.9	0.446	10.4	609.0	97.9202
7:00	204.77	0.594	212.3	0.443	10.3	619.0	98.9576
8:00	243.35	0.692	242.7	0.497	10.5	672.0	106.3285
9:00	195.34	0.556	245.1	0.502	10.5	678.0	106.1806
10:00	179.70	0.511	244.8	0.501	10.5	677.0	105.9241
11:00	200.37	0.570	243.6	0.499	10.5	678.0	106.3960
12:00	237.90	0.677	240.3	0.492	10.5	676.0	105.9134
13:00	231.73	0.666	238.9	0.494	10.4	674.0	105.7166
14:00	196.11	0.558	274.9	0.563	10.5	640.0	100.3727
15:00	194.49	0.559	252.4	0.522	10.4	628.0	98.9456
16:00	200.51	0.576	240.3	0.497	10.4	637.0	100.8340
17:00	238.02	0.677	236.8	0.485	10.5	668.0	105.3133
18:00	235.11	0.663	265.4	0.538	10.6	693.0	108.8947
19:00	222.59	0.622	282.9	0.568	10.7	705.0	110.1663
20:00	209.38	0.585	283.0	0.568	10.7	704.0	110.1201
21:00	224.24	0.626	278.6	0.560	10.7	703.0	110.4431
22:00	234.96	0.656	280.7	0.564	10.7	703.0	110.9796
23:00	223.80	0.625	283.8	0.570	10.7	703.0	109.7098

Date 12/1/2005	SO_2 (ppm)	SO_2 (lb/hr)	NO_x (ppm)	NO_x (lb/mmBtu)	CO_2 (%)	Load (Mwge)	Flow (mmscfh)
0:00	211.16	0.595	239.8	0.486	10.6	661	104.0309
1:00	203.56	0.579	224.0	0.458	10.5	624	99.3375
2:00	234.98	0.669	233.8	0.479	10.5	646	102.7012
3:00	232.04	0.660	239.8	0.491	10.5	662	103.4402
4:00	235.21	0.663	241.0	0.489	10.6	660	103.3302
5:00	214.75	0.611	237.4	0.486	10.5	659	103.8775
6:00	240.19	0.677	259.3	0.526	10.6	700	109.9943
7:00	217.86	0.614	256.7	0.520	10.6	705	110.2743
8:00	225.82	0.631	260.3	0.523	10.7	706	111.2553
9:00	225.68	0.636	263.6	0.534	10.6	704	110.2706

UNIT 3 PROJECT MATERIAL HANDLING EMISSION ESTIMATES

Table PM-SUMPTEMIS
Summary of PM Emissions for Emission Points from the Material Handling Operations
Project: Seminole Electric Cooperative, Inc., Seminole Generating Station Unit 3

Description	Control Device	Conveyor Throughput (TPH)	Emission Point	Map ID	Flowrate Maximum Capacity (cfm)	Average Daily Operation (hours) [a]	PM Emission Factor and Rate: Emission Factor (grain/scfm)	PM: Maximum Hourly Rate (lb/hr)	PM: Daily Hourly Rate (lb/hr)	PM: Daily Hourly Rate (g/s)	PM: Annual Rate (TPY)	PM10 Emission Factor and Rate: Emission Factor (grain/scfm)	PM10: Maximum Hourly Rate (lb/hr)	PM10: Daily Hourly Rate (lb/hr)	PM10: Daily Hourly Rate (g/s)	PM10: Annual Rate (TPY)
Coal Handling System- Dust Collection and Ventilation																
Existing As-Received Transfer Sampling Tower Modifications	Baghouse Dust Collection	3,000	EP-1	76	12,500	2.5	0.01 [b]	1.07	0.11	0.014	0.50	0.01 [b]	1.07	0.11	0.014	0.50
New Transfer Tower (Includes New Inactive Storage Reclaim)	Baghouse Dust Collection	1,700	EP-2	72	19,000	4.5	0.01 [b]	1.63	0.30	0.038	1.34	0.01 [b]	1.63	0.30	0.038	1.34
New Crusher Tower Dust Collector	Baghouse Dust Collection	1,700	EP-3	49	12,400	4.5	0.01 [b]	1.06	0.20	0.025	0.87	0.01 [b]	1.06	0.20	0.025	0.87
Unit Feed System Dust Collection	Baghouse Dust Collection	1,700	EP-4	50	23,400	4.5	0.01 [b]	2.01	0.38	0.047	1.65	0.01 [b]	2.01	0.38	0.047	1.65
Limestone Handling System- Dust Collection and Ventilation																
Limestone Transfer to Ball Mill	Baghouse Dust Collection	100	EP-5	51	3,500	5.5	0.01 [b]	0.30	0.068	0.0086	0.30	0.01 [b]	0.30	0.068	0.0086	0.30
Fly Ash Handling System																
Fly Ash Silo	Baghouse Dust Collection	67	EP-6	52	10,000	7.80	0.01 [b]	0.86	0.279	0.0351	1.22	0.01 [b]	0.86	0.279	0.0351	1.22
TOTAL EMISSIONS									1.34		5.9			1.34		5.9
Number of Emission Points		6														

[a] Based on the following maximum annual throughput for material and maximum capacity of conveyor:

Coal	2,788,625 TPY
Limestone	200,000 TPY
Flyash	190,742 TPY

[b] Grain loading provided

Table PM-SUMSTCK
Summary of Stack and Operating Parameters for the PM Emission Points for the Material Handling Operations
Project: Seminole Electric Cooperative, Inc., Seminole Generating Station Unit 3

Emission Point	Release Height Height (ft)	(m)	Diameter (ft)	(m)	Velocity (ft/s)	(m)
Coal Handling System- Dust Collection and Ventilation						
EP-1	8	2.4	2.13	0.65	58	17.83
EP-2	8	2.4	2.63	0.80	58	17.77
EP-3	8	2.4	2.12	0.65	59	17.85
EP-4	166	50.6	2.92	0.89	58	17.76
Limestone Handling System- Dust Collection and Ventilation						
EP-5	70	21.3	1.13	0.34	58	17.73
Fly Ash Handling System						
EP-6	90	27.4	1.91	0.58	58	17.73

Table PM-SUMTRANS
Summary of PM Emissions for Transfer Points (Fugitive Emissions) from the Material Handling Operations
Project: Seminole Electric Cooperative, Inc., Seminole Generating Station Unit 3

		Emission Rate (lb/hr)		Emission Rate (TPY)	
Transfer Areas	Area	PM 24-hour Rate	PM10 24-hour Rate	PM Annual Rate	PM10 Annual Rate
Coal Handling System					
Transfer coal from rotary car to hoppers	RCU	0.124	0.059	0.347	0.164
Transfer coal from rail hoppers to conveyor belt	RCU	0.041	0.020	0.116	0.055
Transfer coal from existing conveyor in Transfer House to Unit 3 conveyor	CPAB (72)	0.082	0.039	0.231	0.109
Transfer coal from Unit 3 conveyor to Stacker/Reclaimer conveyor	CPAB (53,54)	0.082	0.039	0.231	0.109
Transfer coal from Stacker/Reclaimer conveyor to pile	CPAB (53,54)	0.206	0.098	0.578	0.273
Transfer from Stacker/Reclaimer bucket to conveyor	CPAB (53,54)	0.124	0.059	0.347	0.164
Transfer from Stacker/Reclaimer conveyor to Unit 3 conveyor	CPAB (48)	0.124	0.059	0.347	0.164
Limestone Handling System					
Transfer limestone from to Limestone Unloading Area	LSH (25)	0.027	0.013	0.211	0.100
Transfer limestone from Unloading Area to Loading Hopper for Ball Mill	LSH (25)	0.027	0.013	0.211	0.100
Fly Ash Handling System					
Transfer fly ash from silo to truck using pug mill or equivalent (only if not recycled)	FAH (39)	0.006	0.003	0.016	0.008
Bottom Ash Handling System					
Transfer bottom ash from storage area to truck	BAH	0.001	0.001	0.004	0.002
Gypsum Handling System					
Transfer gypsum from dewatering bldg conveyor	GH (8)	0.015	0.007	0.042	0.020
Transfer gypsum from building conveyor to LaFarge	GH (8)	0.019	0.009	0.083	0.039
TOTAL EMISSIONS		0.88	0.42	2.76	1.31
Number of Transfer Points		13			

Note: CPAB= Coal Piles A & B
LSH= Limestone handling
BAH= Bottom ash handling
FAH= Flyash handling
GH= Gypsum handling
RCU= Railcar unloading

Table PM-SUMFUG
Summary of PM Emissions for Fugitive Emissions Sources from the Material Handling Operations
Project: Seminole Electric Cooperative, Inc., Seminole Generating Station Unit 3

		Emission Rate (lb/hr)		Emission Rate (TPY)	
Emission Source	Area	PM 24-hour Rate	PM10 24-hour Rate	PM Annual Rate	PM10 Annual Rate
Coal Handling System					
Wind erosion					
Inactive Portions- Coal Pile A	CPAB (53,54)	1.65	0.82	0.81	0.40
Inactive Portions- Coal Pile B	CPAB (53,54)	3.65	1.82	1.78	0.89
Active Portions- Coal Pile A/B	CPAB (53,54)	0.56	0.28	0.28	0.14
Bulldozers					
Coal Pile A Maintenance	CPAB (53,54)	0.14	0.03	0.28	0.06
Coal Pile B Maintenance	CPAB (53,54)	0.14	0.03	0.28	0.06
Active Coal Storage Pile and Reclaim Hopper Maintenance	CPAB (53,54)	0.14	0.03	0.28	0.06
Limestone Handling System					
Wind erosion					
Active Limestone Stockout Pile	LSH (25)	0.15	0.073	0.072	0.036
Bulldozers					
Limestone Pile Maintenance	LSH (25)	0.14	0.03	0.28	0.065
Bottom Ash Handling System					
Wind erosion					
Bottom Ash Storage Pile- Unit 1	BAH	0.0007	0.0004	0.0003	0.0002
TOTAL EMISSIONS		6.55	3.13	4.06	1.73
Number of Sources		9			

Note: CPAB= Coal Piles A & B
LSH= Limestone handling
BAH= Bottom ash handling

Table MH-1
Estimation of PM Emission Factors and Rates for the Coal-Handling System From Batch/Continuous Drop Operations at Transfer Points
Project: Seminole Electric Cooperative, Inc., Seminole Generating Station Unit 3

Parameters		Operations: Transfer coal from rotary car to hoppers	Transfer coal from rail hoppers to conveyor belt	Transfer coal from existing conveyor in Transfer House to Unit 3 conveyor	Transfer coal from Unit 3 conveyor to Stacker/Reclaimer conveyor
Emission Point/Area					
Operational Data					
Activity, hours	Daily	2.5 c	2.5	2.5	2.5
days	Annual	365	365	365	365
Material Handling Data					
Material type		Coal	Coal	Coal	Coal
Material throughput, ton/hr (design)	Hourly	3,000 p	3,000	3,000	3,000
ton/day	Daily	7,640 a	7,640	7,640	7,640
ton/yr	Annual	2,788,625 b	2,788,625	2,788,625	2,788,625
Moisture content (M), % (see Note b)		6.4	6.4	6.4	6.4
Number of transfers		1	1	1	1
General/ Site Characteristics					
Mean wind speed, mph	Daily	11.0	11.0	11.0	11.0
	Annual	7.8	7.8	7.8	7.8
Particle size multiplier, PM (k)		0.74	0.74	0.74	0.74
Particle size multiplier, PM10 (k)		0.35	0.35	0.35	0.35
Emission Control Data					
Emission control method		Water spray, roof & side walls	Water spray, below grade	Enclosure	Enclosure
Emission control removal efficiency, %		70	90	80	80
Emission Factor (EF) Equations					
Uncontrolled EF (UEF) Equation	UEF (lb/ton) = k x (0.0032) x $(U/5)^{1.3}/[(M/2)^{1.4}]$				
Controlled EF (CEF) Equation	CEF (lb/ton) = UEF (lb/ton) x [100% - Removal efficiency (%)]				
Calculated PM Emission Factor (EF)					
Uncontrolled EF, lb/ton	Short term	0.00130	0.00130	0.00130	0.00130
	Annual	0.00083	0.00083	0.00083	0.00083
Controlled EF, lb/ton	Short term	0.000389	0.000130	0.00026	0.00026
	Annual	0.000249	0.000083	0.000166	0.000166
Calculated PM10 Emission Factor (EF)					
Uncontrolled EF, lb/ton	Short term	0.00061	0.00061	0.00061	0.00061
	Annual	0.000392	0.000392	0.000392	0.000392
Controlled EF, lb/ton	Short term	0.000184	0.000061	0.000123	0.000123
	Annual	0.000118	0.000039	0.000078	0.000078
Estimated Emission Rate (ER)					
PM ER lb/hr (daily basis)		0.124	0.041	0.082	0.082
TPY		0.347	0.116	0.231	0.231
PM10 ER lb/hr (daily basis)		0.059	0.020	0.039	0.039
TPY		0.164	0.055	0.109	0.109

Source: USEPA, 1995; AP-42, Section 13.2.4 for Aggregate Handling and Storage Piles.
a Maximum daily throughput based on maximum hourly throughput rate and daily coal consumption.
b Minimum moisture based on 70% Illionis-Western Kentucky and 30% Petroleum Coke

Table MH-1
Estimation of PM Emission Factors and Rates for the Coal-Handling System From Batch/Continuous Drop Operations at Transfer Points
Project: Seminole Electric Cooperative, Inc., Seminole Generating Station Unit 3

Parameters		Operations: Transfer coal from Stacker/Reclaimer conveyor to pile	Operations: Transfer from Stacker/Reclaimer bucket to conveyor	Operations: Transfer from Stacker/Reclaimer conveyor to Unit 3 conveyor
Emission Point/Area				
Operational Data				
Activity, hours	Daily	2.5	2.5	2.5
days	Annual	365	365	365
Material Handling Data				
Material type		Coal	Coal	Coal
Material throughput, ton/hr (design)	Hourly	3,000	1,700	1,700
ton/day	Daily	7,640	7,640	7,640
ton/yr	Annual	2,788,625	2,788,625	2,788,625
Moisture content (M), % (nominal)		6.4	6.4	6.4
Number of transfers		1	1	1
General/ Site Characteristics				
Mean wind speed, mph	Daily	11.0	11.0	11.0
	Annual	7.8	7.8	7.8
Particle size multiplier, PM (k)		0.74	0.74	0.74
Particle size multiplier, PM10 (k)		0.35	0.35	0.35
Emission Control Data				
Emission control method		Water spray	Water Spray and partial enclosure	Water Spray and partial enclosure
Emission control removal efficiency, %		50	70	70
Emission Factor (EF) Equations				
Uncontrolled EF (UEF) Equation	$UEF (lb/ton) = k \times (0.0032) \times (U / 5)^{1.3}/[(M / 2)^{1.4}]$			
Controlled EF (CEF) Equation	$CEF (lb/ton) = UEF (lb/ton) \times [100\% - \text{Removal efficiency } (\%)]$			
Calculated PM Emission Factor (EF)				
Uncontrolled EF, lb/ton	Short term	0.00130	0.00130	0.00130
	Annual	0.00083	0.00083	0.00083
Controlled EF, lb/ton	Short term	0.00065	0.00039	0.00039
	Annual	0.000414	0.000249	0.000249
Calculated PM10 Emission Factor (EF)				
Uncontrolled EF, lb/ton	Short term	0.00061	0.00061	0.00061
	Annual	0.000392	0.000392	0.000392
Controlled EF, lb/ton	Short term	0.000306	0.000184	0.000184
	Annual	0.000196	0.000118	0.000118
Estimated Emission Rate (ER)				
PM ER lb/hr (daily basis)		0.206	0.124	0.124
TPY		0.578	0.347	0.347
PM10 ER lb/hr (daily basis)		0.098	0.059	0.059
TPY		0.273	0.164	0.164

Source: USEPA, 1995; AP-42, Section 13.2.4 for Aggregate Handling and Storage Piles.

Table MH-2
Estimation of PM Emission Factors and Rates for the Limestone Handling System
From Batch/Continuous Drop Operations at Transfer Points (Not Associated with Surge Bin Vent Filter)
Project: Seminole Electric Cooperative, Inc., Seminole Generating Station Unit 3

Parameters		Operations: Limestone Handling — Transfer limestone from to Limestone Unloading Area	Operations: Limestone Handling — Transfer limestone from Unloading Area to Loading Hopper for Ball Mill
Emission Point/Area			
Operational Data			
Activity, hours	Daily	0.8	0.8
days	Annual	365	365
Material Handling Data			
Material type		Limestone	Limestone
Material throughput, ton/hr (design)	Hourly	250	250
ton/day	Daily	200	200
ton/yr	Annual	200,000	200,000
Moisture content (M), % (nominal)		2.0	2.0
Number of transfers		1	1
General/ Site Characteristics			
Mean wind speed, mph	Daily	11.0	11.0
	Annual	7.8	7.8
Particle size multiplier, PM (k)		0.74	0.74
Particle size multiplier, PM10 (k)		0.35	0.35
Emission Control Data			
Emission control method		Watering	Watering
Emission control removal efficiency, %		50	50
Emission Factor (EF) Equations			
Uncontrolled EF (UEF) Equation	$UEF (lb/ton) = k \times (0.0032) \times (U / 5)^{1.3} / [(M / 2)^{1.4}]$		
Controlled EF (CEF) Equation	CEF (lb/ton) = UEF (lb/ton) x [100% - Removal efficiency (%)]		
Calculated PM Emission Factor (EF)			
Uncontrolled EF, lb/ton	Short term	0.00660	0.00660
	Annual	0.00422	0.00422
Controlled EF, lb/ton	Short term	0.00330	0.00330
	Annual	0.00211	0.00211
Calculated PM10 Emission Factor (EF)			
Uncontrolled EF, lb/ton	Short term	0.00312	0.00312
	Annual	0.00200	0.00200
Controlled EF, lb/ton	Short term	0.00156	0.00156
	Annual	0.000998	0.000998
Estimated Emission Rate (ER)			
PM ER lb/hr (daily basis)		0.027	0.027
TPY		0.211	0.211
PM10 ER lb/hr (daily basis)		0.013	0.013
TPY		0.100	0.100

Source: USEPA, 1995; AP-42, Section 13.2.4 for Aggregate Handling and Storage Piles.

Table MH-3
Estimation of PM Emission Factors and Rates for the Fly Ash and Bottom Ash Handling Systems
From Batch/Continuous Drop Operations at Transfer Points (Not Associated with Surge Bin Vent Filter)
Project: Seminole Electric Cooperative, Inc., Seminole Generating Station Unit 3

Parameters		Operations: Fly Ash Handling	Operations: Bottom Ash Handling
		Transfer fly ash from silo to truck using pug mill or equivalent (only if not recycled)	Transfer bottom ash from storage area to truck
Emission Point		Fly Ash Silo Area	Unit 3 Bottom Ash
Operational Data			
Trucks- number	Per day	28	NA
number	Day/week	5	NA
truck capacity	tons	20	NA
Activity, hours	Daily	NA	24
days	Annual	260	365
Material Handling Data			
Material type		Fly ash	Bottom Ash
Material throughput, ton/hr (design)	Hourly	NA	4.2
ton/day	Daily	560	101
ton/yr	Annual	190,742	47,685
Moisture content (M), % (nominal)		20	20
Number of transfers		1	1
General/ Site Characteristics			
Mean wind speed, mph	Daily	11.0	11.0
	Annual	7.8	7.8
Particle size multiplier, PM (k)		0.74	0.74
Particle size multiplier, PM10 (k)		0.35	0.35
Emission Control Data			
Emission control method		High moisture content (included in emission factor)	High moisture content (included in emission factor)
Emission control removal efficiency, %		0	0
Emission Factor (EF) Equations			
Uncontrolled EF (UEF) Equation	UEF (lb/ton) = k x (0.0032) x $(U / 5)^{1.3}$/$[(M / 2)^{1.4}]$		
Controlled EF (CEF) Equation	CEF (lb/ton) = UEF (lb/ton) x [100% - Removal efficiency (%)]		
Calculated PM Emission Factor (EF)			
Uncontrolled EF, lb/ton	Short term	0.000263	0.000263
	Annual	0.000168	0.000168
Controlled EF, lb/ton	Short term	0.000263	0.000263
	Annual	0.000168	0.000168
Calculated PM10 Emission Factor (EF)			
Uncontrolled EF, lb/ton	Short term	0.000124	0.000124
	Annual	0.000079	0.000079
Controlled EF, lb/ton	Short term	0.000124	0.000124
	Annual	0.000079	0.000079
Estimated Emission Rate (ER)			
PM ER lb/hr (daily basis)		0.0061	0.0011
TPY		0.0160	0.0040
PM10 ER lb/hr (daily basis)		0.0029	0.0005
TPY		0.0076	0.0019

Source: USEPA, 1995; AP-42, Section 13.2.4 for Aggregate Handling and Storage Piles.

Table MH-4
Estimation of PM Emission Factors and Rates for the Gypsum Handling System
From Batch/Continuous Drop Operations at Transfer Points (Not Associated with Surge Bin Vent Filter)
Project: Seminole Electric Cooperative, Inc., Seminole Generating Station Unit 3

Parameters		Operations: Gypsum Handling — Transfer gypsum from dewatering bldg conveyor	Operations: Gypsum Handling — Transfer gypsum from building conveyor to LaFarge
Emission Point/Area			
Operational Data			
Activity, hours	Daily	24	24
days	Annual	365	365
Material Handling Data			
Material type		Gypsum	Gypsum
Material throughput, ton/hr (design)	Hourly	85.6	53.4
ton/day	Daily	2,055	1,282
ton/yr	Annual	750,000	750,000
Moisture content (M), % (nominal)		10	10
Number of transfers		1	1
General/ Site Characteristics			
Mean wind speed, mph	Daily	11.0	11.0
	Annual	7.8	7.8
Particle size multiplier, PM (k)		0.74	0.74
Particle size multiplier, PM10 (k)		0.35	0.35
Emission Control Data			
Emission control method		High moisture content (included in emission factor); enclosure	High moisture content (included in emission factor) partial enclosure
Emission control removal efficiency, %		75	50
Emission Factor (EF) Equations			
Uncontrolled EF (UEF) Equation	UEF (lb/ton) = k x (0.0032) x $(U / 5)^{1.3})/[(M / 2)^{1.4}]$		
Controlled EF (CEF) Equation	CEF (lb/ton) = UEF (lb/ton) x [100% - Removal efficiency (%)]		
Calculated PM Emission Factor (EF)			
Uncontrolled EF, lb/ton	Short term	0.000693	0.000693
	Annual	0.000443	0.000443
Controlled EF, lb/ton	Short term	0.000173	0.000347
	Annual	0.000111	0.000222
Calculated PM10 Emission Factor (EF)			
Uncontrolled EF, lb/ton	Short term	0.000328	0.000328
	Annual	0.000210	0.000210
Controlled EF, lb/ton	Short term	0.000082	0.000164
	Annual	0.000052	0.000105
Estimated Emission Rate (ER)			
PM ER lb/hr (daily basis)		0.015	0.019
TPY		0.042	0.083
PM10 ER lb/hr (daily basis)		0.007	0.009
TPY		0.020	0.039

Source: USEPA, 1995; AP-42, Section 13.2.4 for Aggregate Handling and Storage Piles.

Table MH-5
Estimation of PM Emission Factors and Rates For Wind Erosion from Active Storage Piles
Project: Seminole Electric Cooperative, Inc., Seminole Generating Station Unit 3

Parameters		Coal handling	Coal handling	Coal handling	Limestone handling	Bottom Ash handling
		Inactive Portions- Coal Pile A	Inactive Portions- Coal Pile B	Active Portions- Coal Pile A/B	Active Limestone Stockout Pile	Bottom Ash Storage Pile-Unit 1
Emission Point/Area		Coal Pile A (1015 ft length x 115 ft width x 40 ft height)	Coal Pile B (975 ft length x 265 ft width x 40 ft height)	Coal Pile A/B (3-days storage	Limestone Active Stockout Pile (No. 19)	Near Boiler Bldg #1
Storage Pile Data						
Material Type		Coal/PetCoke	Coal/Pet Coke	Coal/Pet Coke	Limestone	Bottom ash
Pile Description (shape)		Rectangular	Rectangular	Rectangular	Circular	Rectangular
Average Storage (ton)						
Average Pile Height (ft)		40	40	20	50	15
Average Pile Length (ft)		1015	975	200	115	40
Average Pile Width (ft)		115	265	200	NA	25
Size, ft^2		116,725	258,375	40,000	10,387	1,000
Size, acres		2.68	5.94	0.92	0.24	0.02
General/ Site Characteristics						
Days of precipitation greater than or equal to 0.01 inch (p)	Short term	0	0	0	0	0
	Annual	124	124	124	124	124
Time (%) that unobstructed wind speed exceeds 5.4 m/s at mean pile height (f)	Short term	65	65	65	65	65
	Annual	11	11	11	11	11
Silt content (s), %		3	3	3	3	3
Particle size multiplier, PM (k)		1.00	1.00	1.00	1.00	1.00
Particle size multiplier, PM10 (k)		0.50	0.50	0.50	0.50	0.50
Emission Control Data						
Emission control method		None	None	None	None	High moisture content (20%) and watering
Emission control removal efficiency, %		0	0	0	0	95
Emission Factor (EF) Equation						
Uncontrolled EF (UEF) Equation	UEF (lb/day/acre) = k x 1.7 x (s/1.5) x ((365 - p)/365) x (f/15)					
Controlled (Final) EF (CEF) Equation	CEF (lb/day/acre) = UEF (lb/day/acre) x (100 - Removal efficiency (%))					
Calculated PM Emission Factor (EF)						
Uncontrolled EF, lb/day/acre	Short term	14.73	14.73	14.73	14.73	14.73
	Annual	1.65	1.65	1.65	1.65	1.65
Controlled EF, lb/day/acre	Short term	14.73	14.73	14.73	14.73	0.74
	Annual	1.65	1.65	1.65	1.65	0.08
Calculated PM10 Emission Factor (EF)						
Uncontrolled EF, lb/day/acre	Short term	7.37	7.37	7.37	7.37	7.37
	Annual	0.82	0.82	0.82	0.82	0.82
Controlled EF, lb/day/acre	Short term	7.37	7.37	7.37	7.37	0.37
	Annual	0.82	0.82	0.82	0.82	0.04
Estimated Emission Rate (ER)						
PM ER lb/hr (daily basis)		1.65	3.65	0.56	0.15	0.0007
TPY		0.81	1.78	0.28	0.072	0.0003
PM10 ER lb/hr (daily basis)		0.82	1.82	0.28	0.073	0.0004
TPY		0.40	0.89	0.14	0.036	0.0002

Source: 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)

Table MH-6
Estimation of PM Emission Factors and Rates For Bulldozers and Front End Loaders on Unpaved Roads
Project: Seminole Electric Cooperative, Inc., Seminole Generating Station Unit 3

Parameters		Operations: Coal handling Coal Pile A Maintenance	Operations: Coal handling Coal Pile B Maintenance	Operations: Coal handling Active Coal Storage Pile and Reclaim Hopper Maintenance	Operations: Limestone handling Limestone Pile Maintenance
Emission Point/Area					
Vehicle Data					
Vehicle weight (W), ton	Loaded	49	49	49	49
	Unloaded	49	49	49	49
	Average	49	49	49	49
Operating time, hours	Daily	4	4	4	4
days	Annual	260	260	260	260
Basis for vehicle miles travelled (VMT)					
Number of vehicles	Daily	1	1	1	1
	Annual	260	260	260	260
Distance (miles) travelled/vehicle/route	Per trip	1	1	1	1
VMT (no. vehicles x miles travelled per trip)	Daily	1	1	1	1
	Annual	260	260	260	260
General/ Site Characteristics					
Days of precipitation greater than or	Short-term	0	0	0	0
equal to 0.254 mm (p)	Annual	124	124	124	124
Silt content (s), %		3.0	3.0	3.0	3.0
Particle size multiplier, PM (k)		4.9	4.9	4.9	4.9
PM10 (k)		1.5	1.5	1.5	1.5
Coefficients for silt content- PM	a	0.7	0.7	0.7	0.7
	b	0.45	0.45	0.45	0.45
Coefficients for silt content- PM10	a	0.9	0.9	0.9	0.9
	b	0.45	0.45	0.45	0.45
Emission Control Data					
Emission control method		Water, as needed	Water, as needed	Water, as needed	Water, as needed
Emission control removal efficiency, %		50	50	50	50
Emission Factor (EF) Equation					
Uncontrolled EF (UEF) Equation	UEF(lb/VMT) = k x (s/12)^a x (W)/3)^b x [(365 - p)/365]				
Controlled EF (CEF) Equation	CEF(lb/VMT) = UEF (lb/VMT) x (100 - Removal efficiency (%))				
Calculated PM Emission Factor (EF)					
Uncontrolled EF, lb/VMT	Short term	6.53	6.53	6.53	6.53
	Annual	4.31	4.31	4.31	4.31
Controlled EF, lb/VMT	Short term	3.26	3.26	3.26	3.26
	Annual	2.15	2.15	2.15	2.15
Calculated PM10 Emission Factor (EF)					
Uncontrolled EF, lb/VMT	Short term	1.51	1.51	1.51	1.51
	Annual	1.00	1.00	1.00	1.00
Controlled EF, lb/VMT	Short Term	0.76	0.76	0.76	0.76
	Annual	0.50	0.50	0.50	0.50
Estimated Emission Rate (ER)					
PM ER lb/hr (based on daily rate)		0.14	0.14	0.14	0.14
TPY		0.28	0.28	0.28	0.28
PM10 ER lb/hr (based on daily rate)		0.03	0.03	0.03	0.03
TPY		0.06	0.06	0.06	0.06

Source: USEPA, 2003 (AP-42, Section 13.2.2 Unpaved Roads)

UNIT 3 COOLING TOWER EMISSIONS ESTIMATES

TDS (ppmw)	PM Emission Rate (lb/hr)	Percent of Emissions < or = PM10 %	PM10 Emissions (lb/hr)
1000	0.90	82.04	0.740
2000	1.80	63.50	1.145
2400	2.16	57.20	1.238
3000	2.70	50.00	1.352
4000	3.61	38.33	1.382
5000	4.51	29.97	1.351
6000	5.41	23.59	1.276
7000	6.31	18.20	1.149
8000	7.21	13.57	0.979
9000	8.11	9.65	0.783
10000	9.02	6.28	0.566
11000	9.92	5.11	0.507
12000	10.82	4.46	0.483
29000	26.15	0.82	0.214
89600	80.78	0.22	0.178

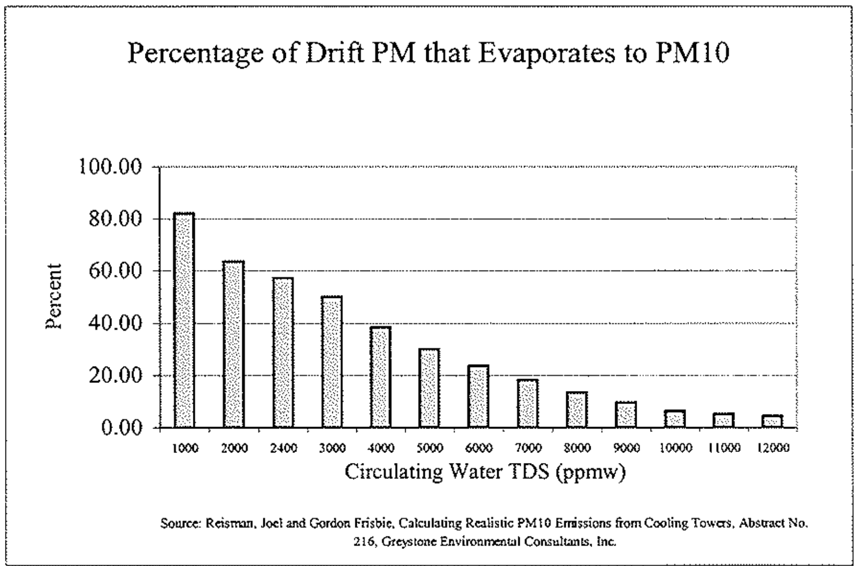
Tower Circulation Rate (GPM)	Drift Rate %
360,352	0.0005

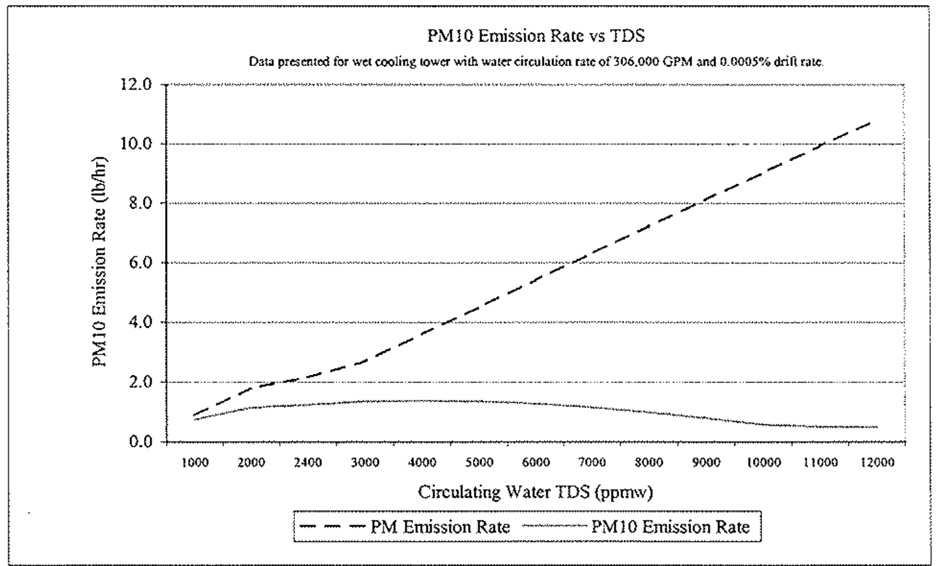
swd

Water density (lb/gal)
8.34

Max TDS (ppm)
2400

Calculated PM10 % < or = PM10 %
82.04
63.50
57.20
50.00
38.33
29.97
23.59
18.20
13.57
9.65
6.28
5.11
4.46
0.82
0.22





Reisman, Joel and Gordon Frisbie, *Calculating Realistic PM10 Emissions from Cooling Towers,* Abstract No. 216, Greystone Environmental Consultants, Inc.

Calculating Realistic PM_{10} Emissions from Cooling Towers

Abstract No. 216   Session No. AM-1b

Joel Reisman and Gordon Frisbie
Greystone Environmental Consultants, Inc., 650 University Avenue, Suite 100, Sacramento, California 95825

ABSTRACT

Particulate matter less than 10 micrometers in diameter (PM_{10}) emissions from wet cooling towers may be calculated using the methodology presented in EPA's AP-42[1], which assumes that all total dissolved solids (TDS) emitted in "drift" particles (liquid water entrained in the air stream and carried out of the tower through the induced draft fan stack.) are PM_{10}. However, for wet cooling towers with medium to high TDS levels, this method is overly conservative, and predicts significantly higher PM_{10} emissions than would actually occur, even for towers equipped with very high efficiency drift eliminators (e.g., 0.0006% drift rate). Such over-prediction may result in unrealistically high PM_{10} modeled concentrations and/or the need to purchase expensive Emission Reduction Credits (ERCs) in PM_{10} non-attainment areas. Since these towers have fairly low emission points (10 to 15 m above ground), over-predicting PM_{10} emission rates can easily result in exceeding federal Prevention of Significant Deterioration (PSD) significance levels at a project's fenceline. This paper presents a method for computing realistic PM_{10} emissions from cooling towers with medium to high TDS levels.

INTRODUCTION

Cooling towers are heat exchangers that are used to dissipate large heat loads to the atmosphere. Wet, or evaporative, cooling towers rely on the latent heat of water evaporation to exchange heat between the process and the air passing through the cooling tower. The cooling water may be an integral part of the process or may provide cooling via heat exchangers, for example, steam condensers. Wet cooling towers provide direct contact between the cooling water and air passing through the tower, and as part of normal operation, a very small amount of the circulating water may be entrained in the air stream and be carried out of the tower as "drift" droplets. Because the drift droplets contain the same chemical impurities as the water circulating through the tower, the particulate matter constituent of the drift droplets may be classified as an emission. The magnitude of the drift loss is influenced by the number and size of droplets produced within the tower, which are determined by the tower fill design, tower design, the air and water patterns, and design of the drift eliminators.

AP-42 METHOD OF CALCULATING DRIFT PARTICULATE

EPA's AP-42[1] provides available particulate emission factors for wet cooling towers, however, these values only have an emission factor rating of "E" (the lowest level of confidence acceptable). They are also rather high, compared to typical present-day manufacturers' guaranteed drift rates, which are on the order of 0.0006%. (Drift emissions are typically expressed as a percentage of the cooling tower water circulation rate). AP-42 states that "a *conservatively high* PM_{10} emission factor can be obtained by (a) multiplying the total liquid drift factor by the TDS fraction in the circulating water, and (b) assuming that once the water evaporates, all remaining solid particles are within the PM_{10} range." (Italics per EPA).

If TDS data for the cooling tower are not available, a source-specific TDS content can be estimated by obtaining the TDS for the make-up water and multiplying it by the cooling tower cycles of concentration. [The cycles of concentration is the ratio of a measured parameter for the cooling tower water (such as conductivity, calcium, chlorides, or phosphate) to that parameter for the make-up water.]

Using AP-42 guidance, the total particulate emissions (PM) (after the pure water has evaporated) can be expressed as:

$$PM = \text{Water Circulation Rate} \times \text{Drift Rate} \times \text{TDS} \qquad [1]$$

For example, for a typical power plant wet cooling tower with a water circulation rate of 146,000 gallons per minute (gpm), drift rate of 0.0006%, and TDS of 7,700 parts per million by weight (ppmw):

$$PM = 146{,}000 \text{ gpm} \times 8.34 \text{ lb water/gal} \times 0.0006/100 \times 7{,}700 \text{ lb solids}/10^6 \text{ lb water} \times 60 \text{ min/hr} = \underline{3.38 \text{ lb/hr}}$$

On an annual basis, this is equivalent to almost 15 tons per year (tpy). Even for a state-of-the-art drift eliminator system, this is not a small number, especially if assumed to all be equal to PM_{10}, a regulated criteria pollutant. However, as the following analysis demonstrates, only a very small fraction is actually PM_{10}.

COMPUTING THE PM_{10} FRACTION

Based on a representative drift droplet size distribution and TDS in the water, the amount of solid mass in each drop size can be calculated. That is, for a given initial droplet size, assuming that the mass of dissolved solids condenses to a spherical particle after all the water evaporates, and assuming the density of the TDS is equivalent to a representative salt (e.g., sodium chloride), the diameter of the final solid particle can be calculated. Thus, using the drift droplet size distribution, the percentage of drift mass containing particles small enough to produce PM_{10} can be calculated. This method is conservative as the final particle is assumed to be perfectly spherical; hence as small a particle as can exist.

The droplet size distribution of the drift emitted from the tower is critical to performing the analysis. Brentwood Industries, a drift eliminator manufacturer, was contacted and agreed to provide drift eliminator test data from a test conducted by Environmental Systems Corporation (ESC) at the Electric Power Research Institute (EPRI) test facility in Houston, Texas in 1988 (Aull[2], 1999). The data consist of water droplet size distributions for a drift eliminator that achieved a tested drift rate of 0.0003 percent. As we are using a 0.0006 percent drift rate, it is reasonable to expect that the 0.0003 percent drift rate would produce smaller droplets, therefore, this size distribution data can be assumed to be conservative for predicting the fraction of PM_{10} in the total cooling tower PM emissions.

In calculating PM_{10} emissions the following assumptions were made:

- Each water droplet was assumed to evaporate shortly after being emitted into ambient air, into a single, solid, spherical particle.
- Drift water droplets have a density (ρ_w) of water; 1.0 g/cm^3 or $1.0 * 10^{-6}\ \mu g/\mu m^3$.
- The solid particles were assumed to have the same density (ρ_{TDS}) as sodium chloride, (i.e., 2.2 g/cm^3).

Using the formula for the volume of a sphere, $V = 4\pi r^3/3$, and the density of pure water, $\rho_w = 1.0$ g/cm^3, the following equations can be used to derive the solid particulate diameter, D_p, as a function of the TDS, the density of the solids, and the initial drift droplet diameter, D_d :

$$\text{Volume of drift droplet} = (4/3)\pi(D_d/2)^3 \quad [2]$$

$$\text{Mass of solids in drift droplet} = (TDS)(\rho_w)(\text{Volume of drift droplet}) \quad [3]$$

substituting,

$$\text{Mass of solids in drift} = (TDS)(\rho_w)(4/3)\pi(D_d/2)^3 \quad [4]$$

Assuming the solids remain and coalesce after the water evaporates, the mass of solids can also be expressed as:

$$\text{Mass of solids} = (\rho_{TDS})\ (\text{solid particle volume}) = (\rho_{TDS})(4/3)\pi(D_p/2)^3 \quad [5]$$

Equations [4] and [5] are equivalent:

$$(\rho_{TDS})(4/3)\pi(D_p/2)^3 = (TDS)(\rho_w)(4/3)\pi(D_d/2)^3 \quad [6]$$

Solving for D_p:

$$D_p = D_d\ [(TDS)(\rho_w/\rho_{TDS})]^{1/3} \quad [7]$$

Where,

TDS is in units of ppmw
D_p = diameter of solid particle, micrometers (μm)
D_d = diameter of drift droplet, μm

Using formulas [2] – [7] and the particle size distribution test data, Table 1 can be constructed for drift from a wet cooling tower having the same characteristics as our example; 7,700 ppmw TDS and a 0.0006% drift rate. The first and last columns of this table are the particle size distribution derived from test results provided by Brentwood Industries. Using straight-line interpolation for a solid particle size 10 μm in diameter, we conclude that approximately 14.9 percent of the mass emissions are equal to or smaller than PM_{10}. The balance of the solid particulate are particulate greater than 10 μm. Hence, PM_{10} emissions from this tower would be equal to PM emissions x 0.149, or 3.38 lb/hr x 0.149 = 0.50 lb/hr. The process is repeated in Table 2, with all parameters equal except that the TDS is 11,000 ppmw. The result is that approximately 5.11 percent are smaller at 11,000 ppm. Thus, while total PM emissions are larger by virtue of a higher TDS, overall PM_{10} emissions are actually lower, because more of the solid particles are larger than 10 μm.

Table 1. Resultant Solid Particulate Size Distribution (TDS = 7700 ppmw)

EPRI Droplet Diameter (μm)	Droplet Volume (μm^3) [2][1]	Droplet Mass (μg) [3]	Particle Mass (Solids) (μg) [4]	Solid Particle Volume (μm^3)	Solid Particle Diameter (μm) [7]	EPRI % Mass Smaller
10	524	5.24E-04	4.03E-06	1.83	1.518	0.000
20	4189	4.19E-03	3.23E-05	14.66	3.037	0.196
30	14137	1.41E-02	1.09E-04	49.48	4.555	0.226
40	33510	3.35E-02	2.58E-04	117.29	6.073	0.514
50	65450	6.54E-02	5.04E-04	229.07	7.591	1.816
60	113097	1.13E-01	8.71E-04	395.84	9.110	5.702
70	179594	1.80E-01	1.38E-03	628.58	10.628	21.348
90	381704	3.82E-01	2.94E-03	1335.96	13.665	49.812
110	696910	6.97E-01	5.37E-03	2439.18	16.701	70.509
130	1150347	1.15E+00	8.86E-03	4026.21	19.738	82.023
150	1767146	1.77E+00	1.36E-02	6185.01	22.774	88.012
180	3053628	3.05E+00	2.35E-02	10687.70	27.329	91.032
210	4849048	4.85E+00	3.73E-02	16971.67	31.884	92.468
240	7238229	7.24E+00	5.57E-02	25333.80	36.439	94.091
270	10305995	1.03E+01	7.94E-02	36070.98	40.994	94.689
300	14137167	1.41E+01	1.09E-01	49480.08	45.549	96.288
350	22449298	2.24E+01	1.73E-01	78572.54	53.140	97.011
400	33510322	3.35E+01	2.58E-01	117286.13	60.732	98.340
450	47712938	4.77E+01	3.67E-01	166995.28	68.323	99.071
500	65449847	6.54E+01	5.04E-01	229074.46	75.915	99.071
600	113097336	1.13E+02	8.71E-01	395840.67	91.098	100.000

[1] Bracketed numbers refer to equation number in text.

The percentage of PM_{10}/PM was calculated for cooling tower TDS values from 1000 to 12000 ppmw and the results are plotted in Figure 1. Using these data, Figure 2 presents predicted PM_{10} emission rates for the 146,000 gpm example tower. As shown in this figure, the PM emission rate increases in a straight line as TDS increases, however, the PM_{10} emission rate increases to a maximum at around a TDS of 4000 ppmw, and then begins to decline. The reason is that at higher TDS, the drift droplets contain more solids and therefore, upon evaporation, result in larger solid particles for any given initial droplet size.

CONCLUSION

The emission factors and methodology given in EPA's AP-42[1] Chapter 13.4 *Wet Cooling Towers*, do not account for the droplet size distribution of the drift exiting the tower. This is a critical factor, as more than 85% of the mass of particulate in the drift from most cooling towers will result in solid particles larger than PM_{10} once the water has evaporated. Particles larger than PM_{10} are no longer a regulated air pollutant, because their impact on human health has been shown to be insignificant. Using reasonable, conservative assumptions and a realistic drift droplet size distribution, a method is now available for calculating realistic PM_{10} emission rates from wet mechanical draft cooling towers equipped with modern, high-efficiency drift eliminators and operating at medium to high levels of TDS in the circulating water.

Table 2. Resultant Solid Particulate Size Distribution (TDS = 11000 ppmw)

EPRI Droplet Diameter (μm)	Droplet Volume (μm^3) [2][1]	Droplet Mass (μg) [3]	Particle Mass (Solids) (μg) [4]	Solid Particle Volume (μm^3)	Solid Particle Diameter (μm) [7]	EPRI % Mass Smaller
10	524	5.24E-04	5.76E-08	2.62	1.710	0.000
20	4189	4.19E-03	4.61E-05	20.94	3.420	0.196
30	14137	1.41E-02	1.56E-04	70.69	5.130	0.226
40	33510	3.35E-02	3.69E-04	167.55	6.840	0.514
50	65450	6.54E-02	7.20E-04	327.25	8.550	1.816
60	113097	1.13E-01	1.24E-03	565.49	10.260	5.702
70	179594	1.80E-01	1.98E-03	897.97	11.970	21.348
90	381704	3.82E-01	4.20E-03	1908.52	15.390	49.812
110	696910	6.97E-01	7.67E-03	3484.55	18.810	70.509
130	1150347	1.15E+00	1.27E-02	5751.73	22.230	82.023
150	1767146	1.77E+00	1.94E-02	8835.73	25.650	88.012
180	3053628	3.05E+00	3.36E-02	15268.14	30.780	91.032
210	4849048	4.85E+00	5.33E-02	24245.24	35.909	92.468
240	7238229	7.24E+00	7.96E-02	36191.15	41.039	94.091
270	10305995	1.03E+01	1.13E-01	51529.97	46.169	94.689
300	14137167	1.41E+01	1.56E-01	70685.83	51.299	96.288
350	22449298	2.24E+01	2.47E-01	112246.49	59.849	97.011
400	33510322	3.35E+01	3.69E-01	167551.61	68.399	98.340
450	47712938	4.77E+01	5.25E-01	238564.69	76.949	99.071
500	65449847	6.54E+01	7.20E-01	327249.23	85.499	99.071
600	113097336	1.13E+02	1.24E+00	565486.68	102.599	100.000

Figure 1: Percentage of Drift PM that Evaporates to PM10

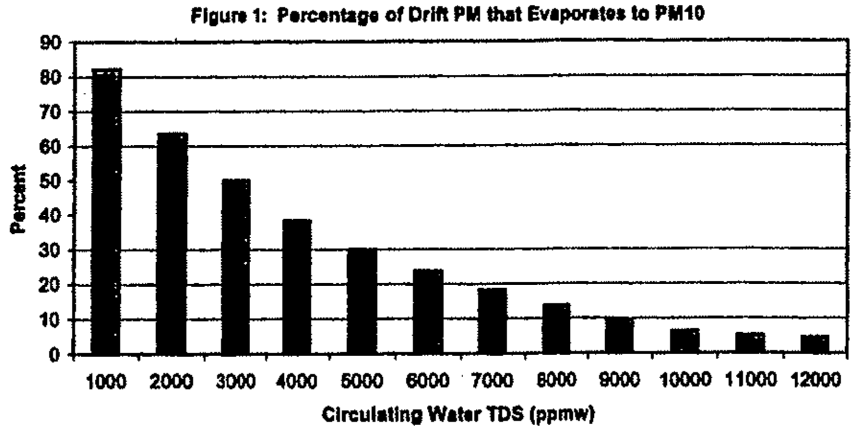
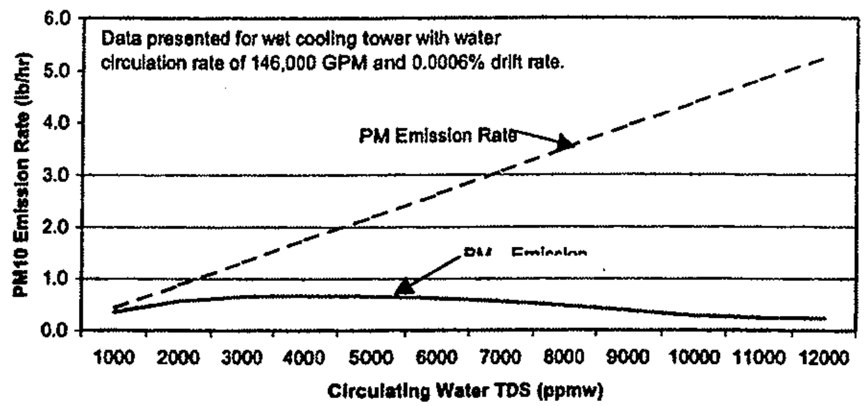


Figure 2: PM_{10} Emission Rate vs. TDS



REFERENCES

1. EPA, 1995. Compilation of Air pollutant Emission Factors, AP-42 Fifth edition, Volume I: *Stationary Point and Area Sources*, Chapter 13.4 Wet Cooling Towers, http://www.epa.gov/ttn/chief/ap42/, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, January.

2. Aull, 1999. Memorandum from R. Aull, Brentwood Industries to J. Reisman, Greystone, December 7, 1999.

KEY WORDS

Drift
Drift eliminators
Cooling tower
PM_{10} emissions
TDS

APPENDIX B

BEST AVAILABLE CONTROL TECHNOLOGY

Table B-1 Coal-Fired Utility PSD Projects

	Company	City (County)	General Project Description	Added Capacity (MWe)	Date of Application	Proposal Received in Regional Office	Date Permit Issued	NSR & 112(g) Regulated Pollutants	BACT-LAER-112(g) Standards	BACT-LAER-112(g) Control Techniques	General Comments
EPA Region 1											
Connecticut	None										
Maine	None										
New Hampshire	None										
Rhode Island	None										
Vermont	None										
EPA Region 2											
New Jersey	None										
New York	None										
Puerto Rico	None										
Virgin Islands	None										
EPA Region 3											
Delaware	None										
Washington, DC	None										
Maryland	AES Cumberland	(Garrett)	Circulating Fluidized Bed Boiler	180	Pre-application Only						
Pennsylvania	Reliant Energy, Seward Power Plant	(Indiana)	CFB boiler to replace existing unit, on-line by 2004	520	30-Sep-00		08-Jun-01		NOx-0.15lb/mmBtu	SNCR	see http://www.reliantenergy.com/news/pressreleases/press_release_197.asp; http://pe.pennnet.com/Articles/Article_Display.cfm?Section=Articles&Subsection=Display&ARTICLE_ID=102413&KEYWORD=reliant . Reliant a net out (repowering) for NOx, state BAT for all but CO
Pennsylvania	Greene Energy (Wellington Development)	Greene	Wellington Development of Fairmont, WV is proposing to build a 525 MW coal mine waste fueled Resource Recovery power project in Green County, Pennsylvania. The resulting project will be one of the cleanest solid fuel burning facilities in the world, utilizing state-of-the-art circulating fluidized bed combustion technology (CFBC).	525					2414 TPY NOx @.10 lb /mmbtu 1207 TPY pm10@.5 lb/mmbtu 5649 TPY SO2@.234lb/mmbtu .314 TPY Hg 145 TPY H2SO4	Filter Baghouse for PM.(CFB) Boiler and Dry SO2 Scrubber for SO2 .(SNCR) and CFB Boiler for reducing NOx	Waste Coal properties 6800-8800 BTU/LB
Pennsylvania	River Hill Power Facility	Clearfield	CIRCULATING FLUIDIZED BED BOILER	290	preapp		pre applicatoin		1300 TPY NOx, (bact), 65 TPY VOCS(-LAER), CO 1900 TPY, PM-10 150 TPY, H2SO4 50 TPY, 4300 TPY SO2	SNCR - NOX, BAGHOUSE-PM10, LIMESTONE INJECTION-SO2	WASTE COAL BEING BURNED
Pennsylvania	Beach Hollow Project	Washington	CIRCULATING FLUIDIZED BED BOILER	250			01-Apr-05		0.08 lb/mmbtu NOx, 0.006 lb/mmbtu VOC, 0.012 lb/mmbtu PM10, 0.245 lb/mmbtu SO2, 0.15 lb/mmbtu CO, 0.140 lb/hr Pb	SNCR, Baghouse, Limestone Injection	NOx and VOC - LAER, PM10 and SO2 BACT
Pennsylvania	AES Beaver Valley		AES proposes to install a new 2,155MMBTU/HR CFB boiler and at the same time retire four existing pulverized coal boilers. This new configuration will generate approximate 180 MW, compared to the current 125 MW	180	09-May-01		21-Nov-01		NOx-0.15lb/mmBtu	SNCR	Permitting staff reviewed the emissions data to see whether the modification would trigger major NSR requirements. Assuming past emissions were compliant, the modification would not trigger major NSR for any pollutant
Virginia	None										
West Virginia	Longview Power, LLC		Longview has proposed to construct a 600 megawatt (MW) (net) power generation facility with interconnection to Allegheny Energy Supply Company lines. The pulverized coal supercritical boiler burning 2.5 percent sulfur (nominal) bituminous coal would operate with a once-through, balanced draft, single reheat steam turbine/generator. A natural gas-fired auxiliary boiler would be used to supply startup steam to the main boiler	600				NOx,	NOx-0.08 lb/MMBtu, SO2 - 0.15lb/MMBtu, PM - 0.018 lb/MMBtu, CO- 0.11 lb/MMBtu, H2SO4-0.0075 lb/MMBtu, Hg-6.38x10e-2 TPY	NOx burners and selective catalytic reduction	
West Virginia	Anker		Circulating Fluidized Bed Boiler	1000	Pre-application Only						
EPA Region 4											
Alabama	None										
Florida	Tampa Electric Company- Polk Power	Mulberry (Polk)	1994 PSD permit allowed construction of an Integrated Gasification Combined Cycle (IGCC) plant. The permit required a NOx BACT evaluation based on data gathered from the plant's operation to be submitted 12-18 months after operation began. On May 10, 2001, the permitting agency issued a proposed BACT determination to require SCR. Tampa Electric appealed the determination, and SCR was not required in final permit.	N/A	05-Dec-00		05-Feb-02	NOx	NOx - 15 ppm (syngas), 42 ppm (fuel oil)	NOx - DLN	
Florida	JEA Northside Generating Station	Jacksonville (Duval)	Construct two new 297.5 MW CFB boilers as a repowering project to replace two existing boilers. Allowable fuels include coal and petroleum coke.	595			14-Jul-99	NOx, SO2, PM/PM10, CO, VOC, HF, Hg.	NOx-0.09 lb/mmBtu (30-day), PM/PM10-0.011 lb/mmBtu (3-hr), CO-350 lb/hr (24-hr), VOC-14 lb/hr (3-hr), HF- 0.43 lb/hr (3-hr), Hg-0.03 lb/hr (6-hr) [Note: Project nets out of review for SO2. SO2 emission limits are 0.20 lb/mmBtu (24-hr) and 0.15 lb/mmBtu (30-day). Project not subject to PSD review for SAM and Pb. SAM emission limit is 1.1 lb/hr (3-hr). Pb emission limit is 0.07 lb/hr (3-hr).]	NOx-CFB+SNCR, PM/PM10-FF, CO-GCP, VOC-GCP, Hg-CFB+FF, HF-CFB+polishing scrubber. [Note: Project not subject to BACT for SO2, SAM, and Pb. Emission control method for SO2 and SAM is CFB+polishing scrubber. Emission control for Pb is FF.]	
Georgia	Longleaf Energy Associates, LLC (LS Power Development, LLC)	(Early)	Construct 2 new pulverized coal boilers (600 MW each)	1,200	19-Nov-04	14-Jan-05		CO, NOx, SO2, PM/PM10, VOC, Fluorides, SAM, Hg	Proposed: NOx-0.07 lb/mmbtu (30-day), SO2-0.12 lb/mmbtu (30-day), PM/PM10-0.033 (30-day), CO-0.15 lb/mmbtu (30-day), VOC-0.006 lb/mmbtu (30-day), fluorides (as HF)-0.0024 lb/mmbtu (PRB) or 0.0031 lb/mmbtu (CAPP), SAM-0.005 lb/mmbtu (30-day), Hg-0.000006 lb/MWh (CAPP) or 0.000020 lb/MWh (PRB)	NOx-LNB+OFA+SCR, SO2-Dry Scrubber, PM/PM10-Baghouse, CO-GCP, VOC-GCP, fluorides-Dry Scrubber+Baghouse, SAM-Dry Scrubber+Baghouse, Hg-Dry Scrubber+Baghouse	Applicant proposes either Powder River Basin (PRB) sub-bituminous coal, or Central Appalachian (CAPP) bituminous coal, or blends
Kentucky	Kentucky Mountain Power, LLC	Ary (Knott)	Construct coal-refuse-fired CFB boilers	500	19-Apr-00		04-May-01	NOx, CO, PM, VOC, SO2, SAM, Hg, Be, Pb, HF	NOx-0.07 lb/mmbtu, CO-0.27 lb/mmbtu, PM-0.015 lb/mmbtu, VOC-0.0072 lb/mmbtu, SO2-0.13 lb/mmbtu, SAM-0.010 lb/mmbtu, Be-0.0000217 lb/mmbtu, Hg-0.000081 lb/mmbtu, Pb-0.000194 lb/mmbtu, HF-0.0053 lb/mmbtu	NOx-SNCR, CO-GCP, PM-Baghouse, VOC-CFB Design, SO2-NIDS, SAM-CFB Design, Be-Baghouse, Hg-Baghouse, Pb-Baghouse, HF-Baghouse	NIDS=Natural Integrated Desulfurization System, GCP=Good Combustion Practices, see http://enquirer.com/editions/2000/08/12/loc_power_company_aiming.html. Project still planned for development as of 27-May-04

Table B-1. Coal-Fired Utility PSD Projects

	Company	City (County)	General Project Description	Added Capacity (MWe)	Date of Application	Proposal Received in Regional Office	Date Permit Issued	NSR & 112(g) Regulated Pollutants	BACT-LAER-112(g) Standards	BACT-LAER-112(g) Control Techniques	General Comments
Kentucky	Thoroughbred Generating Company, LLC (Peabody Energy)	Graham (Muhlenberg)	Construct an electric generating facility with 2 pulverized coal boilers (750 MWe each)	1500	28-Feb-01; complete revised appl. 26-Oct-01	28-Feb-01, revised appl. 26-Oct-01	11-Oct-02	NOx, CO, PM, VOC, SO2, SAM, Hg, Be, Pb, Fluorides	NOx-0.08 lb/mmbtu (30-day), CO-0.1 lb/mmbtu (30-day), PM-0.018 lb/mmbtu (3-hr), VOC-0.0072 lb/mmbtu (30-day), SO2-0.167 lb/mmbtu (30-day) & 0.41 lb/mmbtu (24-hr) (see comment), SAM-0.00497 lb/mmbtu (30-day), Be-0.000000944 lb/mmbtu (quarterly), Hg-0.00000321 lb/mmbtu (quarterly), HF-0.000159 lb/mmbtu (30-day), Pb-0.00000386 lb/mmbtu (quarterly); also case-by-case MACT limits in tpy for VOC, Hg, HCl, HF, As, Be, Cr, Mn, Pb, Cd	NOx-LNB/SCR, CO-GCP, PM-ESP/wet ESP, VOC-GCP, SO2-wet limestone FGD, SAM-FGD/wet ESP, Be-Baghouse, Hg-baghouse/FGD, HF-FGD	GCP=Good Combustion Practices; permittee to perform a 2-year "optimization study" of 24-hr SO2 emissions to determine if the 24-hr limit can be decreased, with a "target" emission rate of 0.23 lb/mmbtu. As of 28-Jan-05 PSD construction permit was under appeal and construction had not commenced. Original PSD permit was extended
Kentucky	East Kentucky Power Cooperative, Spurlock Generating Station	Maysville (Mason)	Construct 1 new circulating fluidized bed boiler	270	24-Apr-01	14-Feb-02	21-Jun-02	NOx, CO, PM, SO2, VOC, SAM (also see comments)	NOx-0.07 lb/mmbtu (30-day), CO-0.15 lb/mmbtu (30-day), PM-0.015 lb/mmbtu (3-hr), SO2-0.20 lb/mmbtu (24-hr), SAM-0.0050 lb/mmbtu (also see comments)	Proposed: NOx-SNCR, CO-GCP, PM-Baghouse, SO2-CFB design/dry lime scrubber, SAM-CFB design/dry lime scrubber (also see comments)	Emissions limits also established for VOC, Hg, flourides, Pb, Be. NOx limit is temporarily waived during an initial "optimization" period; final NOx limit shall not exceed 0.10 lb/mmbtu depending on results achieved during "optimization" period. CFB=Circulating Fluidized Bed (which includes limestone injection), GCP=Good Combustion Practices
Kentucky	East Kentucky Power Cooperative, Spurlock Generating Station (Unit 4)	Maysville (Mason)	Construct 1 new circulating fluidized bed boiler	300	13-Sep-04	04-Oct-04		NOx, CO, PM/PM10, SO2, SAM, Hg	Proposed: NOx-0.1 lb/mmbtu (?-day), CO-0.15 lb/mmbtu (?-hr), PM/PM10-0.015 lb/mmbtu (?-hr), SO2-0.20 lb/mmbtu (?-hr), VOC-nothing proposed, SAM-0.0050 lb/mmbtu (?-hr), Hg-0.0000026 lb/mmBtu (also see comments)	Proposed: NOx-SNCR, CO-GCP, PM/PM10-Baghouse, SO2-CFB design/dry lime scrubber, SAM-CFB design/dry lime scrubber, VOC-nothing proposed, Hg-Baghouse (also see comments)	As of 28-Jan-05, permitting agency considers the application to be deficient. Boiler will be fired with coal and will capability to burn tire-derived fuel. Applicant proposes an "optimization" study after start of operation to assess whether NOx emissions limit can be lowered.
Kentucky	Cash Creek Generation, LLC	(Henderson)	Construct 2 new pulverized coal boilers (500 MW each)	1,000	25-Nov-03 revised	22-Dec-03		(see comments)	(see comments)	(see comments)	A revised permit application is expected in first quarter of 2005
Kentucky	Louisville Gas & Electric Company (LG&E), Trimble County Generating Station	(Trimble)	Construct 1 new pulverized coal boiler (750 MW)	750	01-Dec-04 revised	09-Dec-04		PM/PM10, CO, VOC, SAM, fluorides (also see comments)	Proposed: CO-0.10 lb/mmbtu (3-hr), PM/PM10-0.0018 lb/mmbtu (3-hr), SAM-26.6 lb/hr (3-hr), VOC-0.0032 lb/mmbtu (3-hr), fluorides-no rate proposed, Hg-no rate proposed	Proposed: CO-GCP, PM/PM10-Baghouse, SAM-Wet ESP, VOC-GCP, fluorides-wet FGD, Hg-SCR+Baghouse+Wet FGD (also see comments)	Applicant proposes to net out of PSD review for NOx and SO2. Proposed NOx control is SCR (0.05 lb/mmBtu) and proposed SO2 control is wet FGD (0.107 lb/mmBtu). Proposed primary boiler fuel is eastern bituminous coal. Boiler will also have capability of firing a blend containing eastern bituminous coal and up to 50% western coal.
Kentucky	Estill County Energy Partners	Irvine (Estill)	Construct 1 new circulating fluidized bed boiler. Fuel will be waste eastern bituminous coal.	110	31-Aug-04	03-Sep-04		PM/PM10, SO2, H2SO4, NOx, CO, VOC, Hg (and other HAPs listed)	Proposed: SO2-0.13 lb/mmbtu (30-day) and 0.15 lb/mmbtu (24-hr), PM/PM10-0.015 lb/mmbtu filterable (3-hr), NOx-0.07 lb/mmbtu (30-day), CO-0.15 lb/mmbtu (30-day), VOC-0.007 lb/mmbtu (30-day), H2SO4-0.005 lb/mmbtu (30-day); Hg-0.000004 lb/mmbtu or 90% removal	Proposed: SO2-inherent CFB andn polishing dry scrubber, PM/PM10 - baghouse, NOx-inherent CFB and SNCR, CO-GCP, VOC-GCP, H2SO4-inherent CFB and dry scrubber and baghouse, Hg-co-benefit from BACT controls	As of 16-Dec-04, permitting agency considered the application to be deficient.
Mississippi	None										
North Carolina	None										
South Carolina	Santee Cooper, Cross Generating Station	Cross (Berkeley)	Existing electric generating facility to be expanded with addition of two pulverized coal boilers (660 MWe each).	1,320	[See comment (1)]		05-Feb-04	PM/PM10, CO, VOC, Pb, Hg [See comments (2) and (4)]	PM (filterable only)-0.015 lb/mmBtu (3-hr), PM10 (filterable and condensible)-0.018 lb/mmBtu (3-hr), CO-0.16 lb/mmBtu (3-hr), VOC-0.0024 lb/mmBtu (3 hour), Pb-0.0000169 lb/mmBtu, Hg-0.0000036 lb/mmBtu [See comments (2), (3), (4)]	PM/PM10-dry ESP, CO-GCP, VOC-GCP, Pb-dry ESP, Hg-SCR, dry ESP, wet FGD [See comment (2)]	(1) Original permit application received in 2002; final revised application received in 2003. (2) Project netted out of PSD review for SO2, NOx, and SAM; therefore, emissions limits for these pollutants are not BACT limits. (3) Permit contains several emissions limits in addition to those shown; the limits shown are BACT or 112(g) limits. (4) HAPs with emissions limits also include HCl, HF, and several metals.
Tennessee	None										
EPA Region 5											
Illinois	Enviropower	Benton (Franklin)	Two (2) CFB boilers, 250 MWe each	500	15-Aug-00	24-Mar-00	03-Jul-01	SO2, NOx, PM, CO, VOM, F	SO2 92% redux, 0.25 lb/mmBtu; NOx 0.125, PM 0.015, CO 0.27, VOC 0.007 lb/mmBtu	CFB w/sorbent injection, baghouses	see http://yosemite.epa.gov/r5/il_permt.nsf/133e3c6aefa1d1638625666a00563357/f3340e245be72a385256a2600672e0b/$FILE/EnviroPowerPS PDF. Coal and tailings-fired. For Hg - An emission rate of 0.000004 lb/mmBtu or emissions below the detection level of established emission test methodology; http://www.epa.gov/region5/air/permits/ilonline.htm
Illinois	Southern Illinois Power Cooperative, Marion Power Station	(Williamson)	1st Project - 1 CFB boiler to replace 3 existing coal fired generating units. 2nd Project - 2 simple cycle combustion turbines. 3rd Project- Installation of SCR on existing coal fired boiler	120	12-Jul-00	05-Mar-01	16-May-01	CO	CO-0.015lb/mmBtu	Combustion Controls	see http://www.epa.state.il.us/public-notices/2001/sipco-marion/index.html
Illinois	Combelt Energy	Elkhart (Logan)	Prairie Energy Power Plant. PSD for low-emitting power plant.	91	3rd quarter, 2001			NOx, PM, SO2	NOx - 0.132, SO2 - 0.3 lb/mmBtu	SCR, ESP, FGD	Design funded in part by IL Clean Coal Institute/US DOE. http://www.epa.gov/region5/air/permits/ilonline.htm http://pepei.pennnet.com/articles/article_display.cfm?Section=ONART&Category=PRODI&PUBLICATION_ID=6&ARTICLE_ID=164286
Illinois	Peabody - Prairie State Generating Station	(Washington)	Peabody will build the Prairie State Energy Campus -- a 1,500-megawatt (MW), coal-fired electricity plant, comprised of two 750 MWe pulverized coal boilers and one 400 mmBtu/hr auxiliary boiler -- in Washington County in southern Illinois. Construction at Prairie, if the plans pass state approval, is scheduled to start in late 2002 to early 2003 and is expected to last approximately four years.	1500	10/2001	04-Feb-04		SO2, PM, NOx, CO, VOC, H2SO4, Pb, F	SO2 - 0.30 lb/mmBtu, PM10 - 0.018, NOx - 0.10, CO - 0.15, VOC - 0.01, H2SO4 - 0.039	SCR, wet scrubber, fabric filter or ESP	http://biz.yahoo.com/rf/011022/n22141122_1.html, the public comment period for the draft permit ends June 21, 2004
Illinois	Dynegy-Illinois Power	Baldwin (Randolph)	$1.5 billion, two 650 MW coal-fired boilers. 4 - 5 million tons of coal a year by rail/barge. Adding to 2000 MW from 3 existing boilers.	1300	No app as of 12/4/01						
Illinois	Indeck-Elwood	Elwood (Will)	Two (660 MW total capacity) circulating fluidized bed boilers firing pulverized coal	660	21-Mar-02	07-Apr-03	10-Oct-03	PM, SO2, NOx, CO, VOC, H2SO4, Pb, F	PM-.015 lb/MMBTU, SO2-.15 lb/MMBTU, NOx-.10 lb/MMBTU, CO-.10 lb/MMBTU, VOC-.004 lb/MMBTU	Baghouse, CFB boiler technology, limestone addtion to bed, SNCR	The permit was appealed before the Environmental Appeals Board by the Sierra Club. EAB remanded the permit pending consultation on the Endangered Species Act between EPA and FWS
Illinois	Midwest Generation	Morris (Grundy)	PSD to convert 2 of 5 Oil/NG boilers to coal	1000	Application Received						
Indiana	Enviropower	Petersburg (Pike)	2 - 250 MWe CFB boilers, combusting waste coal	500	03-Aug-00						see http://www.state.in.us/idem/oam/permits/powerplt/summary/enviropike.html, http://enquirer.com/editions/2000/08/12/loc_power_company_aiming.html
Michigan	None										
Ohio	Dominion Energy	Ashtabula		600	08-Mar-04						NOx emissions are projected at 2,300 tons per year and VOC emissions are projected at 120 tons per year.

Table B-1. Coal-Fired Utility PSD Projects

	Company	City (County)	General Project Description	Added Capacity (MWe)	Date of Application	Proposal Received in Regional Office	Date Permit Issued	NSR & 112(g) Regulated Pollutants	BACT-LAER-112(g) Standards	BACT-LAER-112(g) Control Techniques	General Comments
Wisconsin	Wisconsin Energy - Elm Road Generating Station (At existing Oak Creek Facility)	Oak Creek (Milwaukee)	Two 615 MW supercritical pulverized coal boilers, construction is proposed to begin in 2004, with in-service dates of 2007, and 2009 for these units. (One 600 MW integrated gasification combined cycle unit was proposed, but was not approved by the WI Public Service Comission.)	1230	June 18 2002 - October 1 2003	October14, 2003	January 14, 2004	CO, NOx, PM/PM10, SO2, VOC, Hg, Be, HF, HCL, H2SO4, Pb	CO: 0.12 lb/mmbtu, NOx: 0.07 lb/mmbtu, PM/PM10: 0.018 lb/mmbtu, SO2: 0.15 lb/mmbtu, VOC: 0.0035 lb/mmbtu, Pb: 7.9 lb/tbtu, Hg: 1.12 lb/tbtu, Be: 0.35 lb/tbtu, HF: 0.00088 lb/mmbtu, H2SO4, 0.01lb/mmbtu, HCL: 2.56 lb/mmbtu	CO: LNB, NOx: LNB/SCR, PM/PM10: FF, SO2: Wet FGD, VOC: LNB, Pb/Hg/Be HF/HCL: FF, H2SO4: FGD/Wet ESP	see http://www.corporate-ir.net/ireye/ir_site.zhtml?ticker=wec&script=410&layout=7&item_id=154598, http://milwaukee.bcentral.com/milwaukee/stories/2001/09/10/story3.html For permits, see, http://www.dnr.state.wi.us/org/aw/air/permits/APM_toc.htm
Wisconsin	Wisconsin Power and Light		On-line by 2006	500							see http://www.alliantenergy.com/news/news.php?issueID=53
Wisconsin	Wisconsin Public Service Corporation	Wausau	The Weston Unit 4 plant, planned for construction at the existing Weston generating station located three miles south of Wausau in central Wisconsin, is being built to satisfy growing electric demand	500	July 16, 2004	September 2003	October 19, 2004	CO, NOx, PM/PM10, SO2, VOC, Hg, Be, HF, HCL, H2SO4, Pb	CO: 0.15 lb/mmbtu, NOx: 0.06 lb/mmbtu, PM/PM10: 0.020 lb/mmbtu 0.018 lb/mmbtu, SO2: 0.09 lb/mmbtu, VOC: 0.0036 lb/mmbtu, Pb: 0.13 lbs/hr, Hg: 1.7 lb/tbtu, Be: 1.3 lb/tbtu, HF: 0.000217 lb/mmbtu, H2SO4: 0.005 lb/mmbtu, HCL: 10.94 lbs/hr	CO: LNB, NOx: LNB/SCR, PM/PM10: FF, SO2: DRY FGD, VOC: LNB, Pb/Be/HF: FF, Hg: Sorbent Injection/FF, H2SO4/HCL: FGD	see http://pepei.pennnet.com/articles/article_display.cfm?Section=ONART&Category=PRODJ&PUBLICATION_ID=6&ARTICLE_ID=165311. http://www.dnr.state.wi.us/org/aw/air/permits/03-RV-248.zip
Wisconsin	Manitowoc Public Utilities	Manitowoc	Construction of a 64 MW CFB fired boiler. Project will include elimination of solid fuel burning capabilities at existing boiler #5. Boiler #5 will retain its ability to fire natural gas as the boiler is needed at peak usage periods. New boiler will fire coal, coke, and paper pellets as well as natural gas at startup. The emission reduction from the elimination of solid fuel burning capabilities at boiler #5 will be used to net out of PSD for PM, SO2, VOC, NOx, Pb, H2SO4, Be, Hg, and F	64	October 13, 2003	N/A	December 3, 2003	CO	CO: 0.15 lb/mmbtu, NOx: 0.155 lb/mmbtu, PM/PM10: 0.03 lb/mmbtu, VOC: 0.013 lb/mmbtu, Pb: .0002 lb/mmbtu, HF: 0.00173 lb/mmbtu, H2SO4: 0.0045lb/mmbtu,	CO: GCP, NOx: GCP, PM/PM10: FF, SO2: Lime Injection & CFB Boiler Design, VOC: GCP, Pb/Hg/Be/HF: FF, H2SO4: CFB Boiler Design	http://www.dnr.state.wi.us/org/aw/air/permits/APM_toc.htm#section_M
EPA Region 6											
Arkansas	LS Power, Plum Pt. Energy, Plum Pt. Power Sta.	Osceola (MS)	Construct 1 pulverized Powder River basin coal fired boiler to yield 550-800 MW, fuel oil used for start-up. New power plant.	800	May 17, 2001	22-May-01	20-Aug-03	NOx,CO,SO2,PM/PM10,VOC,Pb,Fl,H2SO4	NOx: 0.09 #/mmbtu; CO: 0.16 #/mmbtu; SO2: 0.16 #/mmbtu; PM/PM10: 0.018 #/mmbtu; VOC: 0.02 #/mmbtu; H2SO4: 0.0061 #/mmbtu	NOx: LNB/SCR; CO: cc; SO2: dry FGD; PM/PM10: FF; VOC-cc; H2SO4: dry FGD, FF	Original application for 2 boilers and 1000 MW to 1600 MW. Plant to be designed to fire primarily low sulfur sub-bituminous Powder River Basin coal, with flexibility to fire up to 17% alternate coals. Location on MS River, 40 miles upriver from Memphis, TN. Powder River basin coal to be barged in or railed in. Final is 1 boiler and 550-800 MW
Louisiana	None										
New Mexico	Mustang (Peabody) Energy, Mustang Generating Station	35 mi. no. of Milan, McKinley Co	Construct 1 pulverized coal fired boiler to yield 300 MW, fuel oil or nat. gas used for start-up. Proposed with low NOx burners w/ SCR on the boiler, dry scrubber for SO2, baghouse or ESP for PM, good combustion for CO and VOC.	300	March '02	April '02		NOx,CO,SO2,PM/PM10,VOC,Fl,H2SO4, Be	NOx: 0.09 #/mmbtu; CO: 0.15 #/mmbtu; SO2: 0.11 #/mmbtu, PM/PM10: 0.018 #/mmbtu; VOC: 0.01 #/mmbtu	Proposed with low NOx burners w/ SCR on the boiler, dry scrubber for SO2, baghouse or ESP for PM, good combustion for CO and VOC	
Oklahoma	None										
Texas	City Public Service of San Antonio, Calaveras Lake Station	San Antonio (Bexar)	Construct 1 pulverized Powder River basin coal fired boiler to yield 750 MW. Natural gas as start-up fuel. Existing power plant	750	November '03	02-Dec-03		NOx,CO,SO2,PM/PM10,VOC,Fl,H2SO4, Hg	NOx: 0.05 #/mmbtu; CO: 0.15 #/mmbtu; SO2: 0.06 #/mmbtu, PM/PM10: 0.022 #/mmbtu; VOC: 0.0025 #/mmbtu; H2SO4: 0.0037 #/mmbtu; Hg: 0.0000098 3/mmbtu	NOx: LNB/SCR; CO: cc; SO2: wet FGD; PM/PM10: FF, wet FGD; VOC-cc; H2SO4: wet FGD, FF; Hg: FF, wet FGD, SCR	
Texas	LS Power, Sandy Creek Energy Station	Reisel (McClennan)	Construct 1 pulverized Powder River basin coal fired boiler to yield 800 MW. Fuel oil as start-up fuel. New power plant	800	January '04	12-Jan-04		NOx,CO,SO2,PM/PM10,VOC,Fl,H2SO4, Hg	NOx: 0.09 #/mmbtu; CO: 0.15 #/mmbtu; SO2: 0.12 #/mmbtu; PM/PM10: 0.033 #/mmbtu; VOC: 0.0036 #/mmbtu; H2SO4: 0.007 #/mmbtu; Hg: 0.000017 #/mmbtu	NOx: LNB/SCR; CO: cc; SO2: dry FGD; PM/PM10: FF, VOC-cc; H2SO4: dry FGD, FF; Hg: dry FGD, FF	
EPA Region 7											
Iowa	MidAmerican	Council Bluffs	Installation of one 790 MWe supercritical pulverized coal fired boiler designed for base load operation on Powder River Basin coal. "Unit 4" will be co-located with existing Units 1-3	790	September '02	30-Sep-02	16-Jul-03	NOx, CO, SO2, PM (with condensibles), PM10, VOC, Pb, F, TRS, H2SO4, Hg, HCl, TSM	Final. . NOx: 0.07 #/mmBtu (30-day), SO2: 0.10 #/mmBtu (30-day), Pb: 0.00026 #/mmBtu, F: 0.0009 #/mmBtu, TRS: 0.001 #/mmBtu, H2SO4: 0.00421 #/mmBtu, PM-10: 0.025 #/mmBtu (3-hr with condensibles), VOC: 0.0036 #/mmBtu (3-hr), CO: 0.154 #/mmBtu (24-hour), 112(g) limits . Hg: 1.7#/Tbtu, HAP Acid Gases: 0.0029#/mmBtu HCl; Organic HAP: CO as surrogate; Metallic HAP: 1.04e-4 #/mmBtu "total selected metals"	NOx-SCR, CO-cc, PM10-FF, SO2-DLS, Pb-FF, VOC-cc, Hg-activated carbon, HAP Acid Gases-DLS, Metallic HAP-FF	http://desmoinesregister.com/news/stories/c4788998/16963218.html
Kansas	Sand Sage (colocated at existing Sunflower Holcomb Power Station)	Holcomb (Finney)	Installation of a 660 MWe (6,500 mmBtu/hr) pulverized PRB coal and gas-fired boiler, along with ancillary coal and ash handling equipment and cooling towers. Proposed with ultra-low NOx burners (no SCR), dry scrubber, and baghouse	660	June '01	06-Jun-01	08-Oct-02	NOx, CO, PM10, SO2, Pb, VOC	Final. SO2 (0.15,30d); NOx (0.15*/0.08, 30d), CO (0.15, 3h?); PM10 (0.018 6-hr); VOC (0.0035,3h?); Pb (0.0004,3h?), * for 3 yrs after performance test; accepted "de minimis" HAP limits to avoid 112(g) review	NOx-ULNB, CO-cc, PM10-FF, SO2-DLS, Pb-FF, VOC-cc	
Kansas	Great Plains Power, Atchison Generating Station	Atchison (Atchison)	Installation of one opposed-wall-fired, dry-bottom, boiler (8100 mmBtu/hr), subbituminous coal with No. 2 oil backup and associated equipment, including cooling tower	820	Jan '03	17-Mar-03	Currently Under Review	CO,SO2,NOx,PM10,VOC,Pb	Proposed in Application. NOx (0.08,30d), CO (0.16), PM10 (0.018), SO2 (0.12,30d), VOC (0.0036); all except startup/shutdown/malfunction	NOx - LNB(75%) & SCR(60%), PM10-FF(99.77%), SO2-spray drier(94%) & low sulfur coal (5%S), CO-cc,	Identical project also proposed for Great Plains Weston Bend (MO). At this point, Great Plains is seeking approval of both projects, but it is unclear whether both will be built.
Missouri	Kansas City Power & Light, Hawthorn Power Station	Kansas City (Jackson)	Installation of a 570 MWe pulverized PRB coal and gas-fired boiler (Unit 5, completely rebuilt following catastrophic explosion of existing unit), with SCR, dry scrubber, and baghouse	570	May '99	06-Jul-99	17-Aug-99	NOx, CO, PM10, SO2, Pb, VOC	Final. NOx: 0.08 #/mmBtu (30-day), 0.10 #/mmBtu (24-hr), SO2: 0.12 #/mmBtu (30-day), 0.13 #/mmBtu (3-hr)PM-10: 0.018 #/mmBtu, VOC: 0.0036 #/mmBtu, CO: 0.16 #/mmBtu, Pb: 0.6 ton/yr; 112(g) not applicable to plant since final permitting action preceded December 20, 2000 HAP finding	NOx-SCR, CO-cc, PM10-FF, SO2-DLS, Pb-FF, VOC-cc	PSD triggered for all pollutants because of state's dual source definition, despite large reductions in NOx and SO2 emissions.
Missouri	Great Plains Power, Weston Bend Generating Station (colocated at existing KCPL, Iatan Station)	Weston (Platte)	Installation of one opposed-wall, dry-bottom boiler combusting low sulfur Wyoming subbituminous coal and oil (rated 8,100 mmBtu/hr)	820	Nov '01		Currently Under Review	NOx, CO, PM10, SO2, VOC	Proposed in Application. . SO2 (0.12,30d), NOx (0.08, 30d); CO (0.16, 3h?), PM10 (0.018,3h?); VOC (0.0036,3h?).	NOx-SCR, CO-cc, PM10-FF, SO2-DLS/SDA (with PRB coal), Pb-FF, VOC-cc	Identical project also proposed for Great Plains Atchison (KS). At this point, Great Plains is seeking approval of both projects, but it is unclear whether both will be built
Missouri	City Utilities of Springfield, Southwest Power Station	Springfield (Greene)	Construction of a new 275 MW pulverized coal (low sulfur western subbituminous) utility boiler and associated equipment	275	April '03	01-May-03	15-Dec-04	NOx, CO, PM10, SO2, VOC	Final . SO2 (0.095,30d); NOx (0.08, 30d), CO (0.16, 3h); PM10 (0.018,3h), VOC (0.0036,3h), H2SO4 (1.84e-4,3h); Pb (2.56e-5)	NOx-SCR, CO-cc, PM10-FF, SO2-DLS/SDA (with PRB coal), Pb-FF, VOC-cc	Synthetic minor limits taken to avoid 112(g) HAP review; HAP limits are Hg (7.5e-6#/mmBtu); HCl (0.00073#/mmBtu); HF (0.00037#/mmBtu)

Table B-1. Coal-Fired Utility PSD Projects

	Company	City (County)	General Project Description	Added Capacity (MWe)	Date of Application	Proposal Received in Regional Office	Date Permit Issued	NSR & 112(g) Regulated Pollutants	BACT-LAER-112(g) Standards	BACT-LAER-112(g) Control Techniques	General Comments
Nebraska	Omaha Public Power District	Nebraska City	Addition of one 660 MWn (6478 mmBtu/hr) coal-fired unit at the existing Nebraska City power station. Also includes installation of 125 mmBtu/hr auxiliary boiler and 1837 hp diesel-fired emergency generator	560	February 04	25-Feb-04	09-Mar-05	NOx, CO, PM10, SO2, VOC, H2SO4, Pb, Fluorides, HAPS	Final... SO2 (0.095#/mmBtu,30d); SO2 (0.163#/mmBtu, 24-h), SO2 (0.48#/mmBtu,3-h), H2SO4 (0.0042#/mmBtu, NOx (0.07#NOx/mmBtu, 30d, following 18-mo optimization, interim 0.12), CO (0.16#/mmBtu, RM-average), PM10 (0.018#/mmBtu, F+C, RM-average), VOC (0.0034#/mmBtu), Fl (0.0004#/mmBtu, RM-average), Hg-18e-6 #/MWhr(1.98#/TBtu)	NOx-SCR-LNB, CO-cc, PM10-FF, SO2-DLS-SDA (with PRB coal), Pb-FF, VOC-cc, Hg-MACT	see http://www.oppd.com/news/news.htm#Explore
Nebraska	Municipal Energy Agency of Nebraska (colocated at existing City of Hastings, Gerald Whelan Energy Center)	Hastings	Addition of one 220 MW (2,210.5 MMBTU/hr) pulverized coal dry bottom boiler, 74 MMBTU/hr auxiliary boiler, diesel-fired 800 kW emergency generator, 50 hp diesel-fire fire pump	220	Oct '02	Oct '02	30-Mar-04	NOx, CO, PM10, SO2, Fluorides	SO2 (0.12 #/mmBtu,30d), NOx (0.08 #/mmBtu, 30d), CO (0.15 #/mmBtu, 3h), PM10 (0.018 #/mmBtu,3h), Fluorides (0.0004 #/mmBtu)	NOx-SCR, CO-cc, PM10-FF, SO2-DLS-SDA (with PRB coal), Pb-FF, VOC-cc, Fl (DLS-FF)	see http://www.nmppenergy.org/hastingsengineers.htm; project non-major for 112(g) so no limits established for HAPs
EPA Region 8											
Colorado	Xcel Energy, Comanche Station	Pueblo (Pueblo)	Addition of Unit 3, an approximately 750 MW super critical pulverized coal boiler to the existing Comanche Station	750	9/10/2004 Revised 1/19/05	9/16/2004 Revised 1/24/05		PM/PM10, SO2, NOx, VOC, CO, Pb, SAM, Fluorides, HF, TRS, RSC, Hg		PM/PM10 - pulse jet baghouse; NOx - SCR, SO2 - dry FGD, CO/VOC - combustion control; HAPs - cobenefit control & sorbent injection for Hg	The permit application nets out of PSD for NOx and SO2 by adding controls to existing units. BACT Limits Proposed (lb/MMBtu): PM Total (0.022, 3-hr), PM Filt (0.015, 3-hr), PM10 Total (0.020 3-hr), PM10 Filt (0.013, 3-hr) SO2 (0.1, 30-day, Not BACT - net out), NOx (0.08, 30-day, Not BACT - net out), CO (0.15 no ave), VOC (0.0037 no ave), SAM (0.0029 no ave), HF (0.0005, 3-test runs), Hg (20.0*10E06 lb/MWh). Ave. Coal Characteristics: 8,200 Btu/lb; 0.287 %wt S; 5.75% ash content.
Montana	Bull Mountain Development Company, No 1, LLC	Roundup (Musselshell)	The Power Plant will consist of two coal-fired generating units and auxiliary equipment. Each unit will have a pulverized coal-fired boiler and steam turbine-generator with a gross electrical output of 390 MW. Pollution controls: dry FGD, SCR, and pulse jet baghouse	780	16-Jan-02		21-Jul-03	CO, NOx, PM, PM10, Pb, SOx, VOC, HAP	PM10 (filt) - 0.015 (source test - submit emissions for consideration of lowering to 0.012 after 18 mo); NOx - 0.07 (24-hr ave) & 0.1 (1-hr ave); SO2 - 0.15 (1-hr ave) & 0.12 (24-hr ave); CO - 0.15 (source test); VOC - 0.003 (no ave), SAM - 0.0064 (sour	PM/PM10 - pulse jet baghouse, NOx - SCR; SO2 - dry FGD, CO/VOC - combustion control	Coal characteristics (ave) 9,232 Btu/lb; 1.0% wt S
Montana	Rocky Mountain Power, Inc. (Bison)	Hardin, Montana	Pulverized coal-fired boiler (1968 vintage) with a heat input of up to 1,304 MMBtu/hr to produce up to 900,000 pounds of steam pounds per hour.	~~113~~ 116	31-Jan-02		6/11/2002 Revised 12/22/004	CO, NOx, PM10, SOx, VOC, H2SO4, HCl, HF, and Hg	PM/PM10 (filt) - 0.012 (source test); PM/PM10 (cond) - 0.024; NOx - 0.09 (30-day ave), ~~SO2 - 0.14 (1-hr ave, increment)~~ & 0.11 (30-day ave~~, BACT~~), CO - 0.15 (source test); VOC - 0.0034 (no ave) SAM 0.0063 (1-hr); HCl - 0.00118; HF - 0.00051; All limits in lb/MMBtu. Hg - 5.8 lb/Tbtu (1 hr ave)	PM/PM10 - ~~multiclone & wet venturi scrubber,~~ baghouse, NOx - SCR, SO2 - ~~wet venturi scrubber~~ dry scrubber; CO/VOC combustion control.	Coal characteristics (ave), 9,993 Btu/lb; 0.94% wt S. 12/04 revision to permit to change PM/SO2 emission control equipment originally proposed to baghouse and dry scrubber. BACT limits were revisited for these pollutants only
North Dakota	Montana-Dakota Utilities, Westmoreland Power Inc.	Gascoyne (Bowman)	New power plant consisting of one circulating fluidized bed boiler burning lignite from an adjacent mine with the following pollution controls: fabric filter baghouse, selective non-catalytic reduction (SNCR), dry lime scrubber with limestone injection.	175	14-May-04			PM/PM10, NOx, SO2, VOC, CO, SAM			BACT Limits Proposed (lb/MMBtu) PM10 (0.015 3-hr rolling ave), SO2 (0.038 30-day rolling ave), NOx (0.09 30-day rolling), CO (0.15 no ave), VOC (0.005 no ave), SAM (0.0029 no ave). [Lignite Characteristics (design): 5,680 Btu/lb; 1.067% wt S, 14.1% ash content]
South Dakota	None										
Utah	Intermountain Power Service Corp	Delta (Millard)	Add Unit 3 to existing power plant (pulverized coal fired) with fabric filter baghouse, low NOx burners and SCR, forced oxidation wet limestone FGD system, and combustion controls (CO & VOC)	950	09-Dec-02	03-Apr-04	15-Oct-04	PM10, SO2, NOx, CO, VOC, lead, sulfuric acid mist, HF, TRS, RSC	PM (filt) - 0.013 (3 test runs), PM10 (filt) - 0.012 (3-test runs) , PM10 (total) - 221 lb/hr (0.024 lb/MMBtu equiv - 24 hr block), NOx - 0.07 (30-day), SO2 - 0.10 (24-hr) & 0.09 (30-day), CO - 0.15 (30-day); VOC - 0.0027 (3 test runs); SAM - 0.0044 (24-hr block); Hg (bituminous) - 6.0 E-06 lb/MWhr (12-mo roll); Hg (subbituminous) - 20 E-06 lb/MWhr); Fluorides/HF - 0.0005 (3 test runs); Lead - 0.00002 (3 test runs)	PM/PM10 - Fabric filter baghouse; NOx - SCR, SO2 - wet FGD, CO/VOC - combustion control; HAPs - cobenefit controls	BACT Limits Proposed (lb/MMBtu). PM10 (0.015 3-hr rolling ave), SO2 (0.10 30-day rolling ave), NOx (0.07 30-day rolling), CO (0.154 no ave), VOC (0.0027 no ave), lead (0.00002 no ave), HF (0.001 no ave), SAM (0.027 no ave) Coal Characteristics (design worst-case) 11,193 Btu/lb; 0.75% wt S (calendar year ave); 12.0% Ash
Utah	NEVCO Energy	Sevier (Sevier)	New power plant consisting of one circulating fluidized bed boiler with the following pollution controls. fabric filter baghouse, selective non-catalytic reduction (SNCR), dry lime scrubber with limestone injection, combustion controls (CO).	270	10-Sep-03	05-Mar-04	12-Oct-04	PM10, SO2, NOx, CO	PM/PM10 (filt) - 0.0154 (24-hr); NOx - 0.1 (24-hr); SO2 - 0.05 (24-hr) & 0.022 (30-day); CO - 0.115 (1-hr); VOC - no limit; SAM - 0.0024 (24-hr), Hg - 4.0 E-07 (M29I); Fluorides - 0.00019 (M13A), HF - 0.005 (M26A); Lead - 0.0000113 (M12 or M29), HCl - 4.01 lb/hr (M26A)	PM/PM10 - Baghouse with bag leak detectors; NOx - SNCR, SO2 - dry lime scrubber, CO/VOC - combustion control, HAPs - cobenefit controls	BACT Limits Proposed (lb/MMBtu) PM10 (0.016 no ave), SO2 (0.022 annual ave based on 0.4% S in coal, 0.05 on short-term ave based on 0.9% S coal), NOx (0.10 no ave), CO (0.12 no ave), VOC (0.005 no ave). No VOC limit was established, although VOC emissions greater than significance levels. Ave Coal Characteristics 11,390 Btu/lb; 0.4 wt% S; 8.3% Ash
Utah	PacifiCorp - Hunter	Castle Dale (Emery)	Add Unit 4 to existing power plant (pulverized coal fired) with fabric filter baghouse, low NOx burners and SCR, and forced oxidation wet lime scrubber system, and combustion controls (CO & VOC).	575	14-Nov-03			PM, PM10, SO2, NOx, CO, VOC, lead, SAM, HF, TRS, RSC			BACT Limits Proposed (lb/MMBtu) (Note that there are no proposed BACT limits for SO2 and NOx, as the application nets out of PSD for these pollutants. There are also no BACT limits for lead or sulfur compounds.) PM10 (0.015), SO2 (0.10 30-day rolling ave)
Utah (Tribal Land)	Deseret Generation & Transmission - Bonanza	Bonanza (Uintah)	Add one circulating fluidized bed boiler (waste coal) to existing power plant with fabric filter baghouse, selective non-catalytic reduction (SNCR), limestone injection, and combustion controls (CO and VOC)	110	14-Apr-04			PM, PM10, SO2, NOx, CO, SAM, and HF.			BACT Limits Proposed (lb/MMBtu): PM/PM10 (0.017/0.015, filterable no ave), SO2 (0.10 no ave), NOx (0.10 30-day rolling ave), CO (0.15 no ave), VOC (0.005 no ave), SAM (0.005 no ave).
Wyoming	Independent Energy Group of Black Hills Corporation @ Wygen Unit 1	Gillette	Pulverized coal fired Electric Generating Plant	80	04-Jun-96	04-Jun-96	06-Sep-96	SO2, NOx, CO, VOCs.	PM(filt), 0.02, SO2 0.20(2-hr rolling), 0.17 (30-day), NOx, 0.22(30-day rolling), 0.2(365-day rolling), CO: 0.15, 0.015	PM-ESP, NOx-LNB/OFA, SO2-CDS, VOC-CO-Combustion control	see http://www.babcock.com/pgg/pr/wygen.html
Wyoming	Black Hills Power and Light (WYGEN 2)	Gillette	Pulverized Coal Fired Electric Generating Plant	500	26-Apr-02	06-May-02	26-Sep-02	CO, NOx, PM,PM10, PB,SOx,VOC,HAP	PM/PM10 (filt): 0.012 (source test), SO2 0.1 (30-day ave) 0.15 (3-hr block); NOx: 0.07 (30 day); CO, 0.15 (source test), VOC: 0.01 (source test) Limits in lb/MMBtu.	PM10 - multiclone & wet venturi scrubber: NOx - SCR, SO2 - Spray dryer/absorber; CO/VOC - combustion control.	PRB Coal Characteristics (design) 7,950 Btu/lb; 1.0% wt S
EPA Region 9											
Arizona	Unisource Energy @ Tuscon Electric's Springerville Station	Tucson	2 - 360 MW units, final commitment to procede, July 2001, online 2004 and 2005	720							see http://www.tucsonelectric.com/News/NewsReleases/2001/UNS010201.htm
New Mexico (Navaj	STEAG Power - Desert Rock Energy Facility	25 miles SW of Farmington, NM	2 x 750 MW greenfield, mine mouth plant	1500	25-Feb-04						see http://www.steagnorthamerica.com/site.php
New Mexico (Navaj	BHP Billiton - Cottonwood Energy Center	Four Corners area, NM	One 550 MW coal-fired sub-critical boiler, 495 net.	495	23-Mar-04				NOx (0.06 lb/mmbtu), CO (0.14 lb/mmbtu), SO2 (0.06 lb/mmbtu), VOC (0.0072 lb/mmbtu), PM10 (0.02 lb/mmbtu)	NOx - LNB and SCR, SO2 - limestone wet FGD, PM - baghouse	competitor of STEAG. Only one will be built. Application on hold
California	None										

Table 8-1 Coal-Fired Utility PSD Projects

	Company	City (County)	General Project Description	Added Capacity (MWe)	Date of Application	Proposal Received in Regional Office	Date Permit Issued	NSR & 112(g) Regulated Pollutants	BACT-LAER-112(g) Standards	BACT-LAER-112(g) Control Techniques	General Comments
Hawaii	None										
Nevada	LS Power	White Pine area near UT border	1000 MW	1000	Conceptual						
Nevada	Sempra Energy - Granite Fox Power	Gerlach (Washoe)	1450 MW greenfield plant	1450							
Nevada	Newmont Mining, TS Power Plant	Eureka County	200 MW pulverized coal-fired boiler (four oil-fired combustion turbines to be used for back-up power)	200	01-Oct-04	09-Nov-04			NOx (0.067 lb/MMBTU, 30-day rolling average), CO (0.15 lb/MMBTU, 24-rolling average); SO2 (0.09 lbs/MMBTU 24-hr rolling average); PM/PM10 0.038 lbs/MMBTU (24-hr rolling average)	Low-NOx burners and SCR, combustion controls, Low-sulfur coal and Dry Scrubber, fabric filters	103 page comment letter submitted, EAB appeal possible.
American Samoa	None										
Guam	None										
EPA Region 10											
Alaska	None										
Idaho	None										
Oregon	None										
Washington	None										

Table B-1a. Representative Project Comparisons for SECI SGS3 and Recently Permitted Projects

Project	Date	Status	Plant/Unit Size MW	Type
SECI SGS3	Feb-05	Proposed	750	SCPC
Prairie State-Illinois	Apr-05	Final Permit	1,500	PC
Intermountain-Utah	Apr-04	Final Permit	950	PC
Elm Road-Wisconsin	Jan-04	Final Permit	1,830	SCPC
Longview-West Virginia	Mar-04	Final Permit	600	PC
City Public Service-Texas	Sep-05	Draft	750	PC
Public Service of Colorado	Jul-05	Final Permit	1,410	PC
Longleaf Energy-Georgia	Nov-04	Application	1,200	PC

Table B-1b. Comparison of PM/PM_{10} Emissions from SECI SGS3 and Recently Permitted Projects

Project	Plant/Unit Size MW	Controlled PM/PM_{10} lb/MMBtu	NO_x lb/MW-hr	Comments
SECI SGS3	750	0.015	0.14	ESP
Prairie State-Illinois	1,500	0.015	0.15	ESP
Intermountain-Utah	950	0.015	0.14	Fabric Filter
Elm Road-Wisconsin	1,230	0.018	0.18	Fabric Filter; 20% opacity
Longview-West Virginia	600	0.018	0.18	Fabric Filter
City Public Service-Texas	750	0.022	0.23	Fabric Filter; includes condensables
Public Service of Colorado	750	0.013	0.13	Fabric Filter; 10% opacity
Longleaf Energy-Georgia	1,200	0.07	0.72	Fabric Filter

Table B-1c. Comparison of Sulfur Dioxide Emissions from SECI SGS3 and Recently Permitted Projects

Project	Plant/Unit Size MW	Uncontrolled SO_2 lb/MMBtu	Controlled SO_2 lb/MMBtu	Controlled SO_2 lb/MW-hr	Removal	Comments
SECI SGS3	750	8.00	0.165	1.53	97.94%	Wet FGD Coal and Petroleum Coke
Prairie State-Illinois	1,500	9.11	0.420	4.17	95.39%	Wet FGD; Initial Limit
	1,500	9.11	0.329	3.27	96.39%	Wet FGD; After 12-months
	1,500	9.11	0.181	1.80	98.01%	Wet FGD; Not lower than; performance evaluation
Intermountain-Utah	950	1.34	0.1	0.95	92.54%	Wet FGD; Low Sulfur Coal
Elm Road-Wisconsin	1,230	4.00	0.15	1.51	96.25%	Wet FGD; 2.5% Sulfur Coal and 5% ash
Longview-West Virginia	600	4.00	0.15	1.53	96.25%	Wet FGD; 2.5% sulfur coal; 3-hour
	600	4.00	0.12	1.22	97.00%	Wet FGD; 24-hour
City Public Service-Texas	750	1.25	0.1-0.06	1.07	95%	Wet FGD; 0.06 lb/MMBtu-Annual
Public Service of Colorado	750	1.30	0.1	0.99	92.31%	Dry Scrubber; PRB Coal; uncontrolled SO_2 estimated
Longleaf Energy-Georgia	1,200	1.60	0.12	1.23	92.50%	Dry Scrubber; PRB/Central App. Coal

Table B-1d. Comparison of Nitrogen Oxides Emissions from SECI SGS3 and Recently Permitted Projects

Project	Plant/Unit Size MW	Controlled NO_x lb/MMBtu	NO_x lb/MW-hr	Comments
SECI SGS3	750	0.07	0.65	SCR
Prairie State-Illinois	1,500	0.07	0.70	SCR
Intermountain-Utah	950	0.07	0.67	SCR
Elm Road-Wisconsin	1,230	0.07	0.70	SCR
Longview-West Virginia	600	0.08	0.82	SCR
City Public Service-Texas	750	0.069	0.74	SCR; 0.05 lb/MMBtu (0.53 lb/MW-hr)-Annual
Public Service of Colorado	750	0.08	0.79	SCR; 0.07 lb/MMBtu - Annual Limit
Longleaf Energy-Georgia	1,200	0.07	0.72	SCR

Table B-1e. Comparison of CO and VOCs Emissions from SECI SGS3 and Recently Permitted Projects

Project	Plant/Unit Size MW	Controlled CO lb/MMBtu	CO lb/MW-hr	Controlled VOC lb/MMBtu	VOC lb/MW-hr	Comments
SECI SGS3	750	0.15	1.39	0.004	0.04	Combustion Controls
Prairie State-Illinois	1,500	0.12	1.19	0.004	0.04	Combustion Controls
Intermountain-Utah	950	0.15	1.43	0.0027	0.03	Combustion Controls
Elm Road-Wisconsin	1,230	0.12	1.21	0.0035	0.04	Combustion Controls
Longview-West Virginia	600	0.11	1.12	0.004	0.04	Combustion Controls
City Public Service-Texas	750	0.15	1.60	0.0036	0.04	Combustion Controls
Public Service of Colorado	750	0.13	1.29	0.0035	0.03	Combustion Controls
Longleaf Energy-Georgia	1,200	0.15	1.53	0.0036	0.04	Combustion Controls

Table B-1f. Comparison of Sulfuric Acid Mist Emissions from SECI SGS3 and Recently Permitted Projects

Project	Plant/Unit Size MW	Controlled SAM lb/MMBtu	SAM lb/MW-hr	Comments
SECI SGS3	750	0.005	0.05	WESP
Prairie State-Illinois	1,500	0.005	0.05	WESP
Intermountain-Utah	950	0.0044	0.04	Low Sulfur Coal; no WESP
Elm Road-Wisconsin	1,230	0.01	0.10	WESP
Longview-West Virginia	600	0.0075	0.08	Dry sorbent injection, no WESP
City Public Service-Texas	750	0.0037	0.04	Wet FGD; no WESP
Public Service of Colorado	750	0.0042	0.04	PRB Coal; no WESP
Longleaf Energy-Georgia	1,200	0.005	0.05	PRB/Central App. Coal; Dry Scrubber

Table B-1g. Comparison of Total Fluorides Emissions from SECI SGS3 and Recently Permitted Projects

Project	Plant/Unit Size MW	Controlled Fluorides lb/MMBtu	Controlled Fluorides lb/MW-hr	Comments
SECI SGS3	750	0.00023	0.0021	Wet FGD and WESP
Prairie State-Illinois	1,500	0.00026	0.0026	Wet FGD and WESP
Intermountain-Utah	950	0.0005	0.0048	Low Sulfur Coal; no WESP
Elm Road-Wisconsin	1,230	0.00088	0.0088	Wet ESP
Longview-West Virginia	600	0.00001	0.0001	Dry sorbent injection, no WESP
City Public Service-Texas	750	0.0008	0.0085	Wet FGD; no WESP
Public Service of Colorado	750	0.00001	0.0001	As HF
Longleaf Energy-Georgia	1,200	0.0024	0.0246	PRB/Central App. Coal; Dry Scrubber

Table B-1h. Comparison of Mercury Emissions from SECI SGS3 and Recently Permitted Projects

Project	Plant/Unit Size MW	Controlled Hg 10^{-6} lb/MMBtu	Controlled Hg 10^{-6} lb/MW-hr	Comments
SECI SGS3	750	0.7	7.05	SCR-ESP-Wet FGD-WESP
Prairie State-Illinois	1,500	2.1	21.3	SCR-ESP-Wet FGD-WESP
Intermountain-Utah	950	2.2	21.0	Bituminous Coal; SCR-FF-Wet FGD[1]
	950	4.4	42.0	Subbituminous Coal; SCR-FF-Wet FGD[1]
Elm Road-Wisconsin	1,230	1.12	11.3	SCR-FF-Wet FGD-WESP
Longview-West Virginia	600	2.39	24.3	SCR-FF-Wet FGD-WESP
City Public Service-Texas	750	1.875	20.0	SCR-FF-Wet FGD
Public Service of Colorado	750	2.021	20.0	SCR-Dry FGD-FF
Longleaf Energy-Georgia	1,200	1.955	20.0	SCR-Dry FGD-FF

[1] Original permit limits of 6 and 20 E-06 lb/MW-hr for bituminous and subbituminous coals, respectively reverted to the Subpart Da requirements upon final promulgation.

Table B-1i. Comparison of PM10 Emissions for Cooling Tower Operations from SECI SGS 3 and Recently Permitted Projects

Facility	Recirculation Water Flow Rate	Pollution Control Technology	State	Basis	Date
SECI SGS	0.005	Drift Eliminators	FL	BACT-PSD	3/1/2006
Diamond Wanapa I, L. P.	0.0005	Drift Eliminators	OR	BACT-PSD	8/8/2005
Auburn Nugget	0.005	None Given	IN	BACT-PSD	5/31/2005
Newmont Nevada Energy Investment, LLC	0.0005	Drift Eliminators	NV	BACT-PSD	5/5/2005
Tigen-Nassua Energy Corp.	0.0005	Drift Eliminators	NY	BACT-PSD	3/31/2005
Mirant Mid-Atlantic, LLC	0.001	Drift Eliminators	MD	BACT-PSD	11/5/2004
Midamerican Energy Company	0.001	Drift Eliminators	IA	BACT-PSD	6/17/2003
Wallula Generation, LLC	0.0005	Drift Eliminators	WA	LAER	1/3/2003

Table B-1j. Comparison of PM_{10} Emissions for Material Handling Operations from SECI SGS3 and Recently Permitted Projects

Project	Date	Status	Plant/Unit Size MW	PM_{10} tons/yr	Comments
SECI SGS3	Feb-06	Proposed	750	8.91	Proposed Supercritical
Prairie State-Illinois	Apr-05	Final Permit	1,500	18.4	Mine-mouth
Intermountain-Utah	Apr-04	Final Permit	950	19.05	84% emissions from hauling
Elm Road-Wisconsin	Jan-04	Final Permit	1,830	305.83	Burns 5% ash; IGCC with slag; Landfill emissions 53%
Longview-West Virginia	Mar-04	Final Permit	600	4.13	Does not include fugitives
City Public Service-Texas	Sep-05	Draft	750	13.34	Power River Basin (PBR) Coal
JEA Northside Repowering	Jul-99	Constructed	600	8.75	DOE Demonstration Project; approved by FDEP
Public Service of Colorado	Jul-05	Final Permit	1,410	38.8	Emissions for 3 units; PRB Coal
Longleaf Energy-Georgia	Nov-04	Application	1,200	18.6	Power River Basin Coal

Table B-2. SECI Cost Effectiveness of Dry ESP for PM Control, 820 MW Unit, 100% Capacity Factor, Ash Stored Onsite

Cost Items	Cost Factors[a]	Cost 2006 ($)
DIRECT CAPITAL COSTS (DCC):		
Purchased Equipment Cost (PEC)	Based on EPA Air Pollution Control Fact Sheet EPA-452/F-03-028	38,162,867
ESP.	Included in Equipment and Materials	included
Ductwork to ESP inlet and oulet	Included in Equipment and Materials	included
Electrical switchgear, motor control centers	Included in Equipment and Materials	included
Instruments and Controls	Included in Equipment and Materials	included
Freight	Included in Equipment and Materials	included
Taxes	Not required for Pollution Control Equipment	included
Total PEC:		38,162,867
Direct Installation Costs		
Foundation and Structure Support	Included in Equipment and Materials	included
Handling & Erection	Included in Equipment and Materials	included
Electrical	Included in Equipment and Materials	included
Piping	Included in Equipment and Materials	included
Insulation for ductwork	Included in Equipment and Materials	included
Painting	Included in Equipment and Materials	included
Total Direct Installation Costs		
Total DCC:		38,162,867
INDIRECT CAPITAL COSTS (ICC):		
Contractor Fees +	10% of PEC	3,816,287
Performance test +	1% of PEC	381,629
Contingencies	3% of PEC	1,144,886
Total ICC:		5,342,801
TOTAL CAPITAL INVESTMENT (TCI):	DCC + ICC	43,505,668
DIRECT OPERATING COSTS (DOC):		
Operator	1/2 additional operator @ 65,000/year	33,000
Supervisor	20% of operating labor cost	6,600
Fan Power Requirement	2 inch pressure drop, $0.06/kwH	374,826
TR Sets	Est. Plate Area = 267,492 ft^2, $30/MW-hr	100,236
Maintenance Materials	Eng. Estimate = labor cost	150,000
Maintenance Labor	66.7% of Maintenance materials	100,050
Ash Disposal	Ash stored onsite	3,990,988
Total DOC:		4,755,701
INDIRECT OPERATING COSTS (IOC):		
Overhead	60% of oper. labor & maintenance	288,997
Property Taxes	1% of total capital investment	435,057
Insurance	1% of total capital investment	435,057
Administration	2% of total capital investment	870,113
Total IOC:		2,029,224
CAPITAL RECOVERY COSTS (CRC):	CRF of 0.0944 times TCI (20 yrs @ 7%)	4,106,935
ANNUALIZED COSTS (AC):	DOC + IOC + CRC	10,891,860
BASELINE PM EMISSIONS (TPY) :	8.5 lb/MMBtu, 7,500 MMBtu/hr, 8,760 hr/yr	279,225
MAXIMUM PM EMISSIONS (TPY) :	0.015 lb/MMBtu, 7,500 MMBtu/hr, 8760 hr/yr	493
REDUCTION IN PM EMISSIONS (TPY):		278,732
COST EFFECTIVENESS:	$ per ton of PM Removed	39

Footnotes:

[a] Unless otherwise specified, factors and cost estimates reflect OAQPS Cost Manual, Section 3, Sixth edition.

Table B-3. SECI Cost Effectiveness of Dry ESP for PM Control, 820 MW Unit, 100% Capacity Factor, Fly Ash Recycled

Cost Items	Cost Factors[a]	Cost 2006 ($)
DIRECT CAPITAL COSTS (DCC):		
Purchased Equipment Cost (PEC)	Based on EPA Air Pollution Control Fact Sheet EPA-452/F-03-028	38,162,867
ESP.	Included in Equipment and Materials	included
Ductwork to ESP inlet and oulet	Included in Equipment and Materials	included
Electrical switchgear, motor control centers	Included in Equipment and Materials	included
Instruments and Controls	Included in Equipment and Materials	included
Freight	Included in Equipment and Materials	included
Taxes	Not required for Pollution Control Equipment	included
Total PEC:		38,162,867
Direct Installation Costs		
Foundation and Structure Support	Included in Equipment and Materials	included
Handling & Erection	Included in Equipment and Materials	included
Electrical	Included in Equipment and Materials	included
Piping	Included in Equipment and Materials	included
Insulation for ductwork	Included in Equipment and Materials	included
Painting	Included in Equipment and Materials	included
Total Direct Installation Costs		
Total DCC:		38,162,867
INDIRECT CAPITAL COSTS (ICC):		
Contractor Fees +	10% of PEC	3,816,287
Performance test +	1% of PEC	381,629
Contingencies	3% of PEC	1,144,886
Total ICC:		5,342,801
TOTAL CAPITAL INVESTMENT (TCI):	DCC + ICC	43,505,668
DIRECT OPERATING COSTS (DOC):		
Operator	1/2 additional operator @ 65,000/year	33,000
Supervisor	20% of operating labor cost	6,600
Fan Power Requirement	2 inch pressure drop, $30/MW-hr	187,413
TR Set Energy Use	Est. Plate Area = 267492 ft^2, $30/MW-hr	100,236
Maintenance Materials	Eng. Estimate	150,000
Maintenance Labor	66.7% of Maintenance materials	100,050
Ash Disposal	Ash recycled	0
Total DOC:		577,299
INDIRECT OPERATING COSTS (IOC):		
Overhead	60% of oper. labor & maintenance	176,550
Property Taxes	1% of total capital investment	435,057
Insurance	1% of total capital investment	435,057
Administration	2% of total capital investment	870,113
Total IOC:		1,916,776
CAPITAL RECOVERY COSTS (CRC):	CRF of 0.0944 times TCI (20 yrs @ 7%)	4,106,935
ANNUALIZED COSTS (AC):	DOC + IOC + CRC	6,601,011
BASELINE PM EMISSIONS (TPY) :	8.5 lb/MMBtu, 7,500 MMBtu/hr, 8,760 hr/yr	279,225
MAXIMUM PM EMISSIONS (TPY) :	0.015 lb/MMBtu, 7,500 MMBtu/hr, 8760 hr/yr	493
REDUCTION IN PM EMISSIONS (TPY):		278,732
COST EFFECTIVENESS:	$ per ton of PM Removed	24

Footnotes:

[a] Unless otherwise specified, factors and cost estimates reflect OAQPS Cost Manual, Section 3, Sixth edition.

Table B-4. SECI Cost Effectiveness of Baghouse Filter for PM Control, 820 MW Unit, 100% Capacity Factor, Fly Ash Stored Onsite

Cost Items	Cost Factors[a]	Cost 2006 ($)
DIRECT CAPITAL COSTS (DCC):		
Purchased Equipment Cost (PEC)	Materials and Equipment, Cost Estimate	18,035,926
Baghouse.	Cost Estimate, included in Equipment and Materials	included
Ductwork to Baghouse inlet and oulet	Cost Estimate, included in Equipment and Materials	included
Electrical switchgear, motor control centers	Cost Estimate, included in Equipment and Materials	included
Instruments and Controls	Cost Estimate, included in Equipment and Materials	included
Freight	Cost Estimate, included in Equipment and Materials	included
Taxes	Not required for Pollution Control Equipment	included
Total PEC:		18,035,926
Direct Installation Costs	Cost Estimate	21,863,558
Foundation and Structure Support	Cost Estimate, included in Installation Costs	included
Handling & Erection	Cost Estimate, included in Installation Costs	included
Electrical	Cost Estimate, included in Installation Costs	included
Piping	Cost Estimate, included in Installation Costs	included
Insulation for ductwork	Cost Estimate, included in Installation Costs	included
Painting	Cost Estimate, included in Installation Costs	included
Total Direct Installation Costs		21,863,558
Total DCC:		39,899,485
INDIRECT CAPITAL COSTS (ICC):	Cost Estimate	11,969,845
Engineering	Cost Estimate, included in Indirect Capital Costs	
Contractor Fees	Cost Estimate, included in Indirect Capital Costs	
Performance test +	1% of PEC	180,359
Contingencies	3% of PEC	541,078
Total ICC:		12,691,282
TOTAL CAPITAL INVESTMENT (TCI):	DCC + ICC	52,590,767
DIRECT OPERATING COSTS (DOC):		
Operator	1/2 additional operator @ 65,000/year	33,000
Supervisor	20% of operating labor cost	6,600
Electricity	8 inch pressure drop, $30/MWh	1,034,165
Bag Replacement	Bags and Cages Replacement	841,224
Maintenance Materials	Materials	127,341
Maintenance Labor	66.7% of Maintenance materials (Sargent & Lundy, 2005)	84,937
Ash Disposal	Ash stored in byproduct storage	3,990,988
Total DOC:		6,118,254
INDIRECT OPERATING COSTS (IOC):		
Overhead	60% of oper. labor & maintenance	23,760
Property Taxes	1% of total capital investment	525,908
Insurance	1% of total capital investment	525,908
Administration	2% of total capital investment	1,051,815
Total IOC:		2,127,391
CAPITAL RECOVERY COSTS (CRC):	CRF of 0.0944 times TCI (20 yrs @ 7%)	4,964,568
ANNUALIZED COSTS (AC):	DOC + IOC + CRC	13,210,213
BASELINE PM EMISSIONS (TPY) :	8.5 lb/MMBtu, 7,500 MMBtu/hr, 8,760 hr/yr	279,225.0
MAXIMUM PM EMISSIONS (TPY) :	0.015 lb/MMBtu, 7,500 MMBtu/hr, 8760 hr/yr	492.8
REDUCTION IN PM EMISSIONS (TPY):		278,732.3
COST EFFECTIVENESS:	$ per ton of PM Removed	47

Footnotes:

[a] Unless otherwise specified, factors and cost estimates reflect OAQPS Cost Manual, Section 3, Sixth edition.

Table B-5. SECI Cost Effectiveness of Baghouse Filter for PM Control, 820 MW Unit, 100% Capacity Factor, Fly Ash Recycled

Cost Items	Cost Factors[a]	Cost 2006 ($)
DIRECT CAPITAL COSTS (DCC):		
Purchased Equipment Cost (PEC)	Materials and Equipment, Cost Estimate	18,035,926
Baghouse.	Cost Estimate, included in Equipment and Materials	included
Ductwork to Baghouse inlet and oulet	Cost Estimate, included in Equipment and Materials	included
Electrical switchgear, motor control centers	Cost Estimate, included in Equipment and Materials	included
Instruments and Controls	Cost Estimate, included in Equipment and Materials	included
Freight	Cost Estimate, included in Equipment and Materials	included
Taxes	Not required for Pollution Control Equipment	included
Total PEC:		18,035,926
Direct Installation Costs	Cost Estimate	21,863,558
Foundation and Structure Support	Cost Estimate, included in Installation Costs	included
Handling & Erection	Cost Estimate, included in Installation Costs	included
Electrical	Cost Estimate, included in Installation Costs	included
Piping	Cost Estimate, included in Installation Costs	included
Insulation for ductwork	Cost Estimate, included in Installation Costs	included
Painting	Cost Estimate, included in Installation Costs	included
Total Direct Installation Costs		21,863,558
Total DCC:		39,899,485
INDIRECT CAPITAL COSTS (ICC):	Cost Estimate	11,969,845
Engineering	Cost Estimate, included in Indirect Capital Costs	
Contractor Fees	Cost Estimate, included in Indirect Capital Costs	
Performance test +	1% of PEC	180,359
Contingencies	3% of PEC	541,078
Total ICC:		12,691,282
TOTAL CAPITAL INVESTMENT (TCI):	DCC + ICC	52,590,767
DIRECT OPERATING COSTS (DOC):		
Operator	1/2 additional operator @ 65,000/year	33,000
Supervisor	20% of operating labor cost	6,600
Electricity	8 inch pressure drop, $30/MWh	1,034,165
Bag Replacement	Bags and Cages Replacement	841,224
Maintenance Materials	Materials	127,341
Maintenance Labor	66.7% of Maintenance materials	84,937
Ash Disposal	Ash recycled	0
Total DOC:		2,127,266
INDIRECT OPERATING COSTS (IOC):		
Overhead	60% of oper. labor & maintenance	23,760
Property Taxes	1% of total capital investment	525,908
Insurance	1% of total capital investment	525,908
Administration	2% of total capital investment	1,051,815
Total IOC:		2,127,391
CAPITAL RECOVERY COSTS (CRC):	CRF of 0.0944 times TCI (20 yrs @ 7%)	4,964,568
ANNUALIZED COSTS (AC):	DOC + IOC + CRC	9,219,225
BASELINE PM EMISSIONS (TPY) :	8.5 lb/MMBtu, 7,500 MMBtu/hr, 8,760 hr/yr	279,225
MAXIMUM PM EMISSIONS (TPY) :	0.015 lb/MMBtu, 7,500 MMBtu/hr, 8760 hr/yr	493
REDUCTION IN PM EMISSIONS (TPY):		278,732
COST EFFECTIVENESS:	$ per ton of PM Removed	33

Footnotes:

[a] Unless otherwise specified, factors and cost estimates reflect OAQPS Cost Manual, Section 3, Sixth edition.

APPENDIX C

CALPUFF MODEL DESCRIPTION AND METHODOLOGY

CALPUFF MODEL DESCRIPTION AND METHODOLOGY

C.1 INTRODUCTION

As part of the new source review requirements under Prevention of Significant Deterioration (PSD) regulations, new major sources or major modifications to those sources are required to address air quality impacts at PSD Class I areas. As part of the air construction permit revision application submitted to the Florida Department of Environmental Protection (FDEP) for the proposed modification to Seminole Electric Cooperative, Inc.'s (Seminole) Seminole Generating Station (SGS) in Palatka, Putnam County, Florida, the air quality impacts due to the potential changes for this project are required to be addressed at the PSD Class I areas within 200 kilometers (km) of the SGS. The nearest PSD Class I areas the Okefenokee National Wilderness Area (NWA), located approximately 108 kilometers (km) north of the SGS; the Chassahowitzka NWA, located about 137 km to the southwest; and the Wolf Island NWA, located about 186 km to the north. Air impact modeling analyses were performed for each of these PSD Class I areas.

The evaluation of air quality impacts are only concerned with determining compliance with PSD Class I increments and not assessing a source's impact on Air Quality Related Values (AQRVs), such as regional haze. Further, compliance with PSD Class I increments can be evaluated by determining if the source's impacts are less than the proposed Environmental Protection Agency (EPA) Class I significant impact levels. The significant impact levels are threshold levels that are used to determine the type of air impact analyses needed for the facility. If the new or modified source's impacts are predicted to be less than significant, then the source's impacts are assumed not to have a significant adverse affect on air quality and additional modeling with other sources is not required. However, if the source's impacts are predicted to be greater than the significant impact levels, additional modeling with other sources is required to demonstrate compliance with Class I increments.

Currently, there are several air quality modeling approaches recommended by the Interagency Workgroup on Air Quality Models (IWAQM) to perform these analyses. The IWAQM consists of EPA and Federal Land Managers (FLM) of Class I areas who are responsible for ensuring that AQRVs are not adversely impacted by new and existing sources. These recommendations have been summarized in two documents:

- *Interagency Workgroup on Air Quality Models (IWAQM), Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts* (EPA, 1998), referred to as the IWAQM Phase 2 report.

- *Federal Land Managers' Air Quality Related Values Workgroup (FLAG), Phase I Report, USFS, NPS, USFWS* (12/00), referred to as the FLAG document.

For the SGS, air quality analyses were performed that assess the facility's impacts in the PSD Class I areas using the refined modeling approach from the IWAQM Phase 2 report for SO_2 PSD Class I increment analyses.

The refined analysis approach was used instead of the screening analysis approach since the air quality impacts are based on generally more realistic assumptions, include more detailed meteorological data, and are estimated at locations at the Class I areas.

C.2 GENERAL AIR MODELING APPROACH

The general modeling approach was based on using the long-range transport model, California Puff model Version 5.711a (CALPUFF). The CALPUFF model is the recommended model to use by the FDEP and EPA for addressing impacts at locations located more than 50 km from a source (40 CFR 51, Appendix W).

The methods and assumptions used in the CALPUFF model were based on the latest recommendations for a refined analysis as presented in the IWAQM Phase 2 Summary Report and the FLAG documents.

The following sections present the methods and assumptions used to assess the refined significant impact analyses performed for the proposed project. The results of these analyses are presented in Section 5.0 of the Air Impact Analyses Report for the air dispersion modeling analysis.

C.3 MODEL SELECTION AND SETTINGS

The CALPUFF air modeling system was used to assess the SGS' impacts at the PSD Class I area for comparison to the PSD Class I significant impact levels. CALPUFF is a non-steady state Lagrangian Gaussian puff long-range transport model that includes algorithms for building downwash effects as well as chemical transformations (important for visibility controlling pollutants), and wet/dry deposition. The CALPUFF meteorological and geophysical data preprocessor (CALMET, Version 5.53a), a preprocessor to CALPUFF, is a diagnostic meteorological model that produces a three-dimensional field of wind and temperature and a two-dimensional field of other meteorological parameters. CALMET was designed to process raw meteorological, terrain and land-use databases to be used in the air modeling analysis. The CALPUFF modeling system uses a number of FORTRAN preprocessor programs that extract data from large databases and converts the data into formats suitable for input to CALMET. The processed data produced from CALMET was input to CALPUFF to assess the pollutant specific impact. Both CALMET and CALPUFF were used in a manner that is recommended by the IWAQM Phase 2 report and FLAG document.

C.3.1 CALPUFF MODEL APPROACHES AND SETTINGS

The IWAQM recommended approaches for performing refined air modeling analysis are summarized in Table C-1. These approaches involve the use of meteorological data, hourly ozone data, selection of receptors, dispersion conditions, and the post-processing of model output. The specific settings used in the CALPUFF model are presented in Table C-2.

C.3.2 EMISSION INVENTORY AND BUILDING WAKE EFFECTS

The CALPUFF model included the SGS' emission, stack, and operating data as well as building dimensions to account for the effects of building-induced downwash on the emission sources. Dimensions for all significant building structures were processed with the Building Profile Input Program (BPIP), Version 95086, and were included in the CALPUFF model input. The Air Impact Analyses Report presents a listing of the facility's emissions and structures included in the analysis.

C.4 RECEPTOR LOCATIONS

Pollutant concentrations were predicted at the PSD Class I areas using receptor locations developed by the NPS. For the analyses, the number of receptors modeled at each PSD Class I area is as follows:

- Okefenokee NWA, 180 receptors including all NPS boundary receptors and internal receptors with a greater spacing than the NPS receptor set;
- Wolf Island NWA, all 30 receptors from the NPS; and
- Chassahowitzka NWA, 58 receptors including NPS boundary receptors.

Elevations for all receptor locations were included in the analysis.

C.5 METEOROLOGICAL DATA

C.5.1 REFINED ANALYSIS

The CALPUFF meteorological and geophysical data preprocessor (CALMET, Version 5.53a), a preprocessor to CALPUFF, is a diagnostic meteorological model that produces a 3-dimensional field of wind and temperature and a 2-dimensional field of other meteorological parameters. CALMET was designed to process raw meteorological, terrain, and land-use databases to be used in the air modeling analysis.

The CALPUFF modeling system uses a number of FORTRAN preprocessor programs that extract data from large databases and convert the data into formats suitable for input to CALMET. The processed data produced from CALMET was input to CALPUFF to assess the pollutant-specific impact. Both CALMET and CALPUFF were used in a manner that is recommended by the IWAQM Phase 2 report and FLAG document.

The wind domain used for air modeling covers the SGS site and the evaluated PSD Class I areas.

C.5.2 MODELING DOMAIN

A CALMET-developed rectangular modeling domain extending 448 km in the east-west (x) direction and 684 km in the north-south (y) direction was used for the air modeling analysis. The southwest corner of the domain is the origin and is located at 26.25 degrees north latitude and 85.0 degrees west longitude [East and North Universal Transverse Mercator (UTM) coordinates of 77 km and 2,966.0 km, respectively, Zone 17 equivalent]. This location is in the Gulf of Mexico, approximately 250 km west of Naples, Florida. For the processing of meteorological and geophysical data, the domain contains 112 grid cells in the x-direction and 171 grid cells in the y-direction. The domain grid resolution is 4 km. The air modeling analysis was developed in the UTM coordinate system, Zone 17.

A summary of the model domain description is presented Table C-3.

C.5.3 MESOSCALE MODEL – GENERATION 4 AND 5 (MM4/MM5) DATA

Pennsylvania State University, in conjunction with the National Center for Atmospheric Research (NCAR) Assessment Laboratory developed the MM4 and MM5 data set, a prognostic wind field or "guess" field, for the United States. The hourly meteorological variables used to create this data set (wind, temperature, dew point depression, and geopotential height for 8 standard levels and up to 15 significant levels) are extensive and are available for 1990, 1992, and 1996. The analysis used the MM4 and MM5 data to initialize the CALMET wind field. The MM4 and MM5 data available for 1990 and 1992, respectively, have a horizontal spacing of 80 km and are used to simulate atmospheric variables within the modeling domain. The MM5 data are also available for 1996 and have a horizontal spacing of 36 km.

The MM4 and MM5 data used in the CALMET, although advanced, lacks the fine detail of specific temporal and spatial meteorological variables and geophysical data. These variables were processed into the appropriate format and introduced into the CALMET model through the additional data files obtained from the following sources.

C.5.4 SURFACE DATA STATIONS AND PROCESSING

The surface station data processed for the CALPUFF analyses consisted of data from up to 16 National Weather Service (NWS) stations or Federal Aviation Administration (FAA) Flight Service stations for Charleston in South Carolina; Columbus, Macon, Savannah, Augusta, Athens, and Atlanta in Georgia; and Tampa, Jacksonville, Daytona Beach, Tallahassee, Vero Beach, Fort Myers, Orlando, Pensacola and Gainesville in Florida. The surface station parameters include wind speed, wind direction, cloud ceiling height, opaque cloud cover, dry bulb temperature, relative humidity, station pressure, and a precipitation code that is based on current weather conditions. The surface station data were processed into a SURF.DAT file format for CALMET input.

Because the modeling domain extends over water, up to 10 sea surface stations were incorporated in the analysis. Data were obtained from C-Man stations and National Oceanic and Atmospheric Administration (NOAA) buoys. These data were processed into an over-water surface station format (i.e., SEA*.DAT) for input to CALMET. The over-water station data include wind direction, wind speed and air temperature.

A summary of the surface, over water, and upper air station information and locations is presented in Table C-4.

C.5.5 UPPER AIR DATA STATIONS AND PROCESSING

Upper air data from the following NWS stations, based on the availability of the upper air data, were used in the modeling analysis:

- Waycross, Georgia (1990, 1992);
- Athens, Georgia (1990, 1992);
- Charleston, South Carolina (1990, 1992, 1996);
- Cape Canaveral, Florida (1996)
- Miami, Florida (1996)
- Apalachicola, Florida (1990);
- Ruskin, Florida (1990, 1992, 1996);

- Tallahassee, Florida (1992, 1996);
- West Palm Beach, Florida (1990, 1992)
- Jacksonville, Florida (1996); and
- Peachtree City, Georgia (1996).

C.5.6 PRECIPITATION DATA STATIONS AND PROCESSING

Precipitation data were processed from a network of hourly precipitation data files collected from primary and secondary NWS precipitation-recording stations located within the latitude and longitudinal limits of the modeling domain. Data for 82 stations in Alabama, Georgia, and Florida were obtained in NCDC TD-3240 variable format and converted into a fixed-length format. The utility programs PXTRACT and PMERGE were then used to process the data into the format for the PRECIP.DAT file that is used by CALMET

C.5.7 GEOPHYSICAL DATA PROCESSING

Terrain elevations for each grid cell of the modeling domain were obtained from 1-degree Digital Elevation Model (DEM) files obtained from the U.S. Geographical Survey (USGS) Internet website. The DEM data was extracted for the modeling domain grid using the utility program TERREL. Land-use data were also extracted from 1-degree USGS files and processed using utility programs CTGCOMP and CTGPROC. Both the terrain and land use files were combined into a GEO.DAT file for input to CALMET with the MAKEGEO utility program.

TABLE C-1

CALPUFF REFINED MODELING ANALYSES RECOMMENDATIONS[a]

Model Input/Output		Description
Meteorology	Use CALMET (minimum 6 to 10 layers in the vertical; top layer must extend above the maximum mixing depth expected); horizontal domain extends 50 to 80 km beyond outer receptors and sources being modeled; terrain elevation and land-use data are resolved for the situation.	
Receptors	Within Class I area(s) of concern; digitized by the National Park Service	
Dispersion	1.	CALPUFF with default dispersion settings.
	2.	Use MESOPUFF II chemistry with wet and dry deposition.
	3.	Define background values for ozone and ammonia for area.
Processing	1.	For PSD increments: use highest, second highest 3-hour, and 24-hour average SO_2 concentrations; highest, second highest 24-hour average PM_{10} concentrations; and highest annual average SO_2, PM_{10}, and NO_x concentrations.
	2.	For visibility: process, on a 24-hour basis, compute the source extinction from the maximum increase in emissions of SO_2, NO_x, and PM_{10}; compute the daily relative humidity factor [f(RH)], provided from an external disk file; and compute the maximum percent change in extinction using the FLM supplied background extinction data in the FLAG document.
	3.	For significant impact analysis: use highest annual and highest short-term averaging time concentrations for SO_2, PM_{10}, and NO_x.

[a] IWAQM Phase II report (December, 1998) and FLAG document (December, 2000).

TABLE C-2
CALPUFF MODEL SETTINGS

Parameter	Setting
Pollutant Species	SO_2, SO_4, NO_x, PM_{10}
Chemical Transformation	MESOPUFF II scheme including hourly ozone data.
Deposition	Include both dry and wet deposition, plume depletion.
Meteorological/Land Use Input	CALMET
Plume Rise	Transitional, stack-tip downwash, partial plume penetration.
Dispersion	Puff plume element, PG/MP coefficients, rural mode, ISC building downwash scheme.
Terrain Effects	Partial plume path adjustment.
Output	Create binary concentration file including output species for SO_4, NO_3, PM_{10}, SO_2, and NO_x; process for visibility change using Method 2 and FLAG background extinctions.
Visiblity Model Processing for BART Rule	98 percentile (8th-highest) 24-hour extinction change (%) for a year.
Background Values	Ozone: 50 ppb; Ammonia: 1 ppb.

<u>**Notes:**</u>
ISC = Industrial Source Complex.
PG/MP = Pasquill-Gifford/McAlroy-Pooler
ppb = parts per billion.

TABLE C-3
CALMET SETTINGS AND MODEL DOMAIN

Parameter	Setting
Horizontal Grid Dimensions	448 by 684 km, 4 km grid resolution
Vertical Grid	10 layers
Weather Station Data Inputs	16 surface, 11 upper air, 82 precipitation stations
Wind model options	Diagnostic wind model, no kinematic effects
Prognostic wind field model	1990 MM4 data and 1992 MM5 data, 80 km resolution; 1996 MM5 data, 36 km resolution; used for wind field initialization
Output	Binary hourly gridded meteorological data file for CALPUFF input

TABLE C-4
SURFACE AND UPPER AIR STATIONS USED IN THE NORTH CENTRAL FLORIDA AND SOUTH GEORGIA CALMET DOMAIN

			UTM Coordinates			
Station Name	Station Symbol	WBAN Number	Easting (km)	Northing (km)	UTM Zone	Anemometer Height (m)
Surface Stations						
Tampa, FL	TPA	12842	349.195	3094.289	17	10
Jacksonville, FL	JAX	13889	432.809	3374.192	17	10
Daytona Beach, FL	DAB	12834	495.118	3228.056	17	10
Tallahassee, FL	TLH	93805	176.408[a]	3365.835	16	10
Fort Myers. F L	FMY	12835	413.644	2940.405	17	10
Orlando, FL	MCO	12815	468.942	3146.889	17	10
Pensacola, FL	PNS	13899	-95.74	3386.714	16	10
Vero Beach, FL	VRB	12843	557.487	3058.363	17	10
Columbus, GA	CSG	93842	128.871[a]	3604.422	16	10
Charleston, SC	CHS	13880	590.422	3640.405	17	10
Macon, GA	MCN	3813	251.562	3620.929	17	10
Savannah, GA	SAV	3822	481.12	3554.985	17	10
Gainesville, FL	GNV	12816	377.39	3284.126	17	10
Augusta, GA	AGS	3820	410.024	3692.184	17	10
Athens, GA	AHN	13873	285.867	3758.824	17	10
Atlanta, GA	ATL	13874	181.588[a]	3728.434	16	10
Sea Surface Stations						
Venice, FL	VENF1	-	356.24	2995.05	17	--
Cape Canaveral, FL	41009	-	380.25	3152.87	17	--
Tampa West, FL	42036	-	156.41	3158.73	16	--
Cedar Key, FL	CDRF1	-	302.52	3225.2	17	--
Cape San Blas, FL	CSBF1	-	77.89	3290.18	16	--
Folly Island, SC	FBIS1	-	604.09	3616.38	17	--
Keaton Beach, FL	KTNF1	-	249.71	3301.66	17	--
Lake Worth, FL	LKWF1	-	596.57	2943.61	17	--
Savannah, GA	SVLS1	-	530.24	3534.94	17	--
St. Augustine, FL	SAUF1	-	474.89	3303.3	17	--
Upper Air Stations						
Ruskin, FL	TPA	12842	361.961	3064.616	17	NA
Waycross, GA	AYS	13861	366.674	3457.945	17	NA
Athens, GA	AHN	13873	285.866	3758.824	17	NA
Charleston, SC	CHS	13880	590.421	3640.405	17	NA
Cape Canaveral	XMR	12868	544.048	3150.459	17	NA
Miami -FIU	MFL	92803	562.181	2847.983	17	NA
Apalachicola, FL	AQQ	12832	109.807[a]	3295.816	16	NA
Tallahassee, FL	TLH	93805	176.4072	3365.835	16	NA
Jacksonville, FL	JAX	13889	432.808	3374.192	17	NA
Peachtree, GA	FFC	53819	155.6372	3696.207	16	NA

[a] Equivalent coordinate for Zone 17.

APPENDIX D

SO_2 EMISSION DATA FOR PSD CLASS I BACKGROUND SOURCES

TABLE D-1
STACK, OPERATING, AND SO_2 EMISSIONS OF SO_2 SOURCES INCLUDED IN THE PSD CLASS I AIR MODELING ANALYSES AT THE OKEFENOKEE NWA

Facility	Model ID Name	UTM Coordinates East (km)	UTM Coordinates North (km)	Height (ft)	Height (m)	Diameter (ft)	Diameter (m)	Temperature (°F)	Temperature (K)	Velocity (ft/s)	Velocity (m/s)	Emission Rate (lb/hr)	Emission Rate (g/s)	PSD[a] Source (C/E)
Florida Power & Light (FPL)- Putnam Plant	CFPLPUTM	443.3	3277.6	73.1	22.3	10.3	3.2	328	437	192.2	58.6	1,549.2	195.2 [b]	C
												925.4	116.6 [b]	C
Florida Power & Light (FPL)- Palatka Plant	FPLPALAT	442.8	3277.6	149.9	45.7	13.0	4.0	275	408	31.2	9.5	-2,039.9	-257.0	E
Georgia Pacific, Palatka Mill	SDT4	433.935	3283.478	206.0	62.8	5.0	1.52	179	355.0	33.9	10.35	7.7	0.97	C
	PB524	433.977	3283.447	236.8	72.2	8.0	2.44	413	485.0	85.9	26.19	1,461.9	184.20	C
	CB4	433.983	3283.45	236.8	72.2	8.0	2.44	466	514.0	92.3	28.14	961.1	121.10	C
	PB7	433.986	3283.466	60.0	18.3	7.0	2.13	750	672.0	43.5	13.25	0.2	0.02	C
	LK4	434.107	3283.247	130.9	39.9	4.4	1.35	164	346.5	70.6	21.51	34.5	4.35	C
	TM5P	434.286	3283.44	94.0	28.7	4.2	1.29	450	505.4	77.1	23.50	0.030	0.00378	C
	RB4_24HR	433.882	3283.438	229.9	70.1	12.0	3.66	424	491.0	65.9	20.08	109.8	13.84	C
	TOX	433.982	3283.38	249.9	76.2	3.6	1.10	160	344.0	18.0	5.49	31.3	3.94	C
	RB1B	434.054	3283.407	249.9	76.2	12.0	3.66	188	360.0	28.9	8.80	49.3	6.21	E
	RB2B	434.054	3283.407	249.9	76.2	12.0	3.66	210	372.0	28.9	8.80	70.5	8.88	E
	RB3B	434.02	3283.385	132.8	40.5	11.2	3.41	210	372.0	23.9	7.28	68.1	8.58	E
	RB4B	433.882	3283.438	229.9	70.1	12.0	3.66	394	474.0	55.3	16.86	277.8	35.00	E
	SDT1B	434.059	3283.411	100.0	30.5	2.5	0.76	199	366.0	24.7	7.53	1.0	0.13	E
	SDT2B	434.059	3283.411	100.0	30.5	3.0	0.91	215	375.0	31.2	9.51	1.4	0.18	E
	SDT3B	434.025	3283.388	108.9	33.2	2.5	0.76	205	369.0	11.7	3.57	1.4	0.18	E
	SDT4B	433.935	3283.478	206.0	62.8	5.0	1.52	163	346.0	27.1	8.26	5.6	0.71	E
	LK1B	434.122	3283.301	49.9	15.2	4.2	1.28	262	401.0	17.2	5.24	1.9	0.24	E
	LK2B	434.117	3283.299	52.2	15.9	5.6	1.71	154	341.0	35.0	10.67	1.9	0.24	E
	LK3B	434.119	3283.271	52.2	15.9	5.6	1.71	156	342.0	27.8	8.47	3.8	0.48	E
	LK4B	434.107	3283.247	148.9	45.4	4.3	1.31	172	351.0	54.0	16.46	11.1	1.40	E
	PB4B	433.998	3283.481	122.0	37.2	4.0	1.22	399	477.0	47.7	14.54	358.7	45.2	E
	PB5B	433.977	3283.447	239.1	72.9	9.0	2.74	476	520.0	52.4	15.97	1,277.8	161.0	E
	CB4B	433.983	3283.45	239.1	72.9	10.0	3.05	399	477.0	34.5	10.52	960.3	121.0	E
Gerdau Ameristeel	EAFBH1	405.708	3350.006	110.0	33.5	12.0	3.66	230	383.2	55.2	16.84	16.0	2.02	C
	EAFBH2	405.715	3349.992	110.0	33.5	12.0	3.66	230	383.2	55.2	16.84	16.0	2.02	C
	REHEATN	405.811	3350.324	66.0	20.1	5.8	1.77	480	522.0	45.0	13.72	0.2	0.02	C
	ST12	405.699	3350.109	115.0	35.1	10.0	3.05	230	383.2	64.8	19.76	10.2	1.28	E
	ST34	405.732	3350.117	115.0	35.1	10.0	3.05	230	383.2	67.9	20.70	1.1	0.14	E
	REHEAT	405.758	3350.358	160.0	48.8	6.9	2.10	900	755.4	19.5	5.93	0.1	0.01	E
JEA Brandy Branch	S1NG	408.835	3354.491	189.9	57.9	18.0	5.49	266	403.0	69.8	21.28	32.7	4.12	C
	S2NG	408.713	3354.53	189.9	57.9	18.0	5.49	266	403.0	69.8	21.28	32.7	4.12	C
	S3FO	408.774	3354.53	189.9	57.9	18.0	5.49	266	403.0	69.8	21.28	32.7	4.12	C
	SFP	408.893	3354.536	24.0	7.3	0.5	0.15	649	616.0	196.9	60.02	0.032	0.0040	C
Millenium Specialty Products	BOILER4	436.79	3360.74	40.0	12.2	3.6	1.10	269	405.0	46.0	14.02	200.0	25.2	C
	BOILER5	436.79	3360.74	125.0	38.1	3.8	1.16	350	450.0	76.4	23.29	193.0	24.3	C
	BOILER6	436.79	3360.74	125.0	38.1	5.1	1.55	350	450.0	74.5	22.71	242.2	30.5	C
	BOILER7	436.79	3360.74	125.0	38.1	5.1	1.55	350	450.0	74.5	22.71	82.0	10.3	C
	EBOILER3	436.79	3360.74	40.0	12.2	3.6	1.10	725	658.0	33.1	10.10	67.4	8.5	E
JEA - Northside Power Plant	CJEAN1	447.0	3365.2	495	151.0	15.0	4.57	136	331	63	19.20	553.3	69.7	C
	CJEAN2			495	151.0	15.0	4.57	136	331	63	19.20	553.3	69.7	C
	CJEAN3			75.1	22.9	3.4	1.04	165	347	50.0	15.24	0.28	0.04	C
	EJEAN1			250	76.2	16.0	4.87	266	403	76	23.10	-5,484.1	-691.0	E
	EJEAN2			290	88.4	16.4	5.00	250	394	43	13.10	-4,642.9	-585.0	E

TABLE D-1
STACK, OPERATING, AND SO_2 EMISSIONS OF SO_2 SOURCES INCLUDED IN THE PSD CLASS I AIR MODELING ANALYSES AT THE OKEFENOKEE NWA

Facility	Model ID Name	UTM Coordinates East (km)	UTM Coordinates North (km)	Stack Parameters Height (ft)	Height (m)	Diameter (ft)	Diameter (m)	Temperature (°F)	Temperature (K)	Velocity (ft/s)	Velocity (m/s)	Emission Rate (lb/hr)	Emission Rate (g/s)	PSD [a] Source (C/E)
JEA - St. Johns River Power Park	CRIVER1	447.1	3366.7	640	195.1	22.3	6.79	156	342	90	27.40	7,379.3	929.8 [c]	NA
	CRIVER2			640	195.1	22.3	6.79	156	342	90	27.40	7,379.3	929.8 [c]	NA
	CRIVER1			640	195.1	22.3	6.79	156	342	90	27.40	4,669.4	588.3 [d]	C
	CRIVER2			640	195.1	22.3	6.79	156	342	90	27.40	4,669.4	588.3 [d]	C
Anheiser Busch, Inc	CBUSH1	440.6	3366.8	20.0	6.1	1.97	0.60	1000	811	413.6	126.10	8.49	1.1	C
	CBUSH2			20.0	6.1	1.97	0.60	1000	811	413.6	126.10	8.49	1.1	C
Cedar Bay Cogeneration	CCBAY1	441.6	3365.5	403.1	122.9	13.4	4.10	129	327	120.0	36.60	255.3	32.2	C
	CCBAY2			403.1	122.9	13.4	4.10	129	327	120.0	36.60	255.3	32.2	C
	CCBAY3			403.1	122.9	13.4	4.10	129	327	120.0	36.60	255.3	32.2	C
	CCBAY4			63.0	19.2	4.3	1.30	82	301	93.2	28.40	0.24	0.030	C
	CCBAY5			63.0	19.2	4.3	1.30	82	301	93.2	28.40	0.24	0.030	C
Gilman Paper Co. St. Mary's, GA	CPAPER1	448.2	3401.3	275	83.8	14.1	4.30	350	450	9	2.80	693.3	87.4	C
	CPAPER2			150	45.7	10.2	3.10	127	326	26	7.80	704.9	88.8	C
	CPAPER3			180	54.9	6.9	2.10	305	425	55	16.80	120.6	15.2	C
	CPAPER4			250	76.2	8.5	2.60	280	411	40	12.20	125.5	15.8	C
	CPAPER5			100	30.5	4.9	1.50	170	350	38	11.60	16.9	2.1	C
	EPAPER1			275	83.8	14.1	4.30	350	450	24	7.30	-2,230.2	-281.0	E
	EPAPER2			120	36.6	5.9	1.80	800	700	66	20.00	-476.2	-60.0	E
	EPAPER3			155	47.2	7.5	2.30	307	426	43	13.10	-60.3	-7.6	E
	EPAPER4			175	53.3	5.2	1.60	250	394	83	25.20	-60.3	-7.6	E
	EPAPER5			250	76.2	8.5	2.60	309	427	72	22.10	-125.4	-15.8	E
Jefferson Smurfit Corp. (Jacksonville)	CMILL1	439.9	3359.3	175.2	53.4	10.5	3.20	278	410	75.1	22.90	291.9	36.8	C
	CMILL2			200.1	61.0	9.8	3.00	143	335	35.1	10.70	203.6	25.7	C
	CMILL3			209.9	64.0	4.6	1.40	163	346	36.1	11.00	10.4	1.3	C
	EMILL1			175.2	53.4	10.5	3.20	278	410	75.1	22.90	-133.3	-16.8	E
	EMILL2			51.8	15.8	4.9	1.50	165	347	22.0	6.70	-7.8	-1.0	E
	EMILL3			249.9	76.2	12.5	3.80	359	455	26.2	8.00	-289.7	-36.5	E
Jefferson Smurfit Corp. (Fernandina Beach)	CBMILL1	456.2	3394.2	257	78.4	11.2	3.40	358	454	50	15.20	1,512.5	190.6	C
	CBMILL2			265	80.8	11.5	3.50	428	493	61	18.60	321.1	40.5	C
	CBMILL3			289	88.1	12.8	3.90	412	484	62	18.90	358.1	45.1	C
	CBMILL4			340	103.7	14.8	4.50	334	441	42	12.80	1,226.3	154.5	C
	CBMILL5			75	22.9	5.6	1.70	325	436	55	16.80	26.7	3.4	C
	EBMILL1			227	69.2	7.9	2.40	410	483	55	16.90	-1,150.8	-145.0	E
	EBMILL2			227	69.2	11.2	3.40	404	480	53	16.30	-1,349.2	-170.0	E
	EBMILL3			249	75.9	11.5	3.50	428	493	62	18.80	-278.6	-35.1	E
	EBMILL4			134	40.8	8.9	2.70	242	390	44	13.30	-83.3	-10.5	E
	EBMILL5			44	13.4	3.6	1.10	190	361	40	12.30	-10.3	-1.3	E
	EBMILL6			44	13.4	4.6	1.40	188	360	58	17.60	-10.3	-1.3	E
	EBMILL7			228	69.5	5.9	1.80	170	350	17	5.20	-1.6	-0.2	E
	EBMILL8			109	33.2	2.0	0.60	188	360	19	5.80	-5.5	-0.7	E
Rayonier, Inc.	CRAY1	454.7	3392.2	180	54.9	9.8	3.00	145	336	32	9.80	422.3	53.2	C
	CRAY2			180	54.9	9.8	3.00	145	336	32	9.80	401.3	50.6	C
	CRAY3			180	54.9	9.8	3.00	133	329	32	9.80	440.6	55.5	C
	ERAY			180	54.9	9.8	3.00	133	329	32	9.80	-315.9	-39.8	E
Stone Container Corp. (Seminole Kraft)	CS1	443.0	3365.4	200.1	61.0	7.9	2.40	331	439	17.1	5.20	5.7	0.7	C
	CS2			200.1	61.0	7.9	2.40	331	439	17.1	5.20	5.7	0.7	C
	CS3			200.1	61.0	7.9	2.40	331	439	17.1	5.20	5.7	0.7	C

TABLE D-1

STACK, OPERATING, AND SO_2 EMISSIONS OF SO_2 SOURCES INCLUDED IN THE PSD CLASS I AIR MODELING ANALYSES AT THE OKEFENOKEE NWA

Facility	Model ID Name	UTM Coordinates East (km)	UTM Coordinates North (km)	Height (ft)	Height (m)	Diameter (ft)	Diameter (m)	Temperature (°F)	Temperature (K)	Velocity (ft/s)	Velocity (m/s)	Emission Rate (lb/hr)	Emission Rate (g/s)	PSD [a] Source (C/E)
	ES1			136.0	41.5	8.1	2.46	138	332	42.7	13.01	-458.7	-57.8	E
	ES2			136.0	41.5	8.1	2.46	138	332	42.7	13.01	-458.7	-57.8	E
	ES3			106.0	32.3	6.0	1.83	359	455	46.0	14.02	-334.1	-42.1	E
	ES4			106.0	32.3	7.0	2.13	331	439	47.6	14.51	-488.9	-61.6	E
	ES5			106.0	32.3	7.0	2.13	331	439	47.6	14.51	-485.7	-61.2	E
	ES6			126.0	38.4	8.5	2.59	154	341	52.4	15.97	-102.4	-12.9	E
	ES7			126.0	38.4	9.0	2.74	161	345	51.2	15.61	-131.0	-16.5	E
	ES8			126.0	38.4	9.0	2.74	160	344	47.9	14.60	-131.0	-16.5	E
	ES9			120.0	36.6	3.5	1.07	160	344	13.0	3.96	-2.9	-0.4	E
	ES10			124.0	37.8	4.0	1.22	160	344	14.0	4.27	-3.7	-0.5	E
	ES11			124.0	37.8	4.0	1.22	160	344	14.0	4.27	-3.7	-0.5	E
	ES12			69.0	21.0	5.8	1.77	158	343	10.2	3.11	-6.5	-0.8	E
	ES13			75.0	22.9	4.7	1.42	145	336	21.4	6.52	-6.5	-0.8	E
	ES14			75.0	22.9	3.7	1.12	145	336	26.8	8.17	-6.5	-0.8	E
	ES15			136.0	41.5	8.1	2.46	138	332	42.7	13.01	-62.3	-7.9	E
	ES16			136.0	41.5	8.1	2.46	138	332	42.7	13.01	-74.2	-9.4	E
	ES17			106.0	32.3	6.0	1.83	359	455	46.0	14.02	-323.0	-40.7	E
	ES18			106.0	32.3	7.0	2.13	331	439	47.6	14.51	-473.0	-59.6	E
	ES19			106.0	32.3	7.0	2.13	331	439	47.6	14.51	-471.4	-59.4	E
	ES20			126.0	38.4	8.5	2.59	154	341	52.4	15.97	-97.6	-12.3	E
	ES21			126.0	38.4	9.0	2.74	161	345	51.2	15.61	-124.6	-15.7	E
	ES22			126.0	38.4	9.0	2.74	160	344	47.9	14.60	-126.2	-15.9	E
	ES23			120.0	36.6	3.5	1.07	160	344	13.0	3.96	-2.8	-0.4	E
	ES24			124.0	37.8	4.0	1.22	160	344	14.0	4.27	-3.6	-0.5	E
	ES25			124.0	37.8	4.0	1.22	160	344	14.0	4.27	-3.6	-0.5	E
	ES26			69.0	21.0	5.8	1.77	158	343	10.2	3.11	-4.4	-0.6	E
	ES27			75.0	22.9	4.7	1.42	145	336	21.4	6.52	-5.3	-0.7	E
	ES28			75.0	22.9	3.7	1.12	145	336	26.8	8.17	-5.2	-0.7	E
JEA - Kennedy Power Plant	EKEN	440.0	3359.2	149.9	45.7	10.5	3.2	250	394	34.1	10.4	-596.0	-75.1	E
	KNDY10A			136.1	41.5	9.0	2.74	309	427	79.7	24.3	-734.1	-92.5	E
	KNDY10B			136.1	41.5	9.0	2.74	309	427	79.7	24.3	-734.1	-92.5	E
	KNDY9			149.9	45.7	10.5	3.2	289	416	40.0	12.2	-595.2	-75.0	E
JEA- Southside Power Plant	JEASS1			133.5	40.7	8.0	2.44	343	446	50.8	15.5	-418.3	-52.7	E
	JEASS2			133.5	40.7	8.0	2.44	343	446	50.8	15.5	-418.3	-52.7	E
	JEASS3			133.5	40.7	10.0	3.05	304	424	44.0	13.4	-633.3	-79.8	E
	JEASS4	437.7	3353.9	143.3	43.7	10.7	3.25	275	408	60.7	18.5	-873.0	-110.0	E
	JEASS5A			145.0	44.2	9.7	2.96	287	415	69.9	21.3	-825.4	-104.0	E
	JEASS5B			145.0	44.2	9.7	2.96	287	415	69.9	21.3	-825.4	-104.0	E
Gainesville Regional Utilities- Deerhaven	GRUDH2	365.7	3292.6	349.9	106.68	18.5	5.64	275	408.1	50.0	15.24	2,914.0	367.2	C
	GRUDHCC	365.5	3292.6	52.0	15.85	14.1	4.3	1100	866.5	168.0	51.21	53.0	6.7	C
PCS	SULACC&D	328.3	3368.8	149.9	45.7	5.2	1.59	181	356.0	94.1	28.7	766.7	96.6	C
	SULACE&F			200.1	61.0	9.5	2.90	181	356.0	30.5	9.3	833.3	105.0	C
	AUXBLRE			50.2	15.3	5.2	1.60	311	428.0	52.2	15.9	170.6	21.5	C
	AUXBLRB			35.1	10.7	4.8	1.46	383	468.0	31.2	9.5	174.6	22.0	C
	AUXBLRC&			104.0	31.7	6.5	1.98	383	468.0	49.9	15.2	332.4	41.9	C
	DAP2ZTR			140.1	42.7	8.0	2.44	125	325.0	43.0	13.1	5.5	0.7	C
	SULACA&B			200.1	61.0	5.9	1.80	170	350.0	50.8	15.5	-2,416.7	-304.5	E
	SULACC&D			149.9	45.7	5.2	1.59	181	356.0	94.1	28.7	-600.0	-75.6	E
Suwannee American Cement	AMSUWCEM	321.4	3315.9	315	96.0	9.42	2.87	205	369	46.4	14.1	28.4	3.6	C
Florida Rock Thompson S. Baker Cement Plant	FLROCCEM	348.4	3287.0	250	76.2	9.42	2.87	356	453	47.8	14.6	17.7	2.2	C

NA= not applicable

[a] Consuming (C) sources are sources that were constructed or modified after the PSD baseline date.
Expanding (E) sources are sources that have shutdown or have been modified since the baseline date.

[b] Two of the four CT units (half of the total plant emissions) consume PSD increment and are included in the PSD increment analysis.
Higher emissions based on maximum allowable emissions. Lower emissions are based on maximum actual emissions for the two units. See Table 3-3 for details.

[c] Maximum allowable emissions for each unit based on 1.2 lb/MMBtu and maximum heat input rate of 6144 MMBtu/hr. For one unit, SO2 emissions are 7,372.8 lb/hr.

TABLE D-1

STACK, OPERATING, AND SO_2 EMISSIONS OF SO_2 SOURCES INCLUDED IN THE PSD CLASS I AIR MODELING ANALYSES AT THE OKEFENOKEE NWA

Facility	Model ID Name	UTM Coordinates East (km)	UTM Coordinates North (km)	Stack Parameters Height (ft)	Height (m)	Diameter (ft)	Diameter (m)	Temperature (°F)	Temperature (K)	Velocity (ft/s)	Velocity (m/s)	Emission Rate (lb/hr)	Emission Rate (g/s)	PSD[a] Source (C/E)

[d] Actual emissions for each unit were obtained from the EPA Acid Rain Program using the 2001 to 2003 CEM data:
4,669.4 lb/hr (equivalent to approximately 0.76 lb/MMBtu for each unit operating at maximum heat input rate)

Source: FDEP, File 7_3_12_99.DAT (1/11/02)
SECI 2003

APPENDIX E

RECEPTOR LOCATION FIGURES AND BUILDING PROFILE INPUT PROGRAM (BPIP) FILES,

Figure E-1. Plant Layout With Near-Field Receptors

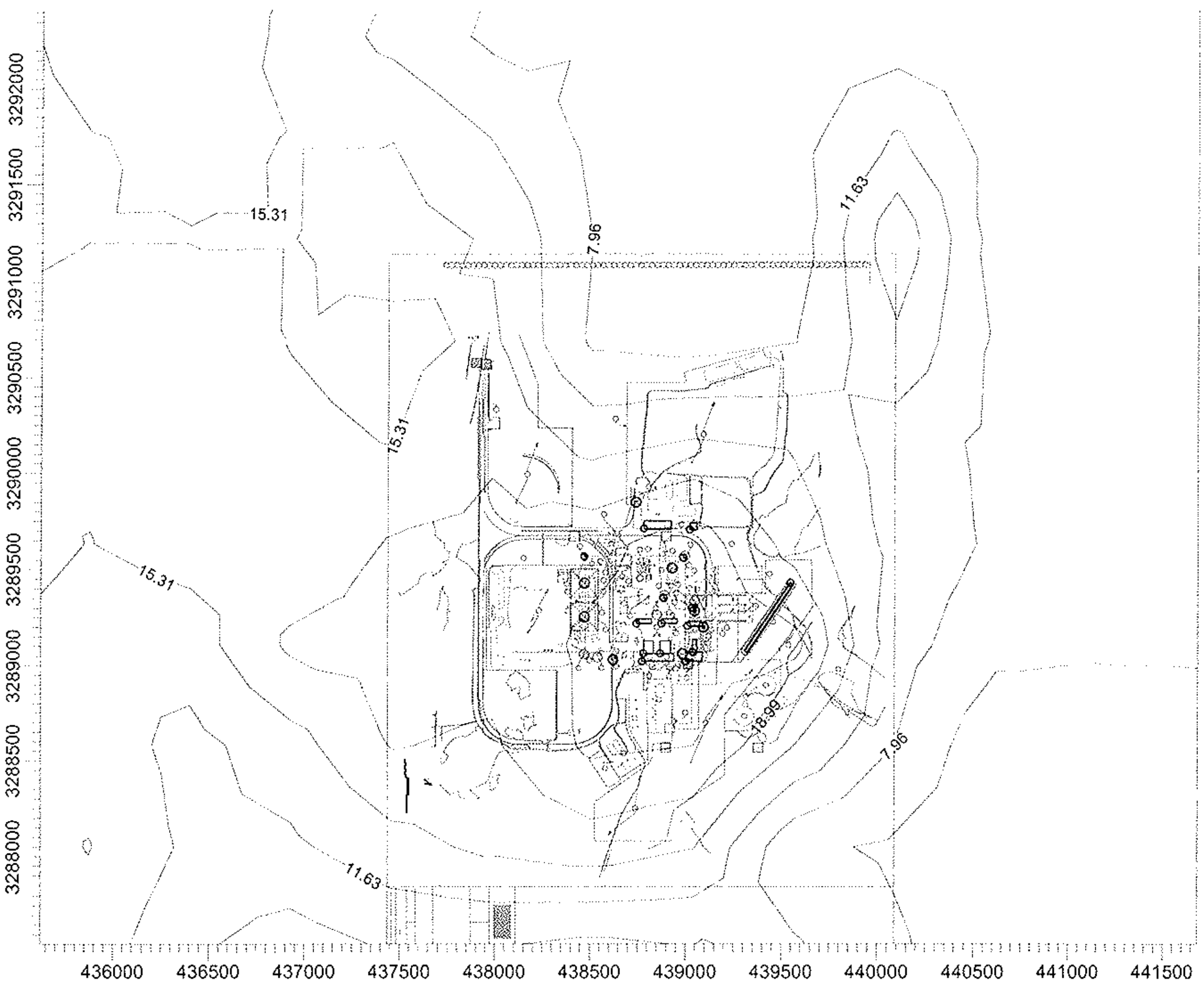
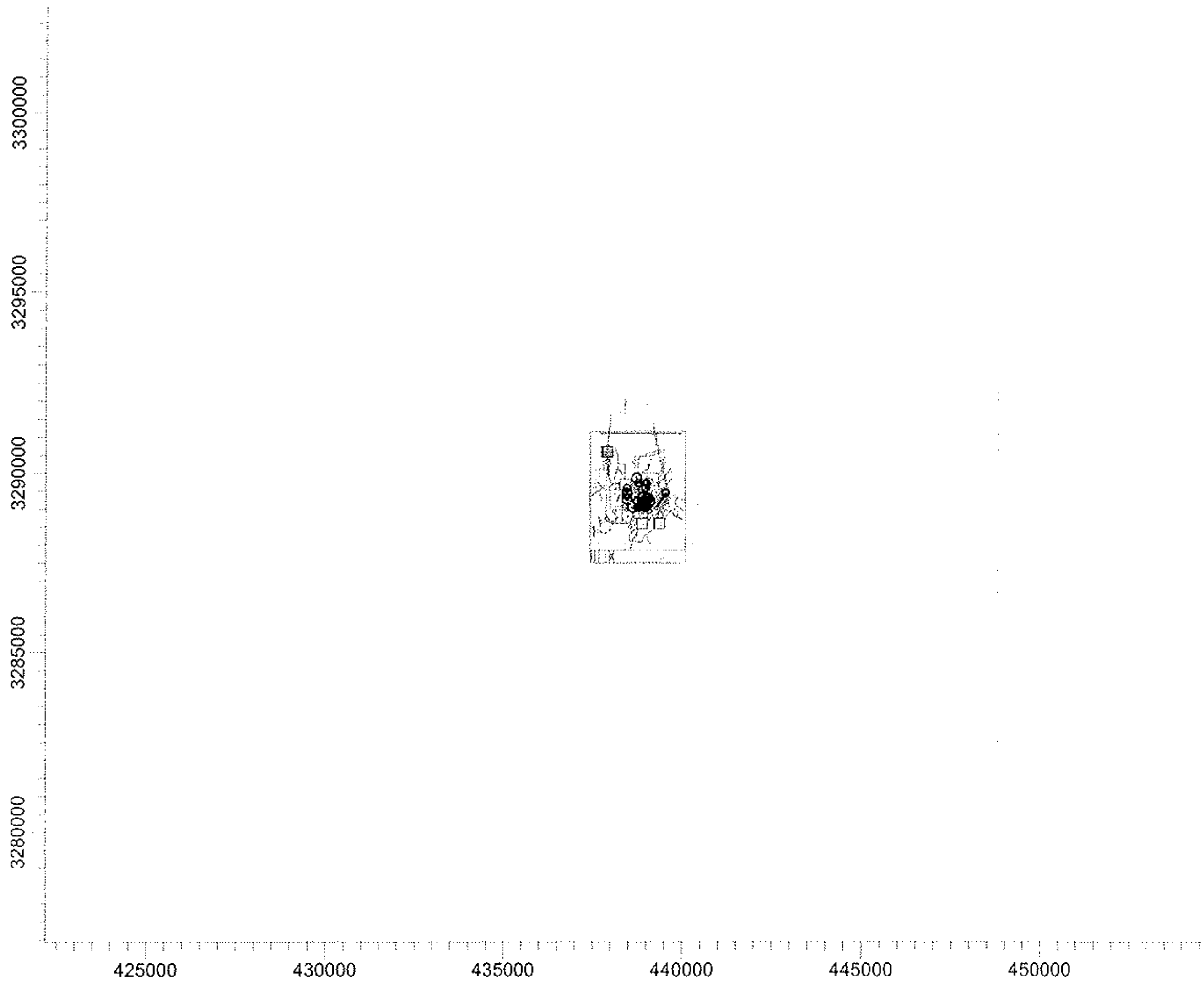


Figure E-2. Plant Layout With Full Receptor Grid



D:\Projects\seci\lakes\seci1.isc

BPIP (Dated: 04274)

DATE : 2/18/2006
TIME : 19:47:34
D:\Projects\seci\lakes\seci1.isc

============================
BPIP PROCESSING INFORMATION:
============================

The P flag has been set for preparing downwash related data for a model run utilizing the PRIME algorithm.

Inputs entered in METERS will be converted to meters using a conversion factor of 1.0000. Output will be in meters.

The UTMP variable is set to UTMY. The input is assumed to be in UTM coordinates. BPIP will move the UTM origin to the first pair of UTM coordinates read. The UTM coordinates of the new origin will be subtracted from all the other UTM coordinates entered to form this new local coordinate system.

Plant north is set to 0.00 degrees with respect to True North.

D:\Projects\seci\lakes\seci1.isc

PRELIMINARY* GEP STACK HEIGHT RESULTS TABLE
(Output Units: meters)

Stack Name	Stack Height	Stack-Building Base Elevation Differences	GEP** EQN1	Preliminary* GEP Stack Height Value
UNIT12	183.00	0.00	205.75	205.75
COOL01	14.30	0.00	28.25	65.00
COOL02	14.30	0.00	28.25	65.00
COOL03	14.30	0.00	28.25	65.00
COOL04	14.30	0.00	28.25	65.00
COOL05	14.30	0.00	28.25	65.00
COOL06	14.30	0.00	28.25	65.00
COOL07	14.30	0.00	28.25	65.00
COOL08	14.30	0.00	28.25	65.00
COOL09	14.30	0.00	28.25	65.00
COOL10	14.30	0.00	28.25	65.00
COOL11	14.30	0.00	28.25	65.00
COOL12	14.30	0.00	28.25	65.00
COOL13	14.30	0.00	28.25	65.00
COOL14	14.30	0.00	28.25	65.00
COOL15	14.30	0.00	28.25	65.00
COOL16	14.30	0.00	28.25	65.00
COOL17	14.30	0.00	28.25	65.00
COOL18	14.30	0.00	179.41	179.41
COOL19	14.30	0.00	179.51	179.51
COOL20	14.30	0.00	179.43	179.43
COOL21	14.30	0.00	179.26	179.26
COOL22	14.30	0.00	178.95	178.95
COOL23	14.30	0.00	178.44	178.44
COOL24	14.30	0.00	177.61	177.61
COOL25	14.30	0.00	178.31	178.31
COOL26	14.30	0.00	205.75	205.75
UNIT3	205.80	0.00	205.75	205.75
EP1	2.44	0.00	205.75	205.75
EP2	2.44	0.00	205.75	205.75
EP3	2.44	0.00	106.75	106.75
EP4	50.60	0.00	205.75	205.75
EP5	21.30	0.00	205.75	205.75
EP6	27.40	0.00	205.75	205.75
U3ZLDSD	32.00	0.00	106.75	106.75

* Results are based on Determinants 1 & 2 on pages 1 & 2 of the GEP Technical Support Document. Determinant 3 may be investigated for additional stack height credit. Final values result after Determinant 3 has been taken into consideration.
** Results were derived from Equation 1 on page 6 of GEP Technical

Support Document. Values have been adjusted for any stack-building base elevation differences.

Note: Criteria for determining stack heights for modeling emission limitations for a source can be found in Table 3.1 of the GEP Technical Support Document.

```
                    BPIP (Dated: 04274)
DATE : 2/18/2006
TIME : 19:47:34


D:\Projects\seci\lakes\seci1.isc

 BPIP output is in meters


  SO BUILDHGT UNIT12     82.30   82.30   82.30   82.30   33.90   33.90
  SO BUILDHGT UNIT12     33.90   33.90    0.00   33.90   33.90   33.90
  SO BUILDHGT UNIT12     33.90   82.30   82.30   82.30   82.30   82.30
  SO BUILDHGT UNIT12     82.30   82.30   82.30   82.30   33.90   33.90
  SO BUILDHGT UNIT12     33.90   33.90    0.00   33.90   33.90   76.20
  SO BUILDHGT UNIT12     76.20   82.30   82.30   82.30   82.30   82.30
  SO BUILDWID UNIT12    149.80  154.55  154.61   83.75   68.86   59.64
  SO BUILDWID UNIT12     48.60   36.09    0.00   36.09   48.60   59.64
  SO BUILDWID UNIT12     68.86   83.75  154.61  154.55  149.80  140.50
  SO BUILDWID UNIT12    149.80  154.55  154.61   83.75   68.86   59.64
  SO BUILDWID UNIT12     48.60   36.09    0.00   36.09   48.60   67.37
  SO BUILDWID UNIT12     63.87   83.75  154.61  154.55  149.80  140.50
  SO BUILDLEN UNIT12     89.27  109.95  127.29   85.21   75.99   80.81
  SO BUILDLEN UNIT12     83.18   83.02    0.00   83.02   83.18   80.81
  SO BUILDLEN UNIT12     75.99   85.21  127.29  109.95   89.27   65.87
  SO BUILDLEN UNIT12     89.27  109.95  127.29   85.21   75.99   80.81
  SO BUILDLEN UNIT12     83.18   83.02    0.00   83.02   83.18   51.20
  SO BUILDLEN UNIT12     58.42   85.21  127.29  109.95   89.27   65.87
  SO XBADJ    UNIT12   -208.96 -211.59 -207.78 -197.67 -110.33 -114.83
  SO XBADJ    UNIT12   -115.85 -113.35    0.00   28.81   31.12   32.48
  SO XBADJ    UNIT12     32.85  113.82   81.55  102.36  120.06  134.11
  SO XBADJ    UNIT12    119.69  101.64   80.49  112.46   34.33   34.02
  SO XBADJ    UNIT12     32.67   30.33    0.00 -111.83 -114.30 -276.89
  SO XBADJ    UNIT12   -283.64 -199.03 -208.85 -212.31 -209.33 -199.98
  SO YBADJ    UNIT12    -30.05  -58.13  -84.44  -75.08   18.40    5.56
  SO YBADJ    UNIT12     -7.45  -20.23    0.00  -19.89   -7.38    5.36
  SO YBADJ    UNIT12     17.94  -73.46  -82.60  -56.14  -27.96    1.06
  SO YBADJ    UNIT12     30.05   58.13   84.44   75.08  -18.40   -5.56
  SO YBADJ    UNIT12      7.45   20.23    0.00   19.89    7.38   40.09
  SO YBADJ    UNIT12     -4.16   73.46   82.60   56.14   27.96   -1.06


  SO BUILDHGT COOL01     11.30   11.30   11.30   11.30   11.30   11.30
  SO BUILDHGT COOL01     11.30   11.30   11.30   11.30   11.30   11.30
  SO BUILDHGT COOL01     11.30   11.30   11.30   11.30   11.30   11.30
  SO BUILDHGT COOL01     11.30   11.30   11.30   11.30   11.30   11.30
  SO BUILDHGT COOL01     11.30   11.30   11.30   11.30   11.30   11.30
  SO BUILDHGT COOL01     11.30   11.30   11.30   11.30   11.30   11.30
  SO BUILDWID COOL01    189.08  119.49   46.27   61.10  133.77  202.37
  SO BUILDWID COOL01    264.83  319.24  363.95  397.60  419.17  428.01
  SO BUILDWID COOL01    427.28  415.86  391.81  355.85  309.08  252.92
  SO BUILDWID COOL01    189.08  119.49   46.27   61.10  133.77  202.37
  SO BUILDWID COOL01    264.83  319.24  363.95  397.60  419.17  428.01
  SO BUILDWID COOL01    427.28  415.86  391.81  355.85  309.08  252.92
  SO BUILDLEN COOL01    397.60  419.17  428.01  427.28  415.86  391.81
  SO BUILDLEN COOL01    355.85  309.09  252.92  189.08  119.49   46.27
  SO BUILDLEN COOL01     61.10  133.77  202.37  264.83  319.24  363.95
  SO BUILDLEN COOL01    397.60  419.17  428.01  427.28  415.86  391.81
  SO BUILDLEN COOL01    355.85  309.08  252.92  189.08  119.49   46.27
  SO BUILDLEN COOL01     61.10  133.77  202.37  264.83  319.24  363.95
  SO XBADJ    COOL01   -386.94 -409.53 -419.67 -418.79 -406.33 -381.52
  SO XBADJ    COOL01   -345.12 -298.23 -242.29 -178.98 -110.23  -38.13
  SO XBADJ    COOL01     -9.60  -10.63  -11.34  -11.70  -11.71  -11.36
  SO XBADJ    COOL01    -10.66   -9.64   -8.33   -8.49   -9.53  -10.29
  SO XBADJ    COOL01    -10.73  -10.85  -10.64  -10.10   -9.26   -8.14
  SO XBADJ    COOL01    -51.49 -123.14 -191.03 -253.13 -307.53 -352.59
  SO YBADJ    COOL01     84.44   50.48   15.00  -20.95  -56.25  -89.85
  SO YBADJ    COOL01   -120.71 -147.91 -170.62 -188.14 -199.94 -205.67
```

```
SO YBADJ     COOL01  -205.15 -198.40 -185.62 -167.19 -143.69 -115.82
SO YBADJ     COOL01   -84.44  -50.48  -15.00   20.95   56.25   89.85
SO YBADJ     COOL01   120.71  147.91  170.62  188.14  199.94  205.67
SO YBADJ     COOL01   205.15  198.40  185.62  167.19  143.69  115.82


SO BUILDHGT COOL02     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL02     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL02     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL02     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL02     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL02     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDWID COOL02    189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL02    264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL02    427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDWID COOL02    189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL02    264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL02    427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDLEN COOL02    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL02    355.85  309.09  252.92  189.08  119.49   46.27
SO BUILDLEN COOL02     61.10  133.77  202.37  264.83  319.24  363.95
SO BUILDLEN COOL02    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL02    355.85  309.08  252.92  189.08  119.49   46.27
SO BUILDLEN COOL02     61.10  133.77  202.37  264.83  319.24  363.95
SO XBADJ     COOL02  -371.96 -393.56 -403.20 -402.32 -390.35 -366.53
SO XBADJ     COOL02  -331.57 -286.54 -232.80 -171.98 -105.94  -36.68
SO XBADJ     COOL02   -11.04  -14.91  -18.32  -21.18  -23.39  -24.90
SO XBADJ     COOL02   -25.64  -25.61  -24.80  -24.96  -25.51  -25.28
SO XBADJ     COOL02   -24.28  -22.55  -20.13  -17.10  -13.55   -9.59
SO XBADJ     COOL02   -50.06 -118.86 -184.05 -243.65 -295.85 -339.05
SO YBADJ     COOL02    77.44   46.20   13.55  -19.51  -51.98  -82.87
SO YBADJ     COOL02  -111.24 -136.23 -157.08 -173.16 -183.97 -189.20
SO YBADJ     COOL02  -188.68 -182.42 -170.63 -153.64 -131.99 -106.33
SO YBADJ     COOL02   -77.44  -46.20  -13.55   19.51   51.98   82.87
SO YBADJ     COOL02   111.24  136.23  157.08  173.16  183.97  189.20
SO YBADJ     COOL02   188.68  182.42  170.63  153.64  131.99  106.33


SO BUILDHGT COOL03     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL03     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL03     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL03     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL03     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL03     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDWID COOL03    189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL03    264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL03    427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDWID COOL03    189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL03    264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL03    427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDLEN COOL03    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL03    355.85  309.09  252.92  189.08  119.49   46.27
SO BUILDLEN COOL03     61.10  133.77  202.37  264.83  319.24  363.95
SO BUILDLEN COOL03    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL03    355.85  309.08  252.92  189.08  119.49   46.27
SO BUILDLEN COOL03     61.10  133.77  202.37  264.83  319.24  363.95
SO XBADJ     COOL03  -357.03 -377.70 -386.89 -386.04 -374.62 -351.81
SO XBADJ     COOL03  -318.31 -275.15 -223.62 -165.29 -101.95  -35.50
SO XBADJ     COOL03   -12.71  -19.38  -25.46  -30.76  -35.13  -38.44
SO XBADJ     COOL03   -40.57  -41.48  -41.12  -41.23  -41.24  -40.00
SO XBADJ     COOL03   -37.54  -33.94  -29.31  -23.79  -17.54  -10.77
SO XBADJ     COOL03   -48.39 -114.39 -176.92 -234.07 -284.11 -325.51
SO YBADJ     COOL03    70.75   42.20   12.37  -17.84  -47.51  -75.73
SO YBADJ     COOL03  -101.65 -124.49 -143.54 -158.23 -168.11 -172.88
SO YBADJ     COOL03  -172.41 -166.69 -155.91 -140.39 -120.60  -97.15
SO YBADJ     COOL03   -70.75  -42.20  -12.37   17.84   47.51   75.73
SO YBADJ     COOL03   101.65  124.49  143.54  158.23  168.11  172.88
SO YBADJ     COOL03   172.41  166.69  155.91  140.39  120.60   97.15


SO BUILDHGT COOL04     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL04     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL04     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL04     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL04     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL04     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDWID COOL04    189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL04    264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL04    427.28  415.86  391.81  355.85  309.08  252.92
```

```
SO BUILDWID COOL04   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL04   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL04   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL04   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL04   355.85 309.09 252.92 189.08 119.49  46.27
SO BUILDLEN COOL04    61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL04   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL04   355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL04    61.10 133.77 202.37 264.83 319.24 363.95
SO XBADJ    COOL04  -341.92 -361.65 -370.40 -369.61 -358.74 -336.98
SO XBADJ    COOL04  -304.97 -263.69 -214.41 -158.60  -97.98  -34.39
SO XBADJ    COOL04   -14.47  -23.97  -32.73  -40.50  -47.05  -52.16
SO XBADJ    COOL04   -55.68  -57.52  -57.61  -57.66  -57.12  -54.83
SO XBADJ    COOL04   -50.89  -45.39  -38.52  -30.48  -21.51  -11.88
SO XBADJ    COOL04   -46.63 -109.80 -169.64 -224.33 -272.19 -311.79
SO YBADJ    COOL04    64.06   38.24   11.25  -16.08  -42.92  -68.45
SO YBADJ    COOL04   -91.91 -112.57 -129.82 -143.12 -152.07 -156.40
SO YBADJ    COOL04  -155.98 -150.81 -141.07 -127.04 -109.15  -87.94
SO YBADJ    COOL04   -64.06  -38.24  -11.25   16.08   42.92   68.45
SO YBADJ    COOL04    91.91  112.57  129.82  143.12  152.07  156.40
SO YBADJ    COOL04   155.98  150.81  141.07  127.04  109.15   87.94


SO BUILDHGT COOL05    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL05    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL05    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL05    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL05    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL05    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL05   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL05   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL05   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL05   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL05   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL05   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL05   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL05   355.85 309.09 252.92 189.08 119.49  46.27
SO BUILDLEN COOL05    61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL05   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL05   355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL05    61.10 133.77 202.37 264.83 319.24 363.95
SO XBADJ    COOL05  -327.02 -345.84 -354.16 -353.44 -343.12 -322.39
SO XBADJ    COOL05  -291.85 -252.45 -205.38 -152.06  -94.13  -33.34
SO XBADJ    COOL05   -16.26  -28.53  -39.94  -50.14  -58.81  -65.70
SO XBADJ    COOL05   -70.59  -73.33  -73.85  -73.84  -72.74  -69.42
SO XBADJ    COOL05   -64.00  -56.64  -47.55  -37.02  -25.36  -12.93
SO XBADJ    COOL05   -44.84 -105.23 -162.43 -214.69 -260.43 -298.25
SO YBADJ    COOL05    57.52   34.38   10.20  -14.29  -38.35  -61.24
SO YBADJ    COOL05   -82.28 -100.81 -116.28 -128.21 -136.26 -140.16
SO YBADJ    COOL05  -139.80 -135.19 -126.48 -113.92  -97.91  -78.91
SO YBADJ    COOL05   -57.52  -34.38  -10.20   14.29   38.35   61.24
SO YBADJ    COOL05    82.28  100.81  116.28  128.21  136.26  140.16
SO YBADJ    COOL05   139.80  135.19  126.48  113.92   97.91   78.91


SO BUILDHGT COOL06    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL06    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL06    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL06    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL06    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL06    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL06   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL06   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL06   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL06   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL06   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL06   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL06   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL06   355.85 309.09 252.92 189.08 119.49  46.27
SO BUILDLEN COOL06    61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL06   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL06   355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL06    61.10 133.77 202.37 264.83 319.24 363.95
SO XBADJ    COOL06  -312.22 -330.04 -337.84 -337.10 -327.26 -307.47
SO XBADJ    COOL06  -278.35 -240.76 -195.87 -145.02  -89.76  -31.78
SO XBADJ    COOL06   -17.55  -32.65  -46.75  -59.43  -70.31  -79.05
SO XBADJ    COOL06   -85.38  -89.13  -90.16  -90.18  -88.60  -84.34
SO XBADJ    COOL06   -77.51  -68.32  -57.06  -44.06  -29.73  -14.49
SO XBADJ    COOL06   -43.54 -101.12 -155.62 -205.40 -248.93 -284.90
```

```
SO YBADJ    COOL06    50.48  30.01   8.64 -12.99 -34.24 -54.44
SO YBADJ    COOL06   -72.98 -89.31 -102.93 -113.42 -120.46 -123.84
SO YBADJ    COOL06  -123.46 -119.33 -111.57 -100.42 -86.22 -69.40
SO YBADJ    COOL06   -50.48 -30.01  -8.64  12.99  34.24  54.44
SO YBADJ    COOL06    72.98  89.31 102.93 113.42 120.46 123.84
SO YBADJ    COOL06   123.46 119.33 111.57 100.42  86.22  69.40


SO BUILDHGT COOL07    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL07    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL07    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL07    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL07    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL07    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL07   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL07   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL07   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL07   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL07   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL07   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL07   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL07   355.85 309.09 252.92 189.08 119.49  46.27
SO BUILDLEN COOL07    61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL07   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL07   355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL07    61.10 133.77 202.37 264.83 319.24 363.95
SO XBADJ    COOL07  -297.05 -313.88 -321.18 -320.44 -311.12 -292.34
SO XBADJ    COOL07  -264.67 -228.97 -186.31 -137.98 -85.47 -30.36
SO XBADJ    COOL07   -19.05 -37.01 -53.85 -69.05 -82.16 -92.77
SO XBADJ    COOL07  -100.56 -105.29 -106.83 -106.83 -104.75 -99.47
SO XBADJ    COOL07   -91.18 -80.12 -66.62 -51.10 -34.02 -15.91
SO XBADJ    COOL07   -42.05 -96.75 -148.52 -195.78 -237.08 -271.18
SO YBADJ    COOL07    43.44  25.72   7.22 -11.50 -29.87 -47.33
SO YBADJ    COOL07   -63.36 -77.46 -89.21 -98.24 -104.30 -107.18
SO YBADJ    COOL07  -106.80 -103.18 -96.43 -86.75 -74.43 -59.84
SO YBADJ    COOL07   -43.44 -25.72  -7.22  11.50  29.87  47.33
SO YBADJ    COOL07    63.36  77.46  89.21  98.24 104.30 107.18
SO YBADJ    COOL07   106.80 103.18  96.43  86.75  74.43  59.84


SO BUILDHGT COOL08    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL08    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL08    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL08    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL08    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL08    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL08   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL08   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL08   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL08   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL08   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL08   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL08   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL08   355.85 309.09 252.92 189.08 119.49  46.27
SO BUILDLEN COOL08    61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL08   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL08   355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL08    61.10 133.77 202.37 264.83 319.24 363.95
SO XBADJ    COOL08  -281.97 -297.90 -304.78 -304.13 -295.38 -277.66
SO XBADJ    COOL08  -251.49 -217.69 -177.28 -131.47 -81.68 -29.40
SO XBADJ    COOL08   -20.95 -41.72 -61.22 -78.86 -94.10 -106.49
SO XBADJ    COOL08  -115.64 -121.27 -123.22 -123.15 -120.48 -114.15
SO XBADJ    COOL08  -104.36 -91.39 -75.65 -57.61 -37.81 -16.87
SO XBADJ    COOL08   -40.15 -92.05 -141.15 -185.97 -225.14 -257.46
SO YBADJ    COOL08    36.93  21.93   6.26  -9.60 -25.16 -39.97
SO YBADJ    COOL08   -53.56 -65.52 -75.49 -83.16 -88.31 -90.78
SO YBADJ    COOL08   -90.49 -87.45 -81.75 -73.57 -63.15 -50.81
SO YBADJ    COOL08   -36.93 -21.93  -6.26   9.60  25.16  39.97
SO YBADJ    COOL08    53.56  65.52  75.49  83.16  88.31  90.78
SO YBADJ    COOL08    90.49  87.45  81.75  73.57  63.15  50.81


SO BUILDHGT COOL09    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL09    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL09    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL09    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL09    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL09    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL09   189.08 119.49  46.27  61.10 133.77 202.37
```

```
SO BUILDWID COOL09   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL09   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL09   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL09   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL09   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL09   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL09   355.85 309.09 252.92 189.08 119.49  46.27
SO BUILDLEN COOL09    61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL09   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL09   355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL09    61.10 133.77 202.37 264.83 319.24 363.95
SO XBADJ    COOL09  -267.00 -281.97 -288.36 -287.72 -279.48 -262.75
SO XBADJ    COOL09  -238.04 -206.09 -167.89 -124.58 -77.48 -28.03
SO XBADJ    COOL09   -22.46 -46.06 -68.25 -88.37 -105.81 -120.03
SO XBADJ    COOL09  -130.60 -137.21 -139.64 -139.56 -136.38 -129.06
SO XBADJ    COOL09  -117.81 -102.99 -85.04 -64.50 -42.01 -18.23
SO XBADJ    COOL09   -38.64 -87.71 -134.12 -176.46 -213.43 -243.92
SO YBADJ    COOL09    30.04  17.74   4.90  -8.09 -20.83 -32.94
SO YBADJ    COOL09   -44.04 -53.81 -61.95 -68.20 -72.38 -74.36
SO YBADJ    COOL09   -74.08 -71.55 -66.85 -60.11 -51.55 -41.42
SO YBADJ    COOL09   -30.04 -17.74  -4.90   8.09  20.83  32.94
SO YBADJ    COOL09    44.04  53.81  61.95  68.20  72.38  74.36
SO YBADJ    COOL09    74.08  71.55  66.85  60.11  51.55  41.42


SO BUILDHGT COOL10    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL10    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL10    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL10    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL10    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL10    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL10   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL10   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL10   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL10   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL10   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL10   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL10   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL10   355.85 309.09 252.92 189.08 119.49  46.27
SO BUILDLEN COOL10    61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL10   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL10   355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL10    61.10 133.77 202.37 264.83 319.24 363.95
SO XBADJ    COOL10  -252.00 -265.97 -271.85 -271.19 -263.44 -247.69
SO XBADJ    COOL10  -224.41 -194.31 -158.31 -117.49 -73.11 -26.51
SO XBADJ    COOL10   -23.83 -50.27 -75.19 -97.82 -117.48 -133.57
SO XBADJ    COOL10  -145.60 -153.21 -156.16 -156.09 -152.42 -144.12
SO XBADJ    COOL10  -131.45 -114.78 -94.62 -71.59 -46.38 -19.76
SO XBADJ    COOL10   -37.27 -83.50 -127.19 -167.01 -201.76 -230.38
SO YBADJ    COOL10    22.95  13.37   3.37  -6.72 -16.61 -26.00
SO YBADJ    COOL10   -34.60 -42.14 -48.41 -53.20 -56.38 -57.84
SO YBADJ    COOL10   -57.55 -55.51 -51.78 -46.48 -39.77 -31.84
SO YBADJ    COOL10   -22.95 -13.37  -3.37   6.72  16.61  26.00
SO YBADJ    COOL10    34.60  42.14  48.41  53.20  56.38  57.84
SO YBADJ    COOL10    57.55  55.51  51.78  46.48  39.77  31.84


SO BUILDHGT COOL11    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL11    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL11    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL11    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL11    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL11    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL11   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL11   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL11   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL11   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL11   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL11   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL11   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL11   355.85 309.09 252.92 189.08 119.49  46.27
SO BUILDLEN COOL11    61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL11   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL11   355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL11    61.10 133.77 202.37 264.83 319.24 363.95
SO XBADJ    COOL11  -236.68 -249.69 -255.11 -254.51 -247.31 -232.60
SO XBADJ    COOL11  -210.83 -182.65 -148.92 -110.66 -69.04 -25.33
SO XBADJ    COOL11   -25.57 -54.88 -82.53 -107.67 -129.54 -147.47
SO XBADJ    COOL11  -160.92 -169.48 -172.89 -172.77 -168.55 -159.21
```

```
SO XBADJ    COOL11  -145.02 -126.44 -104.01  -78.42  -50.45  -20.94
SO XBADJ    COOL11   -35.53  -78.89 -119.84 -157.16 -189.70 -216.48
SO YBADJ    COOL11    16.12    9.30    2.19   -4.98  -12.00  -18.66
SO YBADJ    COOL11   -24.75  -30.08  -34.51  -37.88  -40.11  -41.11
SO YBADJ    COOL11   -40.87  -39.38  -36.70  -32.90  -28.10  -22.45
SO YBADJ    COOL11   -16.12   -9.30   -2.19    4.98   12.00   18.66
SO YBADJ    COOL11    24.75   30.08   34.51   37.88   40.11   41.11
SO YBADJ    COOL11    40.87   39.38   36.70   32.90   28.10   22.45


SO BUILDHGT COOL12    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL12    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL12    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL12    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL12    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL12    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDWID COOL12   189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL12   264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL12   427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDWID COOL12   189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL12   264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL12   427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDLEN COOL12   397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL12   355.85  309.09  252.92  189.08  119.49   46.27
SO BUILDLEN COOL12    61.10  133.77  202.37  264.83  319.24  363.95
SO BUILDLEN COOL12   397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL12   355.85  309.08  252.92  189.08  119.49   46.27
SO BUILDLEN COOL12    61.10  133.77  202.37  264.83  319.24  363.95
SO XBADJ    COOL12  -222.53 -234.63 -239.60 -239.01 -232.31 -218.54
SO XBADJ    COOL12  -198.14 -171.72 -140.08 -104.18  -65.12  -24.07
SO XBADJ    COOL12   -27.03  -59.01  -89.20 -116.68 -140.62 -160.28
SO XBADJ    COOL12  -175.07 -184.54 -188.41 -188.27 -183.55 -173.27
SO XBADJ    COOL12  -157.71 -137.37 -112.85  -84.90  -54.37  -22.19
SO XBADJ    COOL12   -34.07  -74.76 -113.17 -148.15 -178.62 -203.67
SO YBADJ    COOL12     9.64    5.37    0.94   -3.52   -7.87  -11.98
SO YBADJ    COOL12   -15.73  -19.00  -21.70  -23.73  -25.05  -25.60
SO YBADJ    COOL12   -25.37  -24.38  -22.64  -20.21  -17.17  -13.61
SO YBADJ    COOL12    -9.64   -5.37   -0.94    3.52    7.87   11.98
SO YBADJ    COOL12    15.73   19.00   21.70   23.73   25.05   25.60
SO YBADJ    COOL12    25.37   24.38   22.64   20.21   17.17   13.61


SO BUILDHGT COOL13    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL13    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL13    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL13    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL13    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL13    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDWID COOL13   189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL13   264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL13   427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDWID COOL13   189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL13   264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL13   427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDLEN COOL13   397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL13   355.85  309.09  252.92  189.08  119.49   46.27
SO BUILDLEN COOL13    61.10  133.77  202.37  264.83  319.24  363.95
SO BUILDLEN COOL13   397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL13   355.85  309.08  252.92  189.08  119.49   46.27
SO BUILDLEN COOL13    61.10  133.77  202.37  264.83  319.24  363.95
SO XBADJ    COOL13  -206.96 -218.05 -222.52 -221.94 -215.77 -203.05
SO XBADJ    COOL13  -184.15 -159.66 -130.32  -97.01  -60.76  -22.67
SO XBADJ    COOL13   -28.61  -63.53  -96.52 -126.58 -152.80 -174.37
SO XBADJ    COOL13  -190.64 -201.12 -205.49 -205.33 -200.09 -188.76
SO XBADJ    COOL13  -171.70 -149.43 -122.61  -92.07  -58.73  -23.60
SO XBADJ    COOL13   -32.49  -70.24 -105.85 -138.25 -166.44 -189.58
SO YBADJ    COOL13     2.47    1.02   -0.47   -1.94   -3.35   -4.66
SO YBADJ    COOL13    -5.83   -6.82   -7.61   -8.16   -8.47   -8.52
SO YBADJ    COOL13    -8.31   -7.84   -7.14   -6.22   -5.12   -3.85
SO YBADJ    COOL13    -2.47   -1.02    0.47    1.94    3.35    4.66
SO YBADJ    COOL13     5.83    6.82    7.61    8.16    8.47    8.52
SO YBADJ    COOL13     8.31    7.84    7.14    6.22    5.12    3.85


SO BUILDHGT COOL14    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL14    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL14    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL14    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL14    11.30   11.30   11.30   11.30   11.30   11.30
```

```
SO BUILDHGT COOL14    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL14   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL14   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL14   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL14   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL14   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL14   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL14   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL14   355.85 309.09 252.92 189.08 119.49  46.27
SO BUILDLEN COOL14    61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL14   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL14   355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL14    61.10 133.77 202.37 264.83 319.24 363.95
SO XBADJ    COOL14  -188.95 -198.96 -202.93 -202.45 -196.97 -185.51
SO XBADJ    COOL14  -168.41 -146.19 -119.53 -89.23 -56.23 -21.52
SO XBADJ    COOL14   -30.88 -69.15 -105.32 -138.30 -167.06 -190.76
SO XBADJ    COOL14  -208.65 -220.21 -225.08 -224.82 -218.89 -206.30
SO XBADJ    COOL14  -187.45 -162.90 -133.40 -99.85 -63.26 -24.75
SO XBADJ    COOL14   -30.22 -64.62 -97.05 -126.54 -152.18 -173.19
SO YBADJ    COOL14    -5.31  -3.51  -1.62   0.33   2.27   4.14
SO YBADJ    COOL14     5.88   7.44   8.78   9.85  10.62  11.07
SO YBADJ    COOL14    11.19  10.96  10.40   9.52   8.36   6.94
SO YBADJ    COOL14     5.31   3.51   1.62  -0.33  -2.27  -4.14
SO YBADJ    COOL14    -5.88  -7.44  -8.78  -9.85 -10.62 -11.07
SO YBADJ    COOL14   -11.19 -10.96 -10.40  -9.52  -8.36  -6.94


SO BUILDHGT COOL15    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL15    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL15    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL15    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL15    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL15    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL15   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL15   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL15   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL15   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL15   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL15   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL15   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL15   355.85 309.09 252.92 189.08 119.49  46.27
SO BUILDLEN COOL15    61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL15   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL15   355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL15    61.10 133.77 202.37 264.83 319.24 363.95
SO XBADJ    COOL15  -174.38 -183.39 -186.82 -186.29 -181.25 -170.71
SO XBADJ    COOL15  -154.98 -134.53 -110.01 -82.13 -51.77 -19.83
SO XBADJ    COOL15   -32.01 -73.08 -111.92 -147.36 -178.32 -203.87
SO XBADJ    COOL15  -223.22 -235.79 -241.19 -240.99 -234.61 -221.10
SO XBADJ    COOL15  -200.88 -174.55 -142.92 -106.94 -67.72 -26.44
SO XBADJ    COOL15   -29.08 -60.69 -90.46 -117.47 -140.92 -160.08
SO YBADJ    COOL15   -12.41  -7.98  -3.31   1.47   6.19  10.73
SO YBADJ    COOL15    14.94  18.70  21.89  24.42  26.20  27.19
SO YBADJ    COOL15    27.35  26.68  25.20  22.95  20.01  16.46
SO YBADJ    COOL15    12.41   7.98   3.31  -1.47  -6.19 -10.73
SO YBADJ    COOL15   -14.94 -18.70 -21.89 -24.42 -26.20 -27.19
SO YBADJ    COOL15   -27.35 -26.68 -25.20 -22.95 -20.01 -16.46


SO BUILDHGT COOL16    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL16    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL16    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL16    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL16    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL16    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL16   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL16   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL16   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL16   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL16   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL16   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL16   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL16   355.85 309.09 252.92 189.08 119.49  46.27
SO BUILDLEN COOL16    61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL16   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL16   355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL16    61.10 133.77 202.37 264.83 319.24 363.95
SO XBADJ    COOL16  -159.17 -167.25 -170.26 -169.81 -165.35 -155.86
SO XBADJ    COOL16  -141.64 -123.12 -100.86 -75.53 -47.90 -18.82
```

```
SO XBADJ    COOL16   -33.90  -77.80 -119.33 -157.23 -190.36 -217.71
SO XBADJ    COOL16  -238.44 -251.92 -257.75 -257.47 -250.51 -235.95
SO XBADJ    COOL16  -214.21 -185.96 -152.07 -113.55  -71.59  -27.44
SO XBADJ    COOL16   -27.20  -55.97  -83.05 -107.60 -128.88 -146.24
SO YBADJ    COOL16   -19.01  -11.84   -4.31    3.35   10.91   18.14
SO YBADJ    COOL16    24.82   30.74   35.73   39.64   42.34   43.75
SO YBADJ    COOL16    43.83   42.58   40.04   36.28   31.42   25.61
SO YBADJ    COOL16    19.01   11.84    4.31   -3.35  -10.91  -18.14
SO YBADJ    COOL16   -24.82  -30.74  -35.73  -39.64  -42.34  -43.75
SO YBADJ    COOL16   -43.83  -42.58  -40.04  -36.28  -31.42  -25.61


SO BUILDHGT COOL17    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL17    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL17    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL17    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL17    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL17    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDWID COOL17   189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL17   264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL17   427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDWID COOL17   189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL17   264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL17   427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDLEN COOL17   397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL17   355.85  309.09  252.92  189.08  119.49   46.27
SO BUILDLEN COOL17    61.10  133.77  202.37  264.83  319.24  363.95
SO BUILDLEN COOL17   397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL17   355.85  309.08  252.92  189.08  119.49   46.27
SO BUILDLEN COOL17    61.10  133.77  202.37  264.83  319.24  363.95
SO XBADJ    COOL17  -144.60 -151.68 -154.15 -153.65 -149.64 -141.07
SO XBADJ    COOL17  -128.22 -111.48  -91.35  -68.44  -43.45  -17.14
SO XBADJ    COOL17   -35.04  -81.73 -125.93 -166.30 -201.62 -230.82
SO XBADJ    COOL17  -253.00 -267.49 -273.86 -273.63 -266.23 -250.74
SO XBADJ    COOL17  -227.63 -197.61 -161.58 -120.64  -76.04  -29.13
SO XBADJ    COOL17   -26.05  -52.04  -76.45  -98.53 -117.62 -133.13
SO YBADJ    COOL17   -26.10  -16.29   -5.99    4.49   14.84   24.74
SO YBADJ    COOL17    33.89   42.00   48.84   54.20   57.91   59.86
SO YBADJ    COOL17    59.99   58.30   54.83   49.70   43.06   35.12
SO YBADJ    COOL17    26.10   16.29    5.99   -4.49  -14.84  -24.74
SO YBADJ    COOL17   -33.89  -42.00  -48.84  -54.20  -57.91  -59.86
SO YBADJ    COOL17   -59.99  -58.30  -54.83  -49.70  -43.06  -35.12


SO BUILDHGT COOL18    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL18    76.20   76.20   11.30   11.30   11.30   11.30
SO BUILDHGT COOL18    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL18    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL18    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL18    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDWID COOL18   189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL18    68.81   68.20  363.95  397.60  419.17  428.01
SO BUILDWID COOL18   427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDWID COOL18   189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL18   264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL18   427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDLEN COOL18   397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL18    42.42   32.35  252.92  189.08  119.49   46.27
SO BUILDLEN COOL18    61.10  133.77  202.37  264.83  319.24  363.95
SO BUILDLEN COOL18   397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL18   355.85  309.08  252.92  189.08  119.49   46.27
SO BUILDLEN COOL18    61.10  133.77  202.37  264.83  319.24  363.95
SO XBADJ    COOL18  -129.53 -135.65 -137.65 -137.19 -133.71 -126.16
SO XBADJ    COOL18  -371.10 -367.39  -82.02  -61.62  -39.36  -15.89
SO XBADJ    COOL18   -36.68  -86.19 -133.09 -175.95 -213.45 -244.48
SO XBADJ    COOL18  -268.07 -283.52 -290.35 -290.09 -282.15 -265.65
SO XBADJ    COOL18  -241.07 -209.17 -170.91 -127.46  -80.13  -30.38
SO XBADJ    COOL18   -24.42  -47.57  -69.28  -88.88 -105.79 -119.47
SO YBADJ    COOL18   -32.92  -20.39   -7.24    6.13   19.31   31.91
SO YBADJ    COOL18    38.26  -23.08   62.50   69.27   73.93   76.35
SO YBADJ    COOL18    76.45   74.22   69.74   63.14   54.62   44.45
SO YBADJ    COOL18    32.92   20.39    7.24   -6.13  -19.31  -31.91
SO YBADJ    COOL18   -43.53  -53.83  -62.50  -69.27  -73.93  -76.35
SO YBADJ    COOL18   -76.45  -74.22  -69.74  -63.14  -54.62  -44.45


SO BUILDHGT COOL19    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL19    76.20   76.20   11.30   11.30   11.30   11.30
SO BUILDHGT COOL19    11.30   11.30   11.30   11.30   11.30   11.30
```

```
SO BUILDHGT COOL19    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL19    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL19    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL19   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL19    68.83  68.20 363.95 397.60 419.17 428.01
SO BUILDWID COOL19   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL19   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL19   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL19   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL19   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL19    42.42  32.35 252.92 189.08 119.49  46.27
SO BUILDLEN COOL19    61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL19   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL19   355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL19    61.10 133.77 202.37 264.83 319.24 363.95
SO XBADJ    COOL19  -114.46 -119.62 -121.16 -120.73 -117.78 -111.25
SO XBADJ    COOL19  -357.66 -355.83 -72.69 -54.81 -35.26 -14.64
SO XBADJ    COOL19   -38.31 -90.66 -140.26 -185.59 -225.29 -258.14
SO XBADJ    COOL19  -283.14 -299.55 -306.85 -306.55 -298.08 -280.56
SO XBADJ    COOL19  -254.51 -220.73 -180.24 -134.27 -84.23 -31.63
SO XBADJ    COOL19   -22.79 -43.11 -62.12 -79.24 -93.95 -105.81
SO YBADJ    COOL19   -39.73 -24.48  -8.49   7.76  23.78  39.07
SO YBADJ    COOL19    47.90 -11.25  76.16  84.34  89.96  92.85
SO YBADJ    COOL19    92.91  90.15  84.65  76.58  66.18  53.78
SO YBADJ    COOL19    39.73  24.48   8.49  -7.76 -23.78 -39.07
SO YBADJ    COOL19   -53.18 -65.67 -76.16 -84.34 -89.96 -92.85
SO YBADJ    COOL19   -92.91 -90.15 -84.65 -76.58 -66.18 -53.78


SO BUILDHGT COOL20    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL20    76.20  76.20  76.20  11.30  11.30  11.30
SO BUILDHGT COOL20    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL20    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL20    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL20    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL20   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL20    68.82  68.20  65.50 397.60 419.17 428.01
SO BUILDWID COOL20   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL20   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL20   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL20   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL20   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL20    42.42  32.35  21.30 189.08 119.49  46.27
SO BUILDLEN COOL20    61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL20   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL20   355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL20    61.10 133.77 202.37 264.83 319.24 363.95
SO XBADJ    COOL20   -99.58 -103.84 -104.95 -104.60 -102.21 -96.72
SO XBADJ    COOL20  -344.60 -344.65 -334.22 -48.32 -31.46 -13.64
SO XBADJ    COOL20   -40.14 -95.26 -147.49 -195.24 -237.05 -271.67
SO XBADJ    COOL20  -298.03 -315.33 -323.05 -322.68 -313.65 -295.09
SO XBADJ    COOL20  -267.57 -231.91 -189.21 -140.76 -88.03 -32.63
SO XBADJ    COOL20   -20.96 -38.51 -54.88 -69.59 -82.19 -92.28
SO YBADJ    COOL20   -46.22 -28.29  -9.49   9.59  28.38  46.30
SO YBADJ    COOL20    57.55   0.52 -56.53  99.23 105.74 109.05
SO YBADJ    COOL20   109.04 105.72  99.19  89.64  77.37  62.75
SO YBADJ    COOL20    46.22  28.29   9.49  -9.59 -28.38 -46.30
SO YBADJ    COOL20   -62.82 -77.43 -89.69 -99.23 -105.74 -109.05
SO YBADJ    COOL20  -109.04 -105.72 -99.19 -89.64 -77.37 -62.75


SO BUILDHGT COOL21    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL21    76.20  76.20  76.20  11.30  11.30  11.30
SO BUILDHGT COOL21    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL21    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL21    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL21    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL21   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL21    68.71  68.20  65.50 397.60 419.17 428.01
SO BUILDWID COOL21   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL21   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL21   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL21   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL21   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL21    42.42  32.35  21.30 189.08 119.49  46.27
SO BUILDLEN COOL21    61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL21   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL21   355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL21    61.10 133.77 202.37 264.83 319.24 363.95
```

```
SO XBADJ    COOL21   -84.62 -87.86 -88.43 -88.04 -86.12 -81.58
SO XBADJ    COOL21  -330.87 -332.75 -324.52 -41.11 -26.95 -11.98
SO XBADJ    COOL21   -41.37 -99.35 -154.31 -204.59 -248.64 -285.15
SO XBADJ    COOL21  -312.99 -331.31 -339.58 -339.24 -329.75 -310.23
SO XBADJ    COOL21  -281.29 -243.80 -198.91 -147.97 -92.54 -34.29
SO XBADJ    COOL21   -19.73 -34.42 -48.06 -60.24 -70.60 -78.80
SO YBADJ    COOL21   -53.43 -32.79 -11.15  10.82  32.47  53.13
SO YBADJ    COOL21    66.90  12.11 -43.05 114.18 121.73 125.57
SO YBADJ    COOL21   125.60 121.81 114.33 103.36  89.26  72.45
SO YBADJ    COOL21    53.43  32.79  11.15 -10.82 -32.47 -53.13
SO YBADJ    COOL21   -72.17 -89.02 -103.17 -114.18 -121.73 -125.57
SO YBADJ    COOL21  -125.60 -121.81 -114.33 -103.36 -89.26 -72.45


SO BUILDHGT COOL22    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL22    11.30  76.20  76.20  11.30  11.30  11.30
SO BUILDHGT COOL22    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL22    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL22    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL22    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL22   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL22   264.83  68.20  65.50 397.60 419.17 428.01
SO BUILDWID COOL22   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL22   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL22   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL22   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL22   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL22   355.85  32.35  21.30 189.08 119.49  46.27
SO BUILDLEN COOL22    61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL22   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL22   355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL22    61.10 133.77 202.37 264.83 319.24 363.95
SO XBADJ    COOL22   -69.91 -72.18 -72.26 -71.86 -70.43 -66.85
SO XBADJ    COOL22   -61.25 -321.26 -315.19 -34.23 -22.73 -10.54
SO XBADJ    COOL22   -42.76 -103.53 -161.16 -213.88 -260.11 -298.44
SO XBADJ    COOL22  -327.69 -346.99 -355.75 -355.42 -345.43 -324.96
SO XBADJ    COOL22  -294.60 -255.30 -208.24 -154.85 -96.76 -35.72
SO XBADJ    COOL22   -18.33 -30.23 -41.22 -50.95 -59.13 -65.51
SO YBADJ    COOL22   -60.31 -37.01 -12.59  12.22  36.65  59.97
SO YBADJ    COOL22    81.47  23.58 -29.76 128.89 137.41 141.75
SO YBADJ    COOL22   141.78 137.50 129.05 116.68 100.76  81.78
SO YBADJ    COOL22    60.31  37.01  12.59 -12.22 -36.65 -59.97
SO YBADJ    COOL22   -81.47 -100.49 -116.46 -128.89 -137.41 -141.75
SO YBADJ    COOL22  -141.78 -137.50 -129.05 -116.68 -100.76 -81.78


SO BUILDHGT COOL23    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL23    11.30  76.20  76.20  76.20  11.30  11.30
SO BUILDHGT COOL23    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL23    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL23    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL23    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL23   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL23   264.83  68.16  65.50  68.16 419.17 428.01
SO BUILDWID COOL23   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL23   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL23   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL23   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL23   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL23   355.85  32.35  21.30  32.35 119.49  46.27
SO BUILDLEN COOL23    61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL23   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL23   355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL23    61.10 133.77 202.37 264.83 319.24 363.95
SO XBADJ    COOL23   -55.08 -56.45 -56.10 -55.77 -54.90 -52.35
SO XBADJ    COOL23   -48.22 -310.09 -306.23 -304.44 -18.92 -9.53
SO XBADJ    COOL23   -44.57 -108.10 -168.35 -223.49 -271.83 -311.92
SO XBADJ    COOL23  -342.52 -362.73 -371.90 -371.50 -360.96 -339.46
SO XBADJ    COOL23  -307.63 -266.46 -217.20 -161.33 -100.57 -36.74
SO XBADJ    COOL23   -16.53 -25.67 -34.02 -41.34 -47.41 -52.03
SO YBADJ    COOL23   -66.79 -40.82 -13.61  14.02  41.22  67.16
SO YBADJ    COOL23    91.07  35.30 -16.28 -67.36 153.14 157.90
SO YBADJ    COOL23   157.87 153.03 143.55 129.71 111.92  90.74
SO YBADJ    COOL23    66.79  40.82  13.61 -14.02 -41.22 -67.16
SO YBADJ    COOL23   -91.07 -112.21 -129.94 -143.72 -153.14 -157.90
SO YBADJ    COOL23  -157.87 -153.03 -143.55 -129.71 -111.92 -90.74


SO BUILDHGT COOL24    11.30  11.30  11.30  11.30  11.30  11.30
```

```
SO BUILDHGT COOL24    11.30  76.20  76.20  76.20  11.30  11.30
SO BUILDHGT COOL24    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL24    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL24    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL24    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL24   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL24   264.83  67.61  65.50  67.61 419.17 428.01
SO BUILDWID COOL24   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL24   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL24   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL24   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL24   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL24   355.85  32.35  21.30  32.35 119.49  46.27
SO BUILDLEN COOL24    61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL24   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL24   355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL24    61.10 133.77 202.37 264.83 319.24 363.95
SO XBADJ    COOL24   -39.59 -39.95 -39.11 -38.80 -38.46 -36.94
SO XBADJ    COOL24   -34.31 -298.11 -296.53 -297.32 -14.60  -8.13
SO XBADJ    COOL24   -46.15 -112.61 -175.64 -233.34 -283.95 -325.94
SO XBADJ    COOL24  -358.02 -379.22 -388.90 -388.48 -377.41 -354.87
SO XBADJ    COOL24  -321.54 -278.45 -226.90 -168.45 -104.89 -38.13
SO XBADJ    COOL24   -14.95 -21.16 -26.73 -31.49 -35.29 -38.01
SO YBADJ    COOL24   -73.91 -45.14 -15.00  15.60  45.72  74.46
SO YBADJ    COOL24   100.93  47.42  -2.26 -51.87 169.63 174.89
SO YBADJ    COOL24   174.84 169.48 158.96 143.62 123.91 100.44
SO YBADJ    COOL24    73.91  45.14  15.00 -15.60 -45.72 -74.46
SO YBADJ    COOL24  -100.93 -124.33 -143.96 -159.22 -169.63 -174.89
SO YBADJ    COOL24  -174.84 -169.48 -158.96 -143.62 -123.91 -100.44


SO BUILDHGT COOL25    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL25    11.30  76.20  76.20  76.20  11.30  11.30
SO BUILDHGT COOL25    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL25    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL25    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL25    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL25   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL25   264.83  68.07  65.50  68.07 419.17 428.01
SO BUILDWID COOL25   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL25   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL25   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL25   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL25   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL25   355.85  32.35  21.30  32.35 119.49  46.27
SO BUILDLEN COOL25    61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL25   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL25   355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL25    61.10 133.77 202.37 264.83 319.24 363.95
SO XBADJ    COOL25   -24.75 -24.22 -22.96 -22.71 -22.93 -22.44
SO XBADJ    COOL25   -21.28 -286.94 -287.57 -290.84 -10.79  -7.12
SO XBADJ    COOL25   -47.95 -117.17 -182.84 -242.95 -295.67 -339.42
SO XBADJ    COOL25  -372.85 -394.95 -405.05 -404.56 -392.93 -369.37
SO XBADJ    COOL25  -334.57 -289.62 -235.86 -174.93 -108.70 -39.15
SO XBADJ    COOL25   -13.15 -16.60 -19.54 -21.88 -23.57 -24.53
SO YBADJ    COOL25   -80.40 -48.95 -16.02  17.40  50.29  81.65
SO YBADJ    COOL25   110.53  59.14  11.22 -37.04 185.36 191.05
SO YBADJ    COOL25   190.93 185.00 173.46 156.65 135.07 109.40
SO YBADJ    COOL25    80.40  48.95  16.02 -17.40 -50.29 -81.65
SO YBADJ    COOL25  -110.53 -136.05 -157.44 -174.05 -185.36 -191.05
SO YBADJ    COOL25  -190.93 -185.00 -173.46 -156.65 -135.07 -109.40


SO BUILDHGT COOL26    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL26    11.30  11.30  82.30  82.30  76.20  11.30
SO BUILDHGT COOL26    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL26    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL26    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL26    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL26   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL26   264.83 319.24  65.87  89.27  68.83 428.01
SO BUILDWID COOL26   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL26   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL26   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL26   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL26   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL26   355.85 309.09 140.50 149.80  42.42  46.27
SO BUILDLEN COOL26    61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL26   397.60 419.17 428.01 427.28 415.86 391.81
```

```
SO BUILDLEN COOL26   355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL26    61.10 133.77 202.37 264.83 319.24 363.95
SO XBADJ    COOL26   -10.08  -8.61  -6.87  -6.65  -7.37  -7.87
SO XBADJ    COOL26    -8.14  -8.15 -534.54 -535.23 -281.21  -5.84
SO XBADJ    COOL26   -49.48 -121.47 -189.77 -252.31 -307.17 -352.71
SO XBADJ    COOL26  -387.52 -410.57 -421.13 -420.63 -408.49 -383.93
SO XBADJ    COOL26  -347.72 -300.94 -245.01 -181.64 -112.75  -40.43
SO XBADJ    COOL26   -11.62 -12.30 -12.60 -12.52 -12.07 -11.24
SO YBADJ    COOL26   -87.10 -53.00 -17.30  18.93  54.59  88.59
SO YBADJ    COOL26   119.89 147.55  17.82 -63.07 -68.55 207.13
SO YBADJ    COOL26   206.99 200.56 188.03 169.79 146.39 118.55
SO YBADJ    COOL26    87.10  53.00  17.30 -18.93 -54.59 -88.59
SO YBADJ    COOL26  -119.89 -147.55 -170.73 -188.72 -200.98 -207.13
SO YBADJ    COOL26  -206.99 -200.56 -188.03 -169.79 -146.39 -118.55


SO BUILDHGT UNIT3    32.00  82.30  82.30  82.30  82.30  33.90
SO BUILDHGT UNIT3    32.00  32.00  32.00  32.00  32.00  32.00
SO BUILDHGT UNIT3    32.00  32.00  32.00  32.00  32.00  32.00
SO BUILDHGT UNIT3    32.00  32.00  32.00  32.00  32.00  32.00
SO BUILDHGT UNIT3    32.00  32.00  32.00  32.00  32.00  32.00
SO BUILDHGT UNIT3    32.00  32.00  32.00  32.00  32.00  32.00
SO BUILDWID UNIT3    32.94 154.55 154.61  83.75  85.21  59.64
SO BUILDWID UNIT3    44.37  43.23  41.05  43.19  44.29  44.32
SO BUILDWID UNIT3    32.46  34.15  34.80  34.39  32.94  30.48
SO BUILDWID UNIT3    32.94  34.39  34.80  34.15  32.46  44.43
SO BUILDWID UNIT3    44.37  43.23  41.05  43.19  44.29  44.32
SO BUILDWID UNIT3    32.46  34.15  34.80  34.39  32.94  30.48
SO BUILDLEN UNIT3    21.84 109.95 127.29  85.21  83.75  80.81
SO BUILDLEN UNIT3    34.39  32.94  30.48  32.94  34.48  38.38
SO BUILDLEN UNIT3    34.15  32.46  29.79  26.21  21.84  16.80
SO BUILDLEN UNIT3    21.84  26.21  29.79  32.46  34.15  38.18
SO BUILDLEN UNIT3    34.39  32.94  30.48  32.94  34.48  38.38
SO BUILDLEN UNIT3    34.15  32.46  29.79  26.21  21.84  16.80
SO XBADJ    UNIT3   -34.88 -345.41 -367.70 -323.26 -378.43 -205.95
SO XBADJ    UNIT3   -25.46 -20.63 -15.18 -12.18  -8.81  -5.18
SO XBADJ    UNIT3    -1.38   2.45   6.21   9.79  13.06  15.94
SO XBADJ    UNIT3    13.04   9.74   6.15   2.37  -1.48  -5.28
SO XBADJ    UNIT3    -8.93 -12.30 -15.30 -20.76 -25.67 -33.20
SO XBADJ    UNIT3   -32.77 -34.92 -36.00 -36.00 -34.90 -32.74
SO YBADJ    UNIT3    -4.29 103.84  51.82 -34.87 -27.51 -22.39
SO YBADJ    UNIT3   -31.97 -34.67 -36.46 -34.63 -31.89 -28.31
SO YBADJ    UNIT3   -18.60 -15.60 -12.12  -8.27  -4.17   0.06
SO YBADJ    UNIT3     4.29   8.38  12.22  15.69  18.68  28.43
SO YBADJ    UNIT3    31.97  34.67  36.46  34.63  31.89  28.31
SO YBADJ    UNIT3    18.60  15.60  12.12   8.27   4.17  -0.06


SO BUILDHGT EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT EP1     82.30  82.30  82.30   0.00   0.00   0.00
SO BUILDHGT EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID EP1    109.95  89.27  65.87   0.00   0.00   0.00
SO BUILDWID EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDLEN EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDLEN EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDLEN EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDLEN EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDLEN EP1    154.55 149.80  54.06   0.00   0.00   0.00
SO BUILDLEN EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO XBADJ    EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO XBADJ    EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO XBADJ    EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO XBADJ    EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO XBADJ    EP1   -388.01 -390.37 -380.86   0.00   0.00   0.00
SO XBADJ    EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO YBADJ    EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO YBADJ    EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO YBADJ    EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO YBADJ    EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO YBADJ    EP1     54.43  -0.36 -55.13   0.00   0.00   0.00
SO YBADJ    EP1      0.00   0.00   0.00   0.00   0.00   0.00
```

```
SO BUILDHGT EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT EP2     82.30  82.30  82.30   0.00   0.00   0.00
SO BUILDHGT EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID EP2    109.95  89.27  65.87   0.00   0.00   0.00
SO BUILDWID EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDLEN EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDLEN EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDLEN EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDLEN EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDLEN EP2    154.55 149.80  54.06   0.00   0.00   0.00
SO BUILDLEN EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO XBADJ    EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO XBADJ    EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO XBADJ    EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO XBADJ    EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO XBADJ    EP2   -447.61 -456.20 -364.48   0.00   0.00   0.00
SO XBADJ    EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO YBADJ    EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO YBADJ    EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO YBADJ    EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO YBADJ    EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO YBADJ    EP2     95.52  29.76 -36.90   0.00   0.00   0.00
SO YBADJ    EP2      0.00   0.00   0.00   0.00   0.00   0.00


SO BUILDHGT EP3     30.50  30.50  30.50  30.50  30.50  30.50
SO BUILDHGT EP3     30.50  30.50  30.50  30.50  30.50  42.70
SO BUILDHGT EP3     42.70  42.70  42.70  42.70  30.50  30.50
SO BUILDHGT EP3     30.50  30.50  30.50  30.50  30.50  30.50
SO BUILDHGT EP3     30.50  30.50  30.50  30.50  30.50  30.50
SO BUILDHGT EP3     30.50  30.50  30.50  30.50  30.50  30.50
SO BUILDWID EP3     17.61  19.48  20.76  21.41  21.41  20.76
SO BUILDWID EP3     19.48  17.61  15.20  17.61  19.48 106.13
SO BUILDWID EP3    122.48 135.12 143.65 147.81  17.61  15.20
SO BUILDWID EP3     42.14  46.40  49.25  21.41  21.41  20.76
SO BUILDWID EP3     19.48  17.61  15.20  17.61  19.48  20.76
SO BUILDWID EP3     21.41  21.41  20.76  19.48  17.61  15.20
SO BUILDLEN EP3     17.61  19.48  20.76  21.41  21.41  20.76
SO BUILDLEN EP3     19.48  17.61  15.20  17.61  19.48 143.65
SO BUILDLEN EP3    135.12 122.48 106.13  86.55  17.61  15.20
SO BUILDLEN EP3     40.92  45.50  48.70  21.41  21.41  20.76
SO BUILDLEN EP3     19.48  17.61  15.20  17.61  19.48  20.76
SO BUILDLEN EP3     21.41  21.41  20.76  19.48  17.61  15.20
SO XBADJ    EP3     -7.78  -8.63  -9.22  -9.53  -9.54  -9.27
SO XBADJ    EP3     -8.72  -7.90  -6.84  -8.21  -9.34 -275.37
SO XBADJ    EP3   -280.29 -276.70 -264.71 -244.67  -9.56  -8.51
SO XBADJ    EP3   -180.77 -183.62 -180.90 -11.89 -11.87 -11.49
SO XBADJ    EP3    -10.76  -9.71  -8.36  -9.40 -10.15 -10.59
SO XBADJ    EP3    -10.71 -10.50  -9.98  -9.15  -8.04  -6.69
SO YBADJ    EP3     -0.59  -0.40  -0.21   0.00   0.20   0.40
SO YBADJ    EP3      0.59   0.76   0.91   1.02   1.11  70.74
SO YBADJ    EP3     34.32  -3.14 -40.51 -76.64   0.91   0.76
SO YBADJ    EP3     17.27 -10.83 -38.60   0.00  -0.20  -0.40
SO YBADJ    EP3     -0.59  -0.76  -0.91  -1.02  -1.11  -1.16
SO YBADJ    EP3     -1.18  -1.16  -1.11  -1.02  -0.91  -0.76


SO BUILDHGT EP4     76.20  76.20  76.20  76.20  76.20  76.20
SO BUILDHGT EP4     82.30  82.30  82.30  82.30  82.30  82.30
SO BUILDHGT EP4     76.20  76.20  76.20  76.20  76.20  76.20
SO BUILDHGT EP4     76.20  76.20  76.20  76.20  76.20  76.20
SO BUILDHGT EP4     82.30  82.30  82.30  82.30  82.30  82.30
SO BUILDHGT EP4     76.20  76.20  76.20  76.20  76.20  76.20
SO BUILDWID EP4     32.35  42.42  51.20  58.42  63.87  67.37
SO BUILDWID EP4    109.95  89.27  65.87  89.27 109.95  84.08
SO BUILDWID EP4     63.87  58.42  51.20  42.42  32.35  21.30
SO BUILDWID EP4     32.35  42.42  51.20  58.42  63.87  67.37
SO BUILDWID EP4    109.95  89.27  65.87  89.27 109.95  84.08
SO BUILDWID EP4     63.87  58.42  51.20  42.42  32.35  21.30
SO BUILDLEN EP4     68.20  68.83  67.37  63.87  58.42  51.20
SO BUILDLEN EP4    154.55 149.80  54.06 149.80 154.55  79.75
```

```
SO BUILDLEN EP4     58.42  63.87  67.37  68.83  68.20  65.50
SO BUILDLEN EP4     68.20  68.83  67.37  63.87  58.42  51.20
SO BUILDLEN EP4    154.55 149.80  54.06 149.80 154.55  79.75
SO BUILDLEN EP4     58.42  63.87  67.37  68.83  68.20  65.50
SO XBADJ    EP4    -13.95 -15.29 -16.17 -16.55 -16.43 -15.81
SO XBADJ    EP4   -257.73 -266.59 -267.34 -271.40 -267.22 -180.07
SO XBADJ    EP4    -42.86 -48.05 -51.78 -53.93 -54.45 -53.31
SO XBADJ    EP4    -54.25 -53.54 -51.21 -47.32 -41.99 -35.38
SO XBADJ    EP4    103.18 116.79 126.84 121.60 112.67 100.32
SO XBADJ    EP4    -15.56 -15.82 -15.60 -14.90 -13.75 -12.19
SO YBADJ    EP4      4.13   7.57  10.78  13.65  16.12  18.09
SO YBADJ    EP4     80.44  47.89  13.87 -20.56 -54.37 -64.92
SO YBADJ    EP4     15.38  12.78   9.79   6.50   3.01  -0.57
SO YBADJ    EP4     -4.13  -7.57 -10.78 -13.65 -16.12 -18.09
SO YBADJ    EP4    -80.44 -47.89 -13.87  20.56  54.37  64.92
SO YBADJ    EP4    -15.38 -12.78  -9.79  -6.50  -3.01   0.57


SO BUILDHGT EP5     82.30  82.30  82.30  33.90  33.90  18.90
SO BUILDHGT EP5     18.90  18.90  18.90  18.90  18.90  18.90
SO BUILDHGT EP5     18.90  18.90  18.90  18.90  18.90  18.90
SO BUILDHGT EP5     18.90  18.90  18.90  18.90  18.90  18.90
SO BUILDHGT EP5     18.90  18.90  18.90  32.00  32.00  32.00
SO BUILDHGT EP5     18.90  18.90  33.90  33.90  82.30  82.30
SO BUILDWID EP5    149.80 154.55 154.61  75.99  68.86  23.35
SO BUILDWID EP5     22.33  20.63  18.30  20.63  22.33  23.35
SO BUILDWID EP5     23.66  23.25  22.14  20.35  17.95  15.00
SO BUILDWID EP5     17.95  20.35  22.14  23.25  23.66  23.35
SO BUILDWID EP5     22.33  20.63  18.30  43.19  44.29  44.32
SO BUILDWID EP5     23.66  23.25  80.81  83.18 149.80 140.50
SO BUILDLEN EP5     89.27 109.95 127.29  68.86  75.99  22.14
SO BUILDLEN EP5     20.35  17.95  15.00  17.95  20.35  22.14
SO BUILDLEN EP5     23.25  23.66  23.35  22.33  20.63  18.30
SO BUILDLEN EP5     20.63  22.33  23.35  23.66  23.25  22.14
SO BUILDLEN EP5     20.35  17.95  15.00  32.94  34.48  38.38
SO BUILDLEN EP5     23.25  23.66  59.64  48.60  89.27  65.87
SO XBADJ    EP5   -314.80 -319.77 -315.01 -205.49 -206.01 -10.23
SO XBADJ    EP5     -8.61  -6.73  -4.65  -5.60  -6.38  -6.97
SO XBADJ    EP5     -7.35  -7.50  -7.42  -7.12  -6.61  -5.89
SO XBADJ    EP5     -7.60  -9.07 -10.28 -11.17 -11.72 -11.91
SO XBADJ    EP5    -11.74 -11.22 -10.35 -180.78 -183.64 -184.32
SO XBADJ    EP5    -15.91 -16.16 -156.74 -156.99 -301.02 -300.27
SO YBADJ    EP5     -7.34 -54.14 -99.30  -2.57 -32.23  -4.25
SO YBADJ    EP5     -4.04  -3.71  -3.26  -2.72  -2.09  -1.40
SO YBADJ    EP5     -0.66   0.09   0.84   1.56   2.24   2.85
SO YBADJ    EP5      3.37   3.80   4.10   4.28   4.33   4.25
SO YBADJ    EP5      4.04   3.71   3.26  36.81   6.24 -24.38
SO YBADJ    EP5      0.66  -0.09  44.35  21.64  85.51  39.69


SO BUILDHGT EP6     76.20  76.20  76.20  76.20  82.30  82.30
SO BUILDHGT EP6     82.30  82.30  25.90  33.90  33.90  25.90
SO BUILDHGT EP6     25.90  32.00  32.00  32.00  32.00  33.50
SO BUILDHGT EP6     25.90  76.20  76.20  76.20  76.20  76.20
SO BUILDHGT EP6     25.90  25.90  25.90  25.90  25.90  25.90
SO BUILDHGT EP6     25.90  25.90  25.90  25.90  25.90  33.50
SO BUILDWID EP6     32.35  42.42  51.20  58.42  85.21  84.08
SO BUILDWID EP6    109.95  89.27  33.60  36.09  48.60  56.55
SO BUILDWID EP6     65.30  41.21  34.80  34.39  32.94  88.10
SO BUILDWID EP6     78.74  42.42  51.20  58.42  63.87  67.37
SO BUILDWID EP6     46.08  34.21  33.60  34.21  46.08  56.55
SO BUILDWID EP6     65.30  72.06  76.64  78.89  78.74  88.10
SO BUILDLEN EP6     68.20  68.83  67.37  63.87  83.75  79.75
SO BUILDLEN EP6    154.55 149.80  90.32  83.02  83.18  76.64
SO BUILDLEN EP6     72.06  43.42  29.79  26.21  21.84 112.87
SO BUILDLEN EP6     34.21  68.83  67.37  63.87  58.42  51.20
SO BUILDLEN EP6     78.89  78.74  90.32  78.74  78.89  76.64
SO BUILDLEN EP6     72.06  65.30  56.55  46.08  34.21  47.00
SO XBADJ    EP6   -139.02 -142.67 -141.97 -136.97 -262.20 -339.98
SO XBADJ    EP6   -341.23 -332.10 -83.70 -221.94 -219.07 -86.03
SO XBADJ    EP6    -81.53 -128.30 -131.23 -130.19 -125.18  65.66
SO XBADJ    EP6    -25.38  73.83  74.60  73.10  69.38  63.55
SO XBADJ    EP6     -2.22   2.68  -6.62   8.39   9.03   9.39
SO XBADJ    EP6      9.47   9.26   8.77   8.01   7.00 -178.53
SO YBADJ    EP6     28.33   9.68  -9.26 -27.93  47.67  51.91
SO YBADJ    EP6    -15.77 -61.37  10.29  -1.20 -32.51  -8.56
SO YBADJ    EP6    -16.72  30.89  14.44  -5.99 -26.23 -51.05
SO YBADJ    EP6    -47.76  -9.68   9.26  27.93  45.74  62.16
SO YBADJ    EP6    -31.05 -24.11 -10.29  -8.27   0.15   8.56
```

```
SO YBADJ    EP6      16.72  24.37  31.27  37.23  42.05  51.05


SO BUILDHGT U3ZLDSD   30.50  30.50  30.50  30.50  30.50  30.50
SO BUILDHGT U3ZLDSD   30.50  42.70  42.70  42.70  42.70  30.50
SO BUILDHGT U3ZLDSD   30.50  30.50  30.50  30.50  30.50  30.50
SO BUILDHGT U3ZLDSD   30.50  30.50  30.50  30.50  30.50  30.50
SO BUILDHGT U3ZLDSD   30.50  30.50  30.50  30.50  30.50  30.50
SO BUILDHGT U3ZLDSD   30.50  30.50  30.50  30.50  30.50  30.50
SO BUILDWID U3ZLDSD   42.14  46.40  49.25  50.60  50.41  48.70
SO BUILDWID U3ZLDSD   45.50  64.34  40.17  64.34  86.55  48.70
SO BUILDWID U3ZLDSD   50.41  50.60  49.25  46.40  42.14  36.60
SO BUILDWID U3ZLDSD   42.14  46.40  49.25  50.60  50.41  48.70
SO BUILDWID U3ZLDSD   45.50  40.92  35.10  40.92  45.50  48.70
SO BUILDWID U3ZLDSD   50.41  50.60  49.25  46.40  42.14  36.60
SO BUILDLEN U3ZLDSD   40.92  45.50  48.70  50.41  50.60  49.25
SO BUILDLEN U3ZLDSD   46.40 147.49 142.68 147.49 147.81  49.25
SO BUILDLEN U3ZLDSD   50.60  50.41  48.70  45.50  40.92  35.10
SO BUILDLEN U3ZLDSD   40.92  45.50  48.70  50.41  50.60  49.25
SO BUILDLEN U3ZLDSD   46.40  42.14  36.60  42.14  46.40  49.25
SO BUILDLEN U3ZLDSD   50.60  50.41  48.70  45.50  40.92  35.10
SO XBADJ    U3ZLDSD  -22.50 -25.82 -28.36 -30.03 -30.79 -30.62
SO XBADJ    U3ZLDSD  -29.51 -261.69 -263.46 -264.20 -256.91 -29.67
SO XBADJ    U3ZLDSD  -29.57 -28.58 -26.72 -24.04 -20.64 -16.60
SO XBADJ    U3ZLDSD  -18.42 -19.68 -20.34 -20.38 -19.81 -18.63
SO XBADJ    U3ZLDSD  -16.89 -14.63 -11.93 -14.96 -17.53 -19.58
SO XBADJ    U3ZLDSD  -21.03 -21.84 -21.98 -21.46 -20.29 -18.50
SO YBADJ    U3ZLDSD    6.11   5.67   5.05   4.27   3.37   2.37
SO YBADJ    U3ZLDSD    1.29  40.47   7.21 -26.26 -58.93  -4.01
SO YBADJ    U3ZLDSD   -4.82  -5.49  -5.99  -6.31  -6.44  -6.37
SO YBADJ    U3ZLDSD   -6.11  -5.67  -5.05  -4.27  -3.37  -2.37
SO YBADJ    U3ZLDSD   -1.29  -0.17   0.95   2.04   3.07   4.01
SO YBADJ    U3ZLDSD    4.82   5.49   5.99   6.31   6.44   6.37
```

```
'D:\Projects\seci\lakes\seci1.isc'
'P'
'METERS'  1.00000000
'UTMY'  0.0000
17
'U3WESP'  1       25.000  'unit 3 Wet ESP'
  4       32.000
        439032.771    3289302.001
        439032.771    3289318.801
        439063.253    3289318.801
        439063.253    3289302.001
'U3ESP'  1       25.000  'unit 3 ESP'
  4       25.900
        439009.978    3289208.220
        439009.978    3289229.520
        439086.178    3289229.520
        439086.178    3289208.220
'U3TURBIN'  1       25.000  'unit 3 turbine bldg'
  4       33.500
        438998.581    3289023.902
        438998.581    3289070.902
        439086.681    3289070.902
        439086.681    3289023.902
'U3BOILER'  1       25.000  'unit 3 boiler'
  4       76.200
        439036.909    3289071.271
        439036.909    3289136.771
        439058.209    3289136.771
        439058.209    3289071.271
'U3FGD'  1       25.000  'unit 3 fgd'
  32      47.300
        439048.123    3289296.052
        439046.338    3289295.876
        439044.622    3289295.355
        439043.040    3289294.510
        439041.653    3289293.372
        439040.515    3289291.985
        439039.670    3289290.403
        439039.149    3289288.687
        439038.973    3289286.902
        439039.149    3289285.117
        439039.670    3289283.400
        439040.515    3289281.818
        439041.653    3289280.432
        439043.040    3289279.294
        439044.622    3289278.448
        439046.338    3289277.928
        439048.123    3289277.752
        439049.908    3289277.928
        439051.625    3289278.448
        439053.207    3289279.294
        439054.593    3289280.432
        439055.731    3289281.818
        439056.577    3289283.400
        439057.097    3289285.117
        439057.273    3289286.902
        439057.097    3289288.687
        439056.577    3289290.403
        439055.731    3289291.985
        439054.593    3289293.372
        439053.207    3289294.510
        439051.625    3289295.355
        439049.908    3289295.876
'FLYASHSI'  1       25.000  'flyash silo'
  32      38.100
        439093.600    3289209.315
        439092.292    3289209.187
        439091.036    3289208.805
        439089.877    3289208.186
        439088.862    3289207.353
        439088.029    3289206.338
        439087.410    3289205.179
        439087.028    3289203.923
        439086.900    3289202.615
        439087.028    3289201.308
        439087.410    3289200.051
        439088.029    3289198.893
        439088.862    3289197.878
        439089.877    3289197.045
```

```
        439091.036    3289196.425
        439092.292    3289196.044
        439093.600    3289195.915
        439094.907    3289196.044
        439096.164    3289196.425
        439097.322    3289197.045
        439098.337    3289197.878
        439099.170    3289198.893
        439099.790    3289200.051
        439100.171    3289201.308
        439100.300    3289202.615
        439100.171    3289203.923
        439099.790    3289205.179
        439099.170    3289206.338
        439098.337    3289207.353
        439097.322    3289208.186
        439096.164    3289208.805
        439094.907    3289209.187
'CRUSHER' 1      24.992  'crusher house'
   4      30.500
        438987.550    3289562.395
        438987.550    3289577.595
        439002.750    3289577.595
        439002.750    3289562.395
'U3LIMEBL' 1      25.000  'unit 3 limestone ball mill'
   4      18.900
        438886.082    3289352.259
        438886.082    3289370.559
        438901.082    3289370.559
        438901.082    3289352.259
'U3ZLD' 1      25.000  'unit 3 ZLD'
   4      30.500
        439020.936    3289706.413
        439020.936    3289741.513
        439057.536    3289741.513
        439057.536    3289706.413
'U3COALTR' 1      25.000  'unit 3 coal transfer tower'
   4      19.800
        438469.475    3289567.101
        438469.475    3289576.251
        438478.625    3289576.251
        438478.625    3289567.101
'U12TURBN' 1      25.016  'unit 1 and 2 turbine bldgs'
   4      31.700
        438772.711    3289024.010
        438772.711    3289063.158
        438938.621    3289063.158
        438938.621    3289024.010
'U1BOILER' 1      25.000
   4      82.300
        438780.793    3289064.397
        438780.793    3289130.267
        438834.853    3289130.267
        438834.853    3289064.397
'U2BOILER' 1      25.000
   4      82.300
        438867.230    3289064.397
        438867.230    3289130.267
        438921.290    3289130.267
        438921.290    3289064.397
'U1FGD' 1      25.000
   4      33.900
        438742.578    3289220.741
        438742.578    3289243.223
        438822.913    3289243.223
        438822.913    3289220.741
'U2FGD' 1      24.956
   4      33.900
        438875.612    3289221.340
        438875.612    3289243.822
        438955.947    3289243.822
        438955.947    3289221.340
'EPFSILOS' 1      25.000  'epf silos'
   4      42.700
        438782.150    3289712.040
        438782.150    3289752.210
        438924.830    3289752.210
        438924.830    3289712.040
'MDCT' 1      25.000  'new mechanical draft cooling tower deck'
```

```
  4      11.300
      439546.693   3289432.217
      439560.339   3289423.012
      439321.060   3289068.267
      439307.414   3289077.471
35
'UNIT12'     25.000     183.000    438849.980   3289264.380
'COOL01'      25.000      14.300    439549.700   3289420.860
'COOL02'      25.000      14.300    439540.210   3289407.320
'COOL03'      25.000      14.300    439531.030   3289393.780
'COOL04'      25.000      14.300    439521.820   3289380.060
'COOL05'      25.000      14.300    439512.790   3289366.520
'COOL06'      25.000      14.300    439503.280   3289353.170
'COOL07'      25.000      14.300    439493.720   3289339.450
'COOL08'      25.000      14.300    439484.690   3289325.730
'COOL09'      25.000      14.300    439475.300   3289312.190
'COOL10'      25.000      14.300    439465.720   3289298.650
'COOL11'      25.000      14.300    439456.330   3289284.750
'COOL12'      25.000      14.300    439447.490   3289271.940
'COOL13'      25.000      14.300    439437.730   3289257.850
'COOL14'      25.000      14.300    439426.940   3289241.460
'COOL15'      25.000      14.300    439417.420   3289228.350
'COOL16'      25.000      14.300    439408.270   3289214.510
'COOL17'      25.000      14.300    439398.760   3289201.400
'COOL18'      25.000      14.300    439389.430   3289187.740
'COOL19'      25.000      14.300    439380.100   3289174.080
'COOL20'      25.000      14.300    439371.130   3289160.550
'COOL21'      25.000      14.300    439361.430   3289147.070
'COOL22'      25.000      14.300    439352.100   3289133.780
'COOL23'      25.000      14.300    439343.140   3289120.300
'COOL24'      25.000      14.300    439333.440   3289106.280
'COOL25'      25.000      14.300    439324.480   3289092.800
'COOL26'      25.000      14.300    439315.330   3289079.510
'UNIT3'     25.000      205.800    439047.950   3289334.740
'EP1'     25.000      2.440    438540.430   3289042.200 'EXIST TRANSFER TOWER'
'EP2'     25.000      2.440    438470.370   3289060.430 'NEW TRANSFER TOWER'
'EP3'     25.000      2.440    438994.390   3289569.090 'CRUSHER'
'EP4'     25.000     50.600    439048.130   3289083.460 'UNIT FEED'
'EP5'     25.000     21.300    438890.730   3289364.670 'LIMESTONE TRANSFER'
'EP6'     25.000     27.400    439093.680   3289202.430 'FLY ASH SILO'
'U3ZLDSD'     25.000      32.000    439045.610   3289724.910 'UNIT 3 ZERO LIQUID DISCHARGE SPRAY DRYER'
```

APPENDIX F

MODEL SUMMARY AND INPUT FILES

SO_2 LOAD ANALYSIS

AERMOD SUMMARY/INPUT FILES

```
CO STARTING
  TITLEONE 1986 SECI UNITS 3, 1 G/S ANALYSIS AERMOD          2/17/06
  TITLETWO JAX/WAYCROSS 1986-1990 MET DATA
  MODELOPT DFAULT CONC
  AVERTIME PERIOD 24 8 3 1
  POLLUTID GEN
**   EVENTFIL EVPMSIG.I86 SOCONT
  RUNORNOT RUN
CO FINISHED
**
****************************************
** AERMOD Source Pathway
****************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **

  LOCATION UN3100 POINT 439047.950 3289334.740 25.000
  LOCATION UN3075 POINT 439047.950 3289334.740 25.000
  LOCATION UN3050 POINT 439047.950 3289334.740 25.000

  SRCPARAM UN3100      1.0 205.800 325.400 18.80000 7.930
  SRCPARAM UN3075      1.0 205.800 325.400 14.10000 7.930
  SRCPARAM UN3050      1.0 205.800 325.400  9.40000 7.930

  SRCGROUP UN3100 UN3100
  SRCGROUP UN3075 UN3075
  SRCGROUP UN3050 UN3050

SO FINISHED
**
****************************************
** AERMOD Receptor Pathway
****************************************
**
**
RE STARTING
  INCLUDED seci1.rou
RE FINISHED
**
****************************************
** AERMOD Meteorology Pathway
****************************************
**
**
ME STARTING
  SURFFILE C:\AMODMET\JAXAYS86.SFC
  PROFFILE C:\AMODMET\JAXAYS86.PFL
  SURFDATA 13889 1986 JACKSONVILLE/INT'L_ARPT
  UAIRDATA 13861 1986 WAYCROSS/WSMO
  PROFBASE 26 FEET
ME FINISHED
**
****************************************
** AERMOD Output Pathway
****************************************
**
**
OU STARTING
  RECTABLE ALLAVE FIRST
OU FINISHED
```

AERBOB RELEASE 020304
AERMOD OUTPUT FILE NUMBER 1 :UN3GEN.O86
AERMOD OUTPUT FILE NUMBER 2 :UN3GEN.O87
AERMOD OUTPUT FILE NUMBER 3 :UN3GEN.O88
AERMOD OUTPUT FILE NUMBER 4 :UN3GEN.O89
AERMOD OUTPUT FILE NUMBER 5 :UN3GEN.O90
First title for last output file is: 1986 SECI UNITS 3, 1 G/S ANALYSIS AERMOD 2/17/06
Second title for last output file is: JAX/WAYCROSS 1986-1990 MET DATA

AVERAGING TIME	YEAR	CONC (ug/m3)	X (m)	Y (m)	PERIOD ENDING (YYMMDDHH)
SOURCE GROUP ID: UN3100					
Annual					
	1986	0.00735	437791.	3290132.	86123124
	1987	0.00736	440600.	3288400.	87123124
	1988	0.00763	437800.	3290300.	88123124
	1989	0.00661	440500.	3290100.	89123124
	1990	0.00749	437500.	3288700.	90123124
HIGH 24-Hour					
	1986	0.06060	437812.	3290177.	86070724
	1987	0.06153	437728.	3289997.	87072124
	1988	0.05844	437855.	3290267.	88072024
	1989	0.05874	437300.	3288000.	89092724
	1990	0.05666	437800.	3290300.	90050824
HIGH 8-Hour					
	1986	0.13231	437791.	3290132.	86070716
	1987	0.12529	440462.	3288575.	87050816
	1988	0.11800	440462.	3288724.	88092516
	1989	0.12985	440462.	3289223.	89080616
	1990	0.11005	437834.	3290222.	90050816
HIGH 3-Hour					
	1986	0.17678	440214.	3289235.	86063012
	1987	0.16256	440400.	3289400.	87090912
	1988	0.15506	439768.	3288013.	88092115
	1989	0.16593	440300.	3289400.	89060315
	1990	0.15584	440200.	3290100.	90062118
HIGH 1-Hour					
	1986	0.27538	440500.	3287600.	86012516
	1987	0.24445	436800.	3285200.	87022710
	1988	0.20327	439500.	3290200.	88071712
	1989	0.20537	441800.	3287950.	89070308
	1990	0.20225	439900.	3289500.	90072411
SOURCE GROUP ID: UN3075					
Annual					
	1986	0.00860	437791.	3290132.	86123124
	1987	0.00854	440462.	3288425.	87123124
	1988	0.00888	437855.	3290267.	88123124
	1989	0.00774	440400.	3290100.	89123124
	1990	0.00868	437600.	3288700.	90123124
HIGH 24-Hour					
	1986	0.06837	437812.	3290177.	86070724
	1987	0.06994	437728.	3289997.	87072124
	1988	0.06693	437855.	3290267.	88072024
	1989	0.06609	437300.	3288000.	89092724
	1990	0.06514	437855.	3290267.	90050824
HIGH 8-Hour					
	1986	0.14599	437791.	3290132.	86070716
	1987	0.14185	440462.	3288575.	87050816
	1988	0.13363	440462.	3288724.	88092516
	1989	0.14865	440412.	3289225.	89080616
	1990	0.12560	437834.	3290222.	90050816
HIGH 3-Hour					
	1986	0.20488	440164.	3289237.	86063012
	1987	0.18649	440300.	3289400.	87090912
	1988	0.17535	440100.	3289600.	88060318
	1989	0.18623	440200.	3289400.	89060315
	1990	0.17570	440200.	3290100.	90062118
HIGH 1-Hour					
	1986	0.30127	440400.	3287700.	86012516
	1987	0.27543	436800.	3285200.	87022710
	1988	0.23445	439462.	3290123.	88071712
	1989	0.23966	441300.	3288200.	89070308
	1990	0.24015	439900.	3289500.	90072411
SOURCE GROUP ID: UN3050					
Annual					
	1986	0.01034	437791.	3290132.	86123124

1987	0.01025	440462.	3288475.	87123124
1988	0.01070	437834.	3290222.	88123124
1989	0.00954	440300.	3290000.	89123124
1990	0.01042	437648.	3288728.	90123124

HIGH 24-Hour

1986	0.07989	437706.	3289952.	86040524
1987	0.08170	437728.	3289997.	87072124
1988	0.07722	437855.	3290267.	88072024
1989	0.07542	437648.	3288728.	89090324
1990	0.07644	437855.	3290267.	90050824

HIGH 8-Hour

1986	0.16502	437791.	3290132.	86070716
1987	0.16460	440462.	3288625.	87050816
1988	0.15684	440462.	3288724.	88092516
1989	0.17912	440263.	3289233.	89080616
1990	0.14635	437834.	3290222.	90050816

HIGH 3-Hour

1986	0.24580	440065.	3289242.	86063012
1987	0.22435	440200.	3289400.	87090912
1988	0.20826	440100.	3289600.	88060318
1989	0.22101	439600.	3290000.	89070512
1990	0.21203	440100.	3290000.	90062118

HIGH 1-Hour

1986	0.33856	440300.	3287800.	86012516
1987	0.32974	437050.	3285700.	87022710
1988	0.28257	439900.	3289500.	88080111
1989	0.28798	441300.	3288200.	89070308
1990	0.29562	439800.	3289500.	90072411

All receptor computations reported with respect to a user-specified origin

GRID 0.00 0.00

DISCRETE 0.00 0.00

PROJECT PM_{10} AND CO LOAD ANALYSIS

AERMOD SUMMARY/INPUT FILES

```
CO STARTING
   TITLEONE 1986 SECI UNITS 3, PM10 SIG ANALYSIS AERMOD          2/18/06
   TITLETWO JAX/WAYCROSS 1986-1990 MET DATA
   MODELOPT DFAULT CONC
   AVERTIME PERIOD 24
   POLLUTID PM.10
   EVENTFIL EVPMSIG.I86 SOCONT
   RUNORNOT RUN
CO FINISHED
**
***************************************
** AERMOD Source Pathway
***************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
** LOCATION UNIT12 POINT 438849.980 3289264.380 25.000
   LOCATION COOL01 POINT 439549.700 3289420.860 25.000
   LOCATION COOL02 POINT 439540.210 3289407.320 25.000
   LOCATION COOL03 POINT 439531.030 3289393.780 25.000
   LOCATION COOL04 POINT 439521.820 3289380.060 25.000
   LOCATION COOL05 POINT 439512.790 3289366.520 25.000
   LOCATION COOL06 POINT 439503.280 3289353.170 25.000
   LOCATION COOL07 POINT 439493.720 3289339.450 25.000
   LOCATION COOL08 POINT 439484.690 3289325.730 25.000
   LOCATION COOL09 POINT 439475.300 3289312.190 25.000
   LOCATION COOL10 POINT 439465.720 3289298.650 25.000
   LOCATION COOL11 POINT 439456.330 3289284.750 25.000
   LOCATION COOL12 POINT 439447.490 3289271.940 25.000
   LOCATION COOL13 POINT 439437.730 3289257.850 25.000
   LOCATION COOL14 POINT 439426.940 3289241.460 25.000
   LOCATION COOL15 POINT 439417.420 3289228.350 25.000
   LOCATION COOL16 POINT 439408.270 3289214.510 25.000
   LOCATION COOL17 POINT 439398.760 3289201.400 25.000
   LOCATION COOL18 POINT 439389.430 3289187.740 25.000
   LOCATION COOL19 POINT 439380.100 3289174.080 25.000
   LOCATION COOL20 POINT 439371.130 3289160.550 25.000
   LOCATION COOL21 POINT 439361.430 3289147.070 25.000
   LOCATION COOL22 POINT 439352.100 3289133.780 25.000
   LOCATION COOL23 POINT 439343.140 3289120.300 25.000
   LOCATION COOL24 POINT 439333.440 3289106.280 25.000
   LOCATION COOL25 POINT 439324.480 3289092.800 25.000
   LOCATION COOL26 POINT 439315.330 3289079.510 25.000
   LOCATION UNIT3 POINT 439047.950 3289334.740 25.000
   LOCATION EP1 POINT 438540.430 3289042.200 25.000
** DESCRSRC EXIST TRANSFER TOWER
   LOCATION EP2 POINT 438470.370 3289060.430 25.000
** DESCRSRC NEW TRANSFER TOWER
   LOCATION EP3 POINT 438994.390 3289569.090 25.000
** DESCRSRC CRUSHER
   LOCATION EP4 POINT 439048.130 3289083.460 25.000
** DESCRSRC UNIT FEED
   LOCATION EP5 POINT 438890.730 3289364.670 25.000
** DESCRSRC LIMESTONE TRANSFER
   LOCATION EP6 POINT 439093.680 3289202.430 25.000
** DESCRSRC FLY ASH SILO
   LOCATION U3ZLDSD POINT 439045.610 3289724.910 25.000
** DESCRSRC UNIT 3 ZERO LIQUID DISCHARGE SPRAY DRYER
   LOCATION COALPIL1 VOLUME 438470.850 3289429.450 25.000
   LOCATION COALPIL2 VOLUME 438470.850 3289255.080 25.000
   LOCATION RAILCAR VOLUME 438622.010 3289030.680 25.000
   LOCATION LIMESTON VOLUME 438930.080 3289506.710 25.000
   LOCATION FLYASH VOLUME 439093.630 3289202.600 25.000
   LOCATION BOTTMASH VOLUME 438984.990 3289061.850 25.000
   LOCATION GYPSUM VOLUME 438740.070 3289848.630 25.000
** Source Parameters **
** SRCPARAM UNIT12 1 183.000 300.000 20.00000 8.000
   SRCPARAM COOL01 0.00605 14.300 310.700 7.07000 10.350
   SRCPARAM COOL02 0.00605 14.300 310.700 7.07000 10.350
   SRCPARAM COOL03 0.00605 14.300 310.700 7.07000 10.350
   SRCPARAM COOL04 0.00605 14.300 310.700 7.07000 10.350
   SRCPARAM COOL05 0.00605 14.300 310.700 7.07000 10.350
   SRCPARAM COOL06 0.00605 14.300 310.700 7.07000 10.350
   SRCPARAM COOL07 0.00605 14.300 310.700 7.07000 10.350
   SRCPARAM COOL08 0.00605 14.300 310.700 7.07000 10.350
   SRCPARAM COOL09 0.00605 14.300 310.700 7.07000 10.350
   SRCPARAM COOL10 0.00605 14.300 310.700 7.07000 10.350
```

```
   SRCPARAM COOL11 0.00605 14.300 310.700 7.07000 10.350
   SRCPARAM COOL12 0.00605 14.300 310.700 7.07000 10.350
   SRCPARAM COOL13 0.00605 14.300 310.700 7.07000 10.350
   SRCPARAM COOL14 0.00605 14.300 310.700 7.07000 10.350
   SRCPARAM COOL15 0.00605 14.300 310.700 7.07000 10.350
   SRCPARAM COOL16 0.00605 14.300 310.700 7.07000 10.350
   SRCPARAM COOL17 0.00605 14.300 310.700 7.07000 10.350
   SRCPARAM COOL18 0.00605 14.300 310.700 7.07000 10.350
   SRCPARAM COOL19 0.00605 14.300 310.700 7.07000 10.350
   SRCPARAM COOL20 0.00605 14.300 310.700 7.07000 10.350
   SRCPARAM COOL21 0.00605 14.300 310.700 7.07000 10.350
   SRCPARAM COOL22 0.00605 14.300 310.700 7.07000 10.350
   SRCPARAM COOL23 0.00605 14.300 310.700 7.07000 10.350
   SRCPARAM COOL24 0.00605 14.300 310.700 7.07000 10.350
   SRCPARAM COOL25 0.00605 14.300 310.700 7.07000 10.350
   SRCPARAM COOL26 0.00605 14.300 310.700 7.07000 10.350
   SRCPARAM UNIT3 14.2 205.800 325.400 18.80000 7.930
   SRCPARAM EP1 0.014 2.440 0.000 17.83000 0.650
   SRCPARAM EP2 0.038 2.440 0.000 17.77000 0.800
   SRCPARAM EP3 0.025 2.440 0.000 17.85000 0.650
   SRCPARAM EP4 0.047 50.600 0.000 17.76000 0.890
   SRCPARAM EP5 0.0086 21.300 0.000 17.73000 0.340
   SRCPARAM EP6 0.035 27.400 0.000 17.73000 0.580
   SRCPARAM U3ZLDSD 0.1134 32.000 333.200 13.72 0.710
   SRCPARAM COALPIL1 0.209 12.200 33.256 2.840
   SRCPARAM COALPIL2 0.209 12.200 33.256 2.840
   SRCPARAM RAILCAR 0.01 3.050 5.802 1.420
   SRCPARAM LIMESTON 0.017 3.050 9.374 1.420
   SRCPARAM FLYASH 0.00037 19.550 3.116 8.860
   SRCPARAM BOTTMASH 0.00011 3.050 1.419 1.420
   SRCPARAM GYPSUM 0.002 3.050 3.535 1.420

** Building Downwash **
**SO BUILDHGT UNIT12     82.30   82.30   82.30   82.30   33.90   33.90
**SO BUILDHGT UNIT12     33.90   33.90    0.00   33.90   33.90   33.90
**SO BUILDHGT UNIT12     33.90   82.30   82.30   82.30   82.30   82.30
**SO BUILDHGT UNIT12     82.30   82.30   82.30   82.30   33.90   33.90
**SO BUILDHGT UNIT12     33.90   33.90    0.00   33.90   33.90   76.20
**SO BUILDHGT UNIT12     76.20   82.30   82.30   82.30   82.30   82.30
**SO BUILDWID UNIT12    149.80  154.55  154.61   83.75   68.86   59.64
**SO BUILDWID UNIT12     48.60   36.09    0.00   36.09   48.60   59.64
**SO BUILDWID UNIT12     68.86   83.75  154.61  154.55  149.80  140.50
**SO BUILDWID UNIT12    149.80  154.55  154.61   83.75   68.86   59.64
**SO BUILDWID UNIT12     48.60   36.09    0.00   36.09   48.60   67.37
**SO BUILDWID UNIT12     63.87   83.75  154.61  154.55  149.80  140.50
**SO BUILDLEN UNIT12     89.27  109.95  127.29   85.21   75.99   80.81
**SO BUILDLEN UNIT12     83.18   83.02    0.00   83.02   83.18   80.81
**SO BUILDLEN UNIT12     75.99   85.21  127.29  109.95   89.27   65.87
**SO BUILDLEN UNIT12     89.27  109.95  127.29   85.21   75.99   80.81
**SO BUILDLEN UNIT12     83.18   83.02    0.00   83.02   83.18   51.20
**SO BUILDLEN UNIT12     58.42   85.21  127.29  109.95   89.27   65.87
**SO XBADJ    UNIT12   -208.96 -211.59 -207.78 -197.67 -110.33 -114.83
**SO XBADJ    UNIT12   -115.85 -113.35    0.00   28.81   31.12   32.48
**SO XBADJ    UNIT12     32.85  113.82   81.55  102.36  120.06  134.11
**SO XBADJ    UNIT12    119.69  101.64   80.49  112.46   34.33   34.02
**SO XBADJ    UNIT12     32.67   30.33    0.00 -111.83 -114.30 -276.89
**SO XBADJ    UNIT12   -283.64 -199.03 -208.85 -212.31 -209.33 -199.98
**SO YBADJ    UNIT12    -30.05  -58.13  -84.44  -75.08   18.40    5.56
**SO YBADJ    UNIT12     -7.45  -20.23    0.00  -19.89   -7.38    5.36
**SO YBADJ    UNIT12     17.94  -73.46  -82.60  -56.14  -27.96    1.06
**SO YBADJ    UNIT12     30.05   58.13   84.44   75.08  -18.40   -5.56
**SO YBADJ    UNIT12      7.45   20.23    0.00   19.89    7.38   40.09
**SO YBADJ    UNIT12     -4.16   73.46   82.60   56.14   27.96   -1.06


SO BUILDHGT COOL01     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL01     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL01     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL01     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL01     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL01     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDWID COOL01    189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL01    264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL01    427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDWID COOL01    189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL01    264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL01    427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDLEN COOL01    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL01    355.85  309.09  252.92  189.08  119.49   46.27
```

```
SO BUILDLEN COOL01    61.10  133.77  202.37  264.83  319.24  363.95
SO BUILDLEN COOL01   397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL01   355.85  309.08  252.92  189.08  119.49   46.27
SO BUILDLEN COOL01    61.10  133.77  202.37  264.83  319.24  363.95
SO XBADJ    COOL01  -386.94 -409.53 -419.67 -418.79 -406.33 -381.52
SO XBADJ    COOL01  -345.12 -298.23 -242.29 -178.98 -110.23  -38.13
SO XBADJ    COOL01    -9.60  -10.63  -11.34  -11.70  -11.71  -11.36
SO XBADJ    COOL01   -10.66   -9.64   -8.33   -8.49   -9.53  -10.29
SO XBADJ    COOL01   -10.73  -10.85  -10.64  -10.10   -9.26   -8.14
SO XBADJ    COOL01   -51.49 -123.14 -191.03 -253.13 -307.53 -352.59
SO YBADJ    COOL01    84.44   50.48   15.00  -20.95  -56.25  -89.85
SO YBADJ    COOL01  -120.71 -147.91 -170.62 -188.14 -199.94 -205.67
SO YBADJ    COOL01  -205.15 -198.40 -185.62 -167.19 -143.69 -115.82
SO YBADJ    COOL01   -84.44  -50.48  -15.00   20.95   56.25   89.85
SO YBADJ    COOL01   120.71  147.91  170.62  188.14  199.94  205.67
SO YBADJ    COOL01   205.15  198.40  185.62  167.19  143.69  115.82


SO BUILDHGT COOL02    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL02    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL02    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL02    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL02    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL02    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDWID COOL02   189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL02   264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL02   427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDWID COOL02   189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL02   264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL02   427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDLEN COOL02   397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL02   355.85  309.09  252.92  189.08  119.49   46.27
SO BUILDLEN COOL02    61.10  133.77  202.37  264.83  319.24  363.95
SO BUILDLEN COOL02   397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL02   355.85  309.08  252.92  189.08  119.49   46.27
SO BUILDLEN COOL02    61.10  133.77  202.37  264.83  319.24  363.95
SO XBADJ    COOL02  -371.96 -393.56 -403.20 -402.32 -390.35 -366.53
SO XBADJ    COOL02  -331.57 -286.54 -232.80 -171.98 -105.94  -36.68
SO XBADJ    COOL02   -11.04  -14.91  -18.32  -21.18  -23.39  -24.90
SO XBADJ    COOL02   -25.64  -25.61  -24.80  -24.96  -25.51  -25.28
SO XBADJ    COOL02   -24.28  -22.55  -20.13  -17.10  -13.55   -9.59
SO XBADJ    COOL02   -50.06 -118.86 -184.05 -243.65 -295.85 -339.05
SO YBADJ    COOL02    77.44   46.20   13.55  -19.51  -51.98  -82.87
SO YBADJ    COOL02  -111.24 -136.23 -157.08 -173.16 -183.97 -189.20
SO YBADJ    COOL02  -188.68 -182.42 -170.63 -153.64 -131.99 -106.33
SO YBADJ    COOL02   -77.44  -46.20  -13.55   19.51   51.98   82.87
SO YBADJ    COOL02   111.24  136.23  157.08  173.16  183.97  189.20
SO YBADJ    COOL02   188.68  182.42  170.63  153.64  131.99  106.33


SO BUILDHGT COOL03    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL03    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL03    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL03    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL03    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL03    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDWID COOL03   189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL03   264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL03   427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDWID COOL03   189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL03   264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL03   427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDLEN COOL03   397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL03   355.85  309.09  252.92  189.08  119.49   46.27
SO BUILDLEN COOL03    61.10  133.77  202.37  264.83  319.24  363.95
SO BUILDLEN COOL03   397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL03   355.85  309.08  252.92  189.08  119.49   46.27
SO BUILDLEN COOL03    61.10  133.77  202.37  264.83  319.24  363.95
SO XBADJ    COOL03  -357.03 -377.70 -386.89 -386.04 -374.62 -351.81
SO XBADJ    COOL03  -318.31 -275.15 -223.62 -165.29 -101.95  -35.50
SO XBADJ    COOL03   -12.71  -19.38  -25.46  -30.76  -35.13  -38.44
SO XBADJ    COOL03   -40.57  -41.48  -41.12  -41.23  -41.24  -40.00
SO XBADJ    COOL03   -37.54  -33.94  -29.31  -23.79  -17.54  -10.77
SO XBADJ    COOL03   -48.39 -114.39 -176.92 -234.07 -284.11 -325.51
SO YBADJ    COOL03    70.75   42.20   12.37  -17.84  -47.51  -75.73
SO YBADJ    COOL03  -101.65 -124.49 -143.54 -158.23 -168.11 -172.88
SO YBADJ    COOL03  -172.41 -166.69 -155.91 -140.39 -120.60  -97.15
SO YBADJ    COOL03   -70.75  -42.20  -12.37   17.84   47.51   75.73
SO YBADJ    COOL03   101.65  124.49  143.54  158.23  168.11  172.88
```

```
SO YBADJ    COOL03   172.41  166.69  155.91  140.39  120.60   97.15


SO BUILDHGT COOL04    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL04    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL04    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL04    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL04    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL04    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDWID COOL04   189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL04   264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL04   427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDWID COOL04   189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL04   264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL04   427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDLEN COOL04   397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL04   355.85  309.09  252.92  189.08  119.49   46.27
SO BUILDLEN COOL04    61.10  133.77  202.37  264.83  319.24  363.95
SO BUILDLEN COOL04   397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL04   355.85  309.08  252.92  189.08  119.49   46.27
SO BUILDLEN COOL04    61.10  133.77  202.37  264.83  319.24  363.95
SO XBADJ    COOL04  -341.92 -361.65 -370.40 -369.61 -358.74 -336.98
SO XBADJ    COOL04  -304.97 -263.69 -214.41 -158.60  -97.98  -34.39
SO XBADJ    COOL04   -14.47  -23.97  -32.73  -40.50  -47.05  -52.16
SO XBADJ    COOL04   -55.68  -57.52  -57.61  -57.66  -57.12  -54.83
SO XBADJ    COOL04   -50.89  -45.39  -38.52  -30.48  -21.51  -11.88
SO XBADJ    COOL04   -46.63 -109.80 -169.64 -224.33 -272.19 -311.79
SO YBADJ    COOL04    64.06   38.24   11.25  -16.08  -42.92  -68.45
SO YBADJ    COOL04   -91.91 -112.57 -129.82 -143.12 -152.07 -156.40
SO YBADJ    COOL04  -155.98 -150.81 -141.07 -127.04 -109.15  -87.94
SO YBADJ    COOL04   -64.06  -38.24  -11.25   16.08   42.92   68.45
SO YBADJ    COOL04    91.91  112.57  129.82  143.12  152.07  156.40
SO YBADJ    COOL04   155.98  150.81  141.07  127.04  109.15   87.94


SO BUILDHGT COOL05    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL05    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL05    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL05    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL05    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL05    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDWID COOL05   189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL05   264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL05   427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDWID COOL05   189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL05   264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL05   427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDLEN COOL05   397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL05   355.85  309.09  252.92  189.08  119.49   46.27
SO BUILDLEN COOL05    61.10  133.77  202.37  264.83  319.24  363.95
SO BUILDLEN COOL05   397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL05   355.85  309.08  252.92  189.08  119.49   46.27
SO BUILDLEN COOL05    61.10  133.77  202.37  264.83  319.24  363.95
SO XBADJ    COOL05  -327.02 -345.84 -354.16 -353.44 -343.12 -322.39
SO XBADJ    COOL05  -291.85 -252.45 -205.38 -152.06  -94.13  -33.34
SO XBADJ    COOL05   -16.26  -28.53  -39.94  -50.14  -58.81  -65.70
SO XBADJ    COOL05   -70.59  -73.33  -73.85  -73.84  -72.74  -69.42
SO XBADJ    COOL05   -64.00  -56.64  -47.55  -37.02  -25.36  -12.93
SO XBADJ    COOL05   -44.84 -105.23 -162.43 -214.69 -260.43 -298.25
SO YBADJ    COOL05    57.52   34.38   10.20  -14.29  -38.35  -61.24
SO YBADJ    COOL05   -82.28 -100.81 -116.28 -128.21 -136.26 -140.16
SO YBADJ    COOL05  -139.80 -135.19 -126.48 -113.92  -97.91  -78.91
SO YBADJ    COOL05   -57.52  -34.38  -10.20   14.29   38.35   61.24
SO YBADJ    COOL05    82.28  100.81  116.28  128.21  136.26  140.16
SO YBADJ    COOL05   139.80  135.19  126.48  113.92   97.91   78.91


SO BUILDHGT COOL06    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL06    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL06    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL06    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL06    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL06    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDWID COOL06   189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL06   264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL06   427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDWID COOL06   189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL06   264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL06   427.28  415.86  391.81  355.85  309.08  252.92
```

```
SO BUILDLEN COOL06    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL06    355.85  309.09  252.92  189.08  119.49   46.27
SO BUILDLEN COOL06     61.10  133.77  202.37  264.83  319.24  363.95
SO BUILDLEN COOL06    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL06    355.85  309.08  252.92  189.08  119.49   46.27
SO BUILDLEN COOL06     61.10  133.77  202.37  264.83  319.24  363.95
SO XBADJ    COOL06   -312.22 -330.04 -337.84 -337.10 -327.26 -307.47
SO XBADJ    COOL06   -278.35 -240.76 -195.87 -145.02  -89.76  -31.78
SO XBADJ    COOL06    -17.55  -32.65  -46.75  -59.43  -70.31  -79.05
SO XBADJ    COOL06    -85.38  -89.13  -90.16  -90.18  -88.60  -84.34
SO XBADJ    COOL06    -77.51  -68.32  -57.06  -44.06  -29.73  -14.49
SO XBADJ    COOL06    -43.54 -101.12 -155.62 -205.40 -248.93 -284.90
SO YBADJ    COOL06     50.48   30.01    8.64  -12.99  -34.24  -54.44
SO YBADJ    COOL06    -72.98  -89.31 -102.93 -113.42 -120.46 -123.84
SO YBADJ    COOL06   -123.46 -119.33 -111.57 -100.42  -86.22  -69.40
SO YBADJ    COOL06    -50.48  -30.01   -8.64   12.99   34.24   54.44
SO YBADJ    COOL06     72.98   89.31  102.93  113.42  120.46  123.84
SO YBADJ    COOL06    123.46  119.33  111.57  100.42   86.22   69.40


SO BUILDHGT COOL07     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL07     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL07     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL07     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL07     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL07     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDWID COOL07    189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL07    264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL07    427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDWID COOL07    189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL07    264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL07    427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDLEN COOL07    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL07    355.85  309.09  252.92  189.08  119.49   46.27
SO BUILDLEN COOL07     61.10  133.77  202.37  264.83  319.24  363.95
SO BUILDLEN COOL07    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL07    355.85  309.08  252.92  189.08  119.49   46.27
SO BUILDLEN COOL07     61.10  133.77  202.37  264.83  319.24  363.95
SO XBADJ    COOL07   -297.05 -313.88 -321.18 -320.44 -311.12 -292.34
SO XBADJ    COOL07   -264.67 -228.97 -186.31 -137.98  -85.47  -30.36
SO XBADJ    COOL07    -19.05  -37.01  -53.85  -69.05  -82.16  -92.77
SO XBADJ    COOL07   -100.56 -105.29 -106.83 -106.83 -104.75  -99.47
SO XBADJ    COOL07    -91.18  -80.12  -66.62  -51.10  -34.02  -15.91
SO XBADJ    COOL07    -42.05  -96.75 -148.52 -195.78 -237.08 -271.18
SO YBADJ    COOL07     43.44   25.72    7.22  -11.50  -29.87  -47.33
SO YBADJ    COOL07    -63.36  -77.46  -89.21  -98.24 -104.30 -107.18
SO YBADJ    COOL07   -106.80 -103.18  -96.43  -86.75  -74.43  -59.84
SO YBADJ    COOL07    -43.44  -25.72   -7.22   11.50   29.87   47.33
SO YBADJ    COOL07     63.36   77.46   89.21   98.24  104.30  107.18
SO YBADJ    COOL07    106.80  103.18   96.43   86.75   74.43   59.84


SO BUILDHGT COOL08     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL08     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL08     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL08     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL08     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL08     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDWID COOL08    189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL08    264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL08    427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDWID COOL08    189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL08    264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL08    427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDLEN COOL08    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL08    355.85  309.09  252.92  189.08  119.49   46.27
SO BUILDLEN COOL08     61.10  133.77  202.37  264.83  319.24  363.95
SO BUILDLEN COOL08    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL08    355.85  309.08  252.92  189.08  119.49   46.27
SO BUILDLEN COOL08     61.10  133.77  202.37  264.83  319.24  363.95
SO XBADJ    COOL08   -281.97 -297.90 -304.78 -304.13 -295.38 -277.66
SO XBADJ    COOL08   -251.49 -217.69 -177.28 -131.47  -81.68  -29.40
SO XBADJ    COOL08    -20.95  -41.72  -61.22  -78.86  -94.10 -106.49
SO XBADJ    COOL08   -115.64 -121.27 -123.22 -123.15 -120.48 -114.15
SO XBADJ    COOL08   -104.36  -91.39  -75.65  -57.61  -37.81  -16.87
SO XBADJ    COOL08    -40.15  -92.05 -141.15 -185.97 -225.14 -257.46
SO YBADJ    COOL08     36.93   21.93    6.26   -9.60  -25.16  -39.97
SO YBADJ    COOL08    -53.56  -65.52  -75.49  -83.16  -88.31  -90.78
SO YBADJ    COOL08    -90.49  -87.45  -81.75  -73.57  -63.15  -50.81
```

```
SO YBADJ    COOL08    -36.93 -21.93  -6.26   9.60  25.16  39.97
SO YBADJ    COOL08     53.56  65.52  75.49  83.16  88.31  90.78
SO YBADJ    COOL08     90.49  87.45  81.75  73.57  63.15  50.81


SO BUILDHGT COOL09     11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL09     11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL09     11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL09     11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL09     11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL09     11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL09    189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL09    264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL09    427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL09    189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL09    264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL09    427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL09    397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL09    355.85 309.09 252.92 189.08 119.49  46.27
SO BUILDLEN COOL09     61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL09    397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL09    355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL09     61.10 133.77 202.37 264.83 319.24 363.95
SO XBADJ    COOL09   -267.00 -281.97 -288.36 -287.72 -279.48 -262.75
SO XBADJ    COOL09   -238.04 -206.09 -167.89 -124.58 -77.48 -28.03
SO XBADJ    COOL09    -22.46 -46.06 -68.25 -88.37 -105.81 -120.03
SO XBADJ    COOL09   -130.60 -137.21 -139.64 -139.56 -136.38 -129.06
SO XBADJ    COOL09   -117.81 -102.99 -85.04 -64.50 -42.01 -18.23
SO XBADJ    COOL09    -38.64 -87.71 -134.12 -176.46 -213.43 -243.92
SO YBADJ    COOL09     30.04  17.74   4.90  -8.09 -20.83 -32.94
SO YBADJ    COOL09    -44.04 -53.81 -61.95 -68.20 -72.38 -74.36
SO YBADJ    COOL09    -74.08 -71.55 -66.85 -60.11 -51.55 -41.42
SO YBADJ    COOL09    -30.04 -17.74  -4.90   8.09  20.83  32.94
SO YBADJ    COOL09     44.04  53.81  61.95  68.20  72.38  74.36
SO YBADJ    COOL09     74.08  71.55  66.85  60.11  51.55  41.42


SO BUILDHGT COOL10     11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL10     11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL10     11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL10     11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL10     11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL10     11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL10    189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL10    264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL10    427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL10    189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL10    264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL10    427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL10    397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL10    355.85 309.09 252.92 189.08 119.49  46.27
SO BUILDLEN COOL10     61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL10    397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL10    355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL10     61.10 133.77 202.37 264.83 319.24 363.95
SO XBADJ    COOL10   -252.00 -265.97 -271.85 -271.19 -263.44 -247.69
SO XBADJ    COOL10   -224.41 -194.31 -158.31 -117.49 -73.11 -26.51
SO XBADJ    COOL10    -23.83 -50.27 -75.19 -97.82 -117.48 -133.57
SO XBADJ    COOL10   -145.60 -153.21 -156.16 -156.09 -152.42 -144.12
SO XBADJ    COOL10   -131.45 -114.78 -94.62 -71.59 -46.38 -19.76
SO XBADJ    COOL10    -37.27 -83.50 -127.19 -167.01 -201.76 -230.38
SO YBADJ    COOL10     22.95  13.37   3.37  -6.72 -16.61 -26.00
SO YBADJ    COOL10    -34.60 -42.14 -48.41 -53.20 -56.38 -57.84
SO YBADJ    COOL10    -57.55 -55.51 -51.78 -46.48 -39.77 -31.84
SO YBADJ    COOL10    -22.95 -13.37  -3.37   6.72  16.61  26.00
SO YBADJ    COOL10     34.60  42.14  48.41  53.20  56.38  57.84
SO YBADJ    COOL10     57.55  55.51  51.78  46.48  39.77  31.84


SO BUILDHGT COOL11     11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL11     11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL11     11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL11     11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL11     11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL11     11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL11    189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL11    264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL11    427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL11    189.08 119.49  46.27  61.10 133.77 202.37
```

```
SO BUILDWID COOL11    264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL11    427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDLEN COOL11    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL11    355.85  309.09  252.92  189.08  119.49   46.27
SO BUILDLEN COOL11     61.10  133.77  202.37  264.83  319.24  363.95
SO BUILDLEN COOL11    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL11    355.85  309.08  252.92  189.08  119.49   46.27
SO BUILDLEN COOL11     61.10  133.77  202.37  264.83  319.24  363.95
SO XBADJ    COOL11  -236.68 -249.69 -255.11 -254.51 -247.31 -232.60
SO XBADJ    COOL11  -210.83 -182.65 -148.92 -110.66  -69.04  -25.33
SO XBADJ    COOL11   -25.57  -54.88  -82.53 -107.67 -129.54 -147.47
SO XBADJ    COOL11  -160.92 -169.48 -172.89 -172.77 -168.55 -159.21
SO XBADJ    COOL11  -145.02 -126.44 -104.01  -78.42  -50.45  -20.94
SO XBADJ    COOL11   -35.53  -78.89 -119.84 -157.16 -189.70 -216.48
SO YBADJ    COOL11    16.12    9.30    2.19   -4.98  -12.00  -18.66
SO YBADJ    COOL11   -24.75  -30.08  -34.51  -37.88  -40.11  -41.11
SO YBADJ    COOL11   -40.87  -39.38  -36.70  -32.90  -28.10  -22.45
SO YBADJ    COOL11   -16.12   -9.30   -2.19    4.98   12.00   18.66
SO YBADJ    COOL11    24.75   30.08   34.51   37.88   40.11   41.11
SO YBADJ    COOL11    40.87   39.38   36.70   32.90   28.10   22.45


SO BUILDHGT COOL12     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL12     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL12     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL12     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL12     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL12     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDWID COOL12    189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL12    264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL12    427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDWID COOL12    189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL12    264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL12    427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDLEN COOL12    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL12    355.85  309.09  252.92  189.08  119.49   46.27
SO BUILDLEN COOL12     61.10  133.77  202.37  264.83  319.24  363.95
SO BUILDLEN COOL12    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL12    355.85  309.08  252.92  189.08  119.49   46.27
SO BUILDLEN COOL12     61.10  133.77  202.37  264.83  319.24  363.95
SO XBADJ    COOL12  -222.53 -234.63 -239.60 -239.01 -232.31 -218.54
SO XBADJ    COOL12  -198.14 -171.72 -140.08 -104.18  -65.12  -24.07
SO XBADJ    COOL12   -27.03  -59.01  -89.20 -116.68 -140.62 -160.28
SO XBADJ    COOL12  -175.07 -184.54 -188.41 -188.27 -183.55 -173.27
SO XBADJ    COOL12  -157.71 -137.37 -112.85  -84.90  -54.37  -22.19
SO XBADJ    COOL12   -34.07  -74.76 -113.17 -148.15 -178.62 -203.67
SO YBADJ    COOL12     9.64    5.37    0.94   -3.52   -7.87  -11.98
SO YBADJ    COOL12   -15.73  -19.00  -21.70  -23.73  -25.05  -25.60
SO YBADJ    COOL12   -25.37  -24.38  -22.64  -20.21  -17.17  -13.61
SO YBADJ    COOL12    -9.64   -5.37   -0.94    3.52    7.87   11.98
SO YBADJ    COOL12    15.73   19.00   21.70   23.73   25.05   25.60
SO YBADJ    COOL12    25.37   24.38   22.64   20.21   17.17   13.61


SO BUILDHGT COOL13     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL13     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL13     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL13     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL13     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL13     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDWID COOL13    189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL13    264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL13    427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDWID COOL13    189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL13    264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL13    427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDLEN COOL13    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL13    355.85  309.09  252.92  189.08  119.49   46.27
SO BUILDLEN COOL13     61.10  133.77  202.37  264.83  319.24  363.95
SO BUILDLEN COOL13    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL13    355.85  309.08  252.92  189.08  119.49   46.27
SO BUILDLEN COOL13     61.10  133.77  202.37  264.83  319.24  363.95
SO XBADJ    COOL13  -206.96 -218.05 -222.52 -221.94 -215.77 -203.05
SO XBADJ    COOL13  -184.15 -159.66 -130.32  -97.01  -60.76  -22.67
SO XBADJ    COOL13   -28.61  -63.53  -96.52 -126.58 -152.80 -174.37
SO XBADJ    COOL13  -190.64 -201.12 -205.49 -205.33 -200.09 -188.76
SO XBADJ    COOL13  -171.70 -149.43 -122.61  -92.07  -58.73  -23.60
SO XBADJ    COOL13   -32.49  -70.24 -105.85 -138.25 -166.44 -189.58
SO YBADJ    COOL13     2.47    1.02   -0.47   -1.94   -3.35   -4.66
```

```
SO YBADJ    COOL13    -5.83  -6.82  -7.61  -8.16  -8.47  -8.52
SO YBADJ    COOL13    -8.31  -7.84  -7.14  -6.22  -5.12  -3.85
SO YBADJ    COOL13    -2.47  -1.02   0.47   1.94   3.35   4.66
SO YBADJ    COOL13     5.83   6.82   7.61   8.16   8.47   8.52
SO YBADJ    COOL13     8.31   7.84   7.14   6.22   5.12   3.85


SO BUILDHGT COOL14    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL14    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL14    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL14    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL14    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL14    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL14   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL14   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL14   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL14   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL14   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL14   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL14   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL14   355.85 309.09 252.92 189.08 119.49  46.27
SO BUILDLEN COOL14    61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL14   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL14   355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL14    61.10 133.77 202.37 264.83 319.24 363.95
SO XBADJ    COOL14  -188.95 -198.96 -202.93 -202.45 -196.97 -185.51
SO XBADJ    COOL14  -168.41 -146.19 -119.53 -89.23 -56.23 -21.52
SO XBADJ    COOL14   -30.88 -69.15 -105.32 -138.30 -167.06 -190.76
SO XBADJ    COOL14  -208.65 -220.21 -225.08 -224.82 -218.89 -206.30
SO XBADJ    COOL14  -187.45 -162.90 -133.40 -99.85 -63.26 -24.75
SO XBADJ    COOL14   -30.22 -64.62 -97.05 -126.54 -152.18 -173.19
SO YBADJ    COOL14    -5.31  -3.51  -1.62   0.33   2.27   4.14
SO YBADJ    COOL14     5.88   7.44   8.78   9.85  10.62  11.07
SO YBADJ    COOL14    11.19  10.96  10.40   9.52   8.36   6.94
SO YBADJ    COOL14     5.31   3.51   1.62  -0.33  -2.27  -4.14
SO YBADJ    COOL14    -5.88  -7.44  -8.78  -9.85 -10.62 -11.07
SO YBADJ    COOL14   -11.19 -10.96 -10.40  -9.52  -8.36  -6.94


SO BUILDHGT COOL15    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL15    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL15    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL15    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL15    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL15    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL15   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL15   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL15   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL15   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL15   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL15   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL15   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL15   355.85 309.09 252.92 189.08 119.49  46.27
SO BUILDLEN COOL15    61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL15   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL15   355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL15    61.10 133.77 202.37 264.83 319.24 363.95
SO XBADJ    COOL15  -174.38 -183.39 -186.82 -186.29 -181.25 -170.71
SO XBADJ    COOL15  -154.98 -134.53 -110.01 -82.13 -51.77 -19.83
SO XBADJ    COOL15   -32.01 -73.08 -111.92 -147.36 -178.32 -203.87
SO XBADJ    COOL15  -223.22 -235.79 -241.19 -240.99 -234.61 -221.10
SO XBADJ    COOL15  -200.88 -174.55 -142.92 -106.94 -67.72 -26.44
SO XBADJ    COOL15   -29.08 -60.69 -90.46 -117.47 -140.92 -160.08
SO YBADJ    COOL15   -12.41  -7.98  -3.31   1.47   6.19  10.73
SO YBADJ    COOL15    14.94  18.70  21.89  24.42  26.20  27.19
SO YBADJ    COOL15    27.35  26.68  25.20  22.95  20.01  16.46
SO YBADJ    COOL15    12.41   7.98   3.31  -1.47  -6.19 -10.73
SO YBADJ    COOL15   -14.94 -18.70 -21.89 -24.42 -26.20 -27.19
SO YBADJ    COOL15   -27.35 -26.68 -25.20 -22.95 -20.01 -16.46


SO BUILDHGT COOL16    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL16    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL16    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL16    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL16    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL16    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL16   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL16   264.83 319.24 363.95 397.60 419.17 428.01
```

```
SO BUILDWID COOL16   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL16   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL16   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL16   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL16   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL16   355.85 309.09 252.92 189.08 119.49  46.27
SO BUILDLEN COOL16    61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL16   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL16   355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL16    61.10 133.77 202.37 264.83 319.24 363.95
SO XBADJ    COOL16  -159.17 -167.25 -170.26 -169.81 -165.35 -155.86
SO XBADJ    COOL16  -141.64 -123.12 -100.86 -75.53 -47.90 -18.82
SO XBADJ    COOL16   -33.90 -77.80 -119.33 -157.23 -190.36 -217.71
SO XBADJ    COOL16  -238.44 -251.92 -257.75 -257.47 -250.51 -235.95
SO XBADJ    COOL16  -214.21 -185.96 -152.07 -113.55 -71.59 -27.44
SO XBADJ    COOL16   -27.20 -55.97 -83.05 -107.60 -128.88 -146.24
SO YBADJ    COOL16   -19.01 -11.84  -4.31   3.35  10.91  18.14
SO YBADJ    COOL16    24.82  30.74  35.73  39.64  42.34  43.75
SO YBADJ    COOL16    43.83  42.58  40.04  36.28  31.42  25.61
SO YBADJ    COOL16    19.01  11.84   4.31  -3.35 -10.91 -18.14
SO YBADJ    COOL16   -24.82 -30.74 -35.73 -39.64 -42.34 -43.75
SO YBADJ    COOL16   -43.83 -42.58 -40.04 -36.28 -31.42 -25.61


SO BUILDHGT COOL17    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL17    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL17    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL17    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL17    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL17    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL17   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL17   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL17   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL17   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL17   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL17   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL17   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL17   355.85 309.09 252.92 189.08 119.49  46.27
SO BUILDLEN COOL17    61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL17   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL17   355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL17    61.10 133.77 202.37 264.83 319.24 363.95
SO XBADJ    COOL17  -144.60 -151.68 -154.15 -153.65 -149.64 -141.07
SO XBADJ    COOL17  -128.22 -111.48 -91.35 -68.44 -43.45 -17.14
SO XBADJ    COOL17   -35.04 -81.73 -125.93 -166.30 -201.62 -230.82
SO XBADJ    COOL17  -253.00 -267.49 -273.86 -273.63 -266.23 -250.74
SO XBADJ    COOL17  -227.63 -197.61 -161.58 -120.64 -76.04 -29.13
SO XBADJ    COOL17   -26.05 -52.04 -76.45 -98.53 -117.62 -133.13
SO YBADJ    COOL17   -26.10 -16.29  -5.99   4.49  14.84  24.74
SO YBADJ    COOL17    33.89  42.00  48.84  54.20  57.91  59.86
SO YBADJ    COOL17    59.99  58.30  54.83  49.70  43.06  35.12
SO YBADJ    COOL17    26.10  16.29   5.99  -4.49 -14.84 -24.74
SO YBADJ    COOL17   -33.89 -42.00 -48.84 -54.20 -57.91 -59.86
SO YBADJ    COOL17   -59.99 -58.30 -54.83 -49.70 -43.06 -35.12


SO BUILDHGT COOL18    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL18    76.20  76.20  11.30  11.30  11.30  11.30
SO BUILDHGT COOL18    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL18    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL18    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL18    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL18   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL18    68.81  68.20 363.95 397.60 419.17 428.01
SO BUILDWID COOL18   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL18   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL18   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL18   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL18   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL18    42.42  32.35 252.92 189.08 119.49  46.27
SO BUILDLEN COOL18    61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL18   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL18   355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL18    61.10 133.77 202.37 264.83 319.24 363.95
SO XBADJ    COOL18  -129.53 -135.65 -137.65 -137.19 -133.71 -126.16
SO XBADJ    COOL18  -371.10 -367.39 -82.02 -61.62 -39.36 -15.89
SO XBADJ    COOL18   -36.68 -86.19 -133.09 -175.95 -213.45 -244.48
SO XBADJ    COOL18  -268.07 -283.52 -290.35 -290.09 -282.15 -265.65
SO XBADJ    COOL18  -241.07 -209.17 -170.91 -127.46 -80.13 -30.38
```

```
SO XBADJ    COOL18    -24.42  -47.57  -69.28  -88.88 -105.79 -119.47
SO YBADJ    COOL18    -32.92  -20.39   -7.24    6.13   19.31   31.91
SO YBADJ    COOL18     38.26  -23.08   62.50   69.27   73.93   76.35
SO YBADJ    COOL18     76.45   74.22   69.74   63.14   54.62   44.45
SO YBADJ    COOL18     32.92   20.39    7.24   -6.13  -19.31  -31.91
SO YBADJ    COOL18    -43.53  -53.83  -62.50  -69.27  -73.93  -76.35
SO YBADJ    COOL18    -76.45  -74.22  -69.74  -63.14  -54.62  -44.45


SO BUILDHGT COOL19     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL19     76.20   76.20   11.30   11.30   11.30   11.30
SO BUILDHGT COOL19     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL19     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL19     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL19     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDWID COOL19    189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL19     68.83   68.20  363.95  397.60  419.17  428.01
SO BUILDWID COOL19    427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDWID COOL19    189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL19    264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL19    427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDLEN COOL19    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL19     42.42   32.35  252.92  189.08  119.49   46.27
SO BUILDLEN COOL19     61.10  133.77  202.37  264.83  319.24  363.95
SO BUILDLEN COOL19    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL19    355.85  309.08  252.92  189.08  119.49   46.27
SO BUILDLEN COOL19     61.10  133.77  202.37  264.83  319.24  363.95
SO XBADJ    COOL19   -114.46 -119.62 -121.16 -120.73 -117.78 -111.25
SO XBADJ    COOL19   -357.66 -355.83  -72.69  -54.81  -35.26  -14.64
SO XBADJ    COOL19    -38.31  -90.66 -140.26 -185.59 -225.29 -258.14
SO XBADJ    COOL19   -283.14 -299.55 -306.85 -306.55 -298.08 -280.56
SO XBADJ    COOL19   -254.51 -220.73 -180.24 -134.27  -84.23  -31.63
SO XBADJ    COOL19    -22.79  -43.11  -62.12  -79.24  -93.95 -105.81
SO YBADJ    COOL19    -39.73  -24.48   -8.49    7.76   23.78   39.07
SO YBADJ    COOL19     47.90  -11.25   76.16   84.34   89.96   92.85
SO YBADJ    COOL19     92.91   90.15   84.65   76.58   66.18   53.78
SO YBADJ    COOL19     39.73   24.48    8.49   -7.76  -23.78  -39.07
SO YBADJ    COOL19    -53.18  -65.67  -76.16  -84.34  -89.96  -92.85
SO YBADJ    COOL19    -92.91  -90.15  -84.65  -76.58  -66.18  -53.78


SO BUILDHGT COOL20     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL20     76.20   76.20   76.20   11.30   11.30   11.30
SO BUILDHGT COOL20     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL20     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL20     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL20     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDWID COOL20    189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL20     68.82   68.20   65.50  397.60  419.17  428.01
SO BUILDWID COOL20    427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDWID COOL20    189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL20    264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL20    427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDLEN COOL20    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL20     42.42   32.35   21.30  189.08  119.49   46.27
SO BUILDLEN COOL20     61.10  133.77  202.37  264.83  319.24  363.95
SO BUILDLEN COOL20    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL20    355.85  309.08  252.92  189.08  119.49   46.27
SO BUILDLEN COOL20     61.10  133.77  202.37  264.83  319.24  363.95
SO XBADJ    COOL20    -99.58 -103.84 -104.95 -104.60 -102.21  -96.72
SO XBADJ    COOL20   -344.60 -344.65 -334.22  -48.32  -31.46  -13.64
SO XBADJ    COOL20    -40.14  -95.26 -147.49 -195.24 -237.05 -271.67
SO XBADJ    COOL20   -298.03 -315.33 -323.05 -322.68 -313.65 -295.09
SO XBADJ    COOL20   -267.57 -231.91 -189.21 -140.76  -88.03  -32.63
SO XBADJ    COOL20    -20.96  -38.51  -54.88  -69.59  -82.19  -92.28
SO YBADJ    COOL20    -46.22  -28.29   -9.49    9.59   28.38   46.30
SO YBADJ    COOL20     57.55    0.52  -56.53   99.23  105.74  109.05
SO YBADJ    COOL20    109.04  105.72   99.19   89.64   77.37   62.75
SO YBADJ    COOL20     46.22   28.29    9.49   -9.59  -28.38  -46.30
SO YBADJ    COOL20    -62.82  -77.43  -89.69  -99.23 -105.74 -109.05
SO YBADJ    COOL20   -109.04 -105.72  -99.19  -89.64  -77.37  -62.75


SO BUILDHGT COOL21     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL21     76.20   76.20   76.20   11.30   11.30   11.30
SO BUILDHGT COOL21     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL21     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL21     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL21     11.30   11.30   11.30   11.30   11.30   11.30
```

```
SO BUILDWID COOL21    189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL21     68.71   68.20   65.50  397.60  419.17  428.01
SO BUILDWID COOL21    427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDWID COOL21    189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL21    264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL21    427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDLEN COOL21    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL21     42.42   32.35   21.30  189.08  119.49   46.27
SO BUILDLEN COOL21     61.10  133.77  202.37  264.83  319.24  363.95
SO BUILDLEN COOL21    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL21    355.85  309.08  252.92  189.08  119.49   46.27
SO BUILDLEN COOL21     61.10  133.77  202.37  264.83  319.24  363.95
SO XBADJ    COOL21    -84.62  -87.86  -88.43  -88.04  -86.12  -81.58
SO XBADJ    COOL21   -330.87 -332.75 -324.52  -41.11  -26.95  -11.98
SO XBADJ    COOL21    -41.37  -99.35 -154.31 -204.59 -248.64 -285.15
SO XBADJ    COOL21   -312.99 -331.31 -339.58 -339.24 -329.75 -310.23
SO XBADJ    COOL21   -281.29 -243.80 -198.91 -147.97  -92.54  -34.29
SO XBADJ    COOL21    -19.73  -34.42  -48.06  -60.24  -70.60  -78.80
SO YBADJ    COOL21    -53.43  -32.79  -11.15   10.82   32.47   53.13
SO YBADJ    COOL21     66.90   12.11  -43.05  114.18  121.73  125.57
SO YBADJ    COOL21    125.60  121.81  114.33  103.36   89.26   72.45
SO YBADJ    COOL21     53.43   32.79   11.15  -10.82  -32.47  -53.13
SO YBADJ    COOL21    -72.17  -89.02 -103.17 -114.18 -121.73 -125.57
SO YBADJ    COOL21   -125.60 -121.81 -114.33 -103.36  -89.26  -72.45


SO BUILDHGT COOL22     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL22     11.30   76.20   76.20   11.30   11.30   11.30
SO BUILDHGT COOL22     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL22     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL22     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL22     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDWID COOL22    189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL22    264.83   68.20   65.50  397.60  419.17  428.01
SO BUILDWID COOL22    427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDWID COOL22    189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL22    264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL22    427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDLEN COOL22    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL22    355.85   32.35   21.30  189.08  119.49   46.27
SO BUILDLEN COOL22     61.10  133.77  202.37  264.83  319.24  363.95
SO BUILDLEN COOL22    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL22    355.85  309.08  252.92  189.08  119.49   46.27
SO BUILDLEN COOL22     61.10  133.77  202.37  264.83  319.24  363.95
SO XBADJ    COOL22    -69.91  -72.18  -72.26  -71.86  -70.43  -66.85
SO XBADJ    COOL22    -61.25 -321.26 -315.19  -34.23  -22.73  -10.54
SO XBADJ    COOL22    -42.76 -103.53 -161.16 -213.88 -260.11 -298.44
SO XBADJ    COOL22   -327.69 -346.99 -355.75 -355.42 -345.43 -324.96
SO XBADJ    COOL22   -294.60 -255.30 -208.24 -154.85  -96.76  -35.72
SO XBADJ    COOL22    -18.33  -30.23  -41.22  -50.95  -59.13  -65.51
SO YBADJ    COOL22    -60.31  -37.01  -12.59   12.22   36.65   59.97
SO YBADJ    COOL22     81.47   23.58  -29.76  128.89  137.41  141.75
SO YBADJ    COOL22    141.78  137.50  129.05  116.68  100.76   81.78
SO YBADJ    COOL22     60.31   37.01   12.59  -12.22  -36.65  -59.97
SO YBADJ    COOL22    -81.47 -100.49 -116.46 -128.89 -137.41 -141.75
SO YBADJ    COOL22   -141.78 -137.50 -129.05 -116.68 -100.76  -81.78


SO BUILDHGT COOL23     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL23     11.30   76.20   76.20   76.20   11.30   11.30
SO BUILDHGT COOL23     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL23     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL23     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL23     11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDWID COOL23    189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL23    264.83   68.16   65.50   68.16  419.17  428.01
SO BUILDWID COOL23    427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDWID COOL23    189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL23    264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL23    427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDLEN COOL23    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL23    355.85   32.35   21.30   32.35  119.49   46.27
SO BUILDLEN COOL23     61.10  133.77  202.37  264.83  319.24  363.95
SO BUILDLEN COOL23    397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL23    355.85  309.08  252.92  189.08  119.49   46.27
SO BUILDLEN COOL23     61.10  133.77  202.37  264.83  319.24  363.95
SO XBADJ    COOL23    -55.08  -56.45  -56.10  -55.77  -54.90  -52.35
SO XBADJ    COOL23    -48.22 -310.09 -306.23 -304.44  -18.92   -9.53
SO XBADJ    COOL23    -44.57 -108.10 -168.35 -223.49 -271.83 -311.92
```

```
SO XBADJ    COOL23  -342.52 -362.73 -371.90 -371.50 -360.96 -339.46
SO XBADJ    COOL23  -307.63 -266.46 -217.20 -161.33 -100.57  -36.74
SO XBADJ    COOL23   -16.53  -25.67  -34.02  -41.34  -47.41  -52.03
SO YBADJ    COOL23   -66.79  -40.82  -13.61   14.02   41.22   67.16
SO YBADJ    COOL23    91.07   35.30  -16.28  -67.36  153.14  157.90
SO YBADJ    COOL23   157.87  153.03  143.55  129.71  111.92   90.74
SO YBADJ    COOL23    66.79   40.82   13.61  -14.02  -41.22  -67.16
SO YBADJ    COOL23   -91.07 -112.21 -129.94 -143.72 -153.14 -157.90
SO YBADJ    COOL23  -157.87 -153.03 -143.55 -129.71 -111.92  -90.74


SO BUILDHGT COOL24    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL24    11.30   76.20   76.20   76.20   11.30   11.30
SO BUILDHGT COOL24    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL24    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL24    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL24    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDWID COOL24   189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL24   264.83   67.61   65.50   67.61  419.17  428.01
SO BUILDWID COOL24   427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDWID COOL24   189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL24   264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL24   427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDLEN COOL24   397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL24   355.85   32.35   21.30   32.35  119.49   46.27
SO BUILDLEN COOL24    61.10  133.77  202.37  264.83  319.24  363.95
SO BUILDLEN COOL24   397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL24   355.85  309.08  252.92  189.08  119.49   46.27
SO BUILDLEN COOL24    61.10  133.77  202.37  264.83  319.24  363.95
SO XBADJ    COOL24   -39.59  -39.95  -39.11  -38.80  -38.46  -36.94
SO XBADJ    COOL24   -34.31 -298.11 -296.53 -297.32  -14.60   -8.13
SO XBADJ    COOL24   -46.15 -112.61 -175.64 -233.34 -283.95 -325.94
SO XBADJ    COOL24  -358.02 -379.22 -388.90 -388.48 -377.41 -354.87
SO XBADJ    COOL24  -321.54 -278.45 -226.90 -168.45 -104.89  -38.13
SO XBADJ    COOL24   -14.95  -21.16  -26.73  -31.49  -35.29  -38.01
SO YBADJ    COOL24   -73.91  -45.14  -15.00   15.60   45.72   74.46
SO YBADJ    COOL24   100.93   47.42   -2.26  -51.87  169.63  174.89
SO YBADJ    COOL24   174.84  169.48  158.96  143.62  123.91  100.44
SO YBADJ    COOL24    73.91   45.14   15.00  -15.60  -45.72  -74.46
SO YBADJ    COOL24  -100.93 -124.33 -143.96 -159.22 -169.63 -174.89
SO YBADJ    COOL24  -174.84 -169.48 -158.96 -143.62 -123.91 -100.44


SO BUILDHGT COOL25    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL25    11.30   76.20   76.20   76.20   11.30   11.30
SO BUILDHGT COOL25    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL25    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL25    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL25    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDWID COOL25   189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL25   264.83   68.07   65.50   68.07  419.17  428.01
SO BUILDWID COOL25   427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDWID COOL25   189.08  119.49   46.27   61.10  133.77  202.37
SO BUILDWID COOL25   264.83  319.24  363.95  397.60  419.17  428.01
SO BUILDWID COOL25   427.28  415.86  391.81  355.85  309.08  252.92
SO BUILDLEN COOL25   397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL25   355.85   32.35   21.30   32.35  119.49   46.27
SO BUILDLEN COOL25    61.10  133.77  202.37  264.83  319.24  363.95
SO BUILDLEN COOL25   397.60  419.17  428.01  427.28  415.86  391.81
SO BUILDLEN COOL25   355.85  309.08  252.92  189.08  119.49   46.27
SO BUILDLEN COOL25    61.10  133.77  202.37  264.83  319.24  363.95
SO XBADJ    COOL25   -24.75  -24.22  -22.96  -22.71  -22.93  -22.44
SO XBADJ    COOL25   -21.28 -286.94 -287.57 -290.84  -10.79   -7.12
SO XBADJ    COOL25   -47.95 -117.17 -182.84 -242.95 -295.67 -339.42
SO XBADJ    COOL25  -372.85 -394.95 -405.05 -404.56 -392.93 -369.37
SO XBADJ    COOL25  -334.57 -289.62 -235.86 -174.93 -108.70  -39.15
SO XBADJ    COOL25   -13.15  -16.60  -19.54  -21.88  -23.57  -24.53
SO YBADJ    COOL25   -80.40  -48.95  -16.02   17.40   50.29   81.65
SO YBADJ    COOL25   110.53   59.14   11.22  -37.04  185.36  191.05
SO YBADJ    COOL25   190.93  185.00  173.46  156.65  135.07  109.40
SO YBADJ    COOL25    80.40   48.95   16.02  -17.40  -50.29  -81.65
SO YBADJ    COOL25  -110.53 -136.05 -157.44 -174.05 -185.36 -191.05
SO YBADJ    COOL25  -190.93 -185.00 -173.46 -156.65 -135.07 -109.40


SO BUILDHGT COOL26    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL26    11.30   11.30   82.30   82.30   76.20   11.30
SO BUILDHGT COOL26    11.30   11.30   11.30   11.30   11.30   11.30
SO BUILDHGT COOL26    11.30   11.30   11.30   11.30   11.30   11.30
```

```
SO BUILDHGT COOL26    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDHGT COOL26    11.30  11.30  11.30  11.30  11.30  11.30
SO BUILDWID COOL26   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL26   264.83 319.24  65.87  89.27  68.83 428.01
SO BUILDWID COOL26   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDWID COOL26   189.08 119.49  46.27  61.10 133.77 202.37
SO BUILDWID COOL26   264.83 319.24 363.95 397.60 419.17 428.01
SO BUILDWID COOL26   427.28 415.86 391.81 355.85 309.08 252.92
SO BUILDLEN COOL26   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL26   355.85 309.09 140.50 149.80  42.42  46.27
SO BUILDLEN COOL26    61.10 133.77 202.37 264.83 319.24 363.95
SO BUILDLEN COOL26   397.60 419.17 428.01 427.28 415.86 391.81
SO BUILDLEN COOL26   355.85 309.08 252.92 189.08 119.49  46.27
SO BUILDLEN COOL26    61.10 133.77 202.37 264.83 319.24 363.95
SO XBADJ    COOL26   -10.08  -8.61  -6.87  -6.65  -7.37  -7.87
SO XBADJ    COOL26    -8.14  -8.15 -534.54 -535.23 -281.21  -5.84
SO XBADJ    COOL26   -49.48 -121.47 -189.77 -252.31 -307.17 -352.71
SO XBADJ    COOL26  -387.52 -410.57 -421.13 -420.63 -408.49 -383.93
SO XBADJ    COOL26  -347.72 -300.94 -245.01 -181.64 -112.75  -40.43
SO XBADJ    COOL26   -11.62 -12.30 -12.60 -12.52 -12.07 -11.24
SO YBADJ    COOL26   -87.10 -53.00 -17.30  18.93  54.59  88.59
SO YBADJ    COOL26   119.89 147.55  17.82 -63.07 -68.55 207.13
SO YBADJ    COOL26   206.99 200.56 188.03 169.79 146.39 118.55
SO YBADJ    COOL26    87.10  53.00  17.30 -18.93 -54.59 -88.59
SO YBADJ    COOL26  -119.89 -147.55 -170.73 -188.72 -200.98 -207.13
SO YBADJ    COOL26  -206.99 -200.56 -188.03 -169.79 -146.39 -118.55


SO BUILDHGT UNIT3     32.00  82.30  82.30  82.30  82.30  33.90
SO BUILDHGT UNIT3     32.00  32.00  32.00  32.00  32.00  32.00
SO BUILDHGT UNIT3     32.00  32.00  32.00  32.00  32.00  32.00
SO BUILDHGT UNIT3     32.00  32.00  32.00  32.00  32.00  32.00
SO BUILDHGT UNIT3     32.00  32.00  32.00  32.00  32.00  32.00
SO BUILDHGT UNIT3     32.00  32.00  32.00  32.00  32.00  32.00
SO BUILDWID UNIT3     32.94 154.55 154.61  83.75  85.21  59.64
SO BUILDWID UNIT3     44.37  43.23  41.05  43.19  44.29  44.32
SO BUILDWID UNIT3     32.46  34.15  34.80  34.39  32.94  30.48
SO BUILDWID UNIT3     32.94  34.39  34.80  34.15  32.46  44.43
SO BUILDWID UNIT3     44.37  43.23  41.05  43.19  44.29  44.32
SO BUILDWID UNIT3     32.46  34.15  34.80  34.39  32.94  30.48
SO BUILDLEN UNIT3     21.84 109.95 127.29  85.21  83.75  80.81
SO BUILDLEN UNIT3     34.39  32.94  30.48  32.94  34.48  38.38
SO BUILDLEN UNIT3     34.15  32.46  29.79  26.21  21.84  16.80
SO BUILDLEN UNIT3     21.84  26.21  29.79  32.46  34.15  38.18
SO BUILDLEN UNIT3     34.39  32.94  30.48  32.94  34.48  38.38
SO BUILDLEN UNIT3     34.15  32.46  29.79  26.21  21.84  16.80
SO XBADJ    UNIT3   -34.88 -345.41 -367.70 -323.26 -378.43 -205.95
SO XBADJ    UNIT3   -25.46 -20.63 -15.18 -12.18  -8.81  -5.18
SO XBADJ    UNIT3    -1.38   2.45   6.21   9.79  13.06  15.94
SO XBADJ    UNIT3    13.04   9.74   6.15   2.37  -1.48  -5.28
SO XBADJ    UNIT3    -8.93 -12.30 -15.30 -20.76 -25.67 -33.20
SO XBADJ    UNIT3   -32.77 -34.92 -36.00 -36.00 -34.90 -32.74
SO YBADJ    UNIT3    -4.29 103.84  51.82 -34.87 -27.51 -22.39
SO YBADJ    UNIT3   -31.97 -34.67 -36.46 -34.63 -31.89 -28.31
SO YBADJ    UNIT3   -18.60 -15.60 -12.12  -8.27  -4.17   0.06
SO YBADJ    UNIT3     4.29   8.38  12.22  15.69  18.68  28.43
SO YBADJ    UNIT3    31.97  34.67  36.46  34.63  31.89  28.31
SO YBADJ    UNIT3    18.60  15.60  12.12   8.27   4.17  -0.06


SO BUILDHGT EP1       0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT EP1       0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT EP1       0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT EP1       0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT EP1      82.30  82.30  82.30   0.00   0.00   0.00
SO BUILDHGT EP1       0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID EP1       0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID EP1       0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID EP1       0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID EP1       0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID EP1     109.95  89.27  65.87   0.00   0.00   0.00
SO BUILDWID EP1       0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDLEN EP1       0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDLEN EP1       0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDLEN EP1       0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDLEN EP1       0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDLEN EP1     154.55 149.80  54.06   0.00   0.00   0.00
SO BUILDLEN EP1       0.00   0.00   0.00   0.00   0.00   0.00
SO XBADJ    EP1       0.00   0.00   0.00   0.00   0.00   0.00
```

```
SO XBADJ    EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO XBADJ    EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO XBADJ    EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO XBADJ    EP1   -388.01 -390.37 -380.86  0.00   0.00   0.00
SO XBADJ    EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO YBADJ    EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO YBADJ    EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO YBADJ    EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO YBADJ    EP1      0.00   0.00   0.00   0.00   0.00   0.00
SO YBADJ    EP1     54.43  -0.36 -55.13   0.00   0.00   0.00
SO YBADJ    EP1      0.00   0.00   0.00   0.00   0.00   0.00


SO BUILDHGT EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDHGT EP2     82.30  82.30  82.30   0.00   0.00   0.00
SO BUILDHGT EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDWID EP2    109.95  89.27  65.87   0.00   0.00   0.00
SO BUILDWID EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDLEN EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDLEN EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDLEN EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDLEN EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO BUILDLEN EP2    154.55 149.80  54.06   0.00   0.00   0.00
SO BUILDLEN EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO XBADJ    EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO XBADJ    EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO XBADJ    EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO XBADJ    EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO XBADJ    EP2   -447.61 -456.20 -364.48  0.00   0.00   0.00
SO XBADJ    EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO YBADJ    EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO YBADJ    EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO YBADJ    EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO YBADJ    EP2      0.00   0.00   0.00   0.00   0.00   0.00
SO YBADJ    EP2     95.52  29.76 -36.90   0.00   0.00   0.00
SO YBADJ    EP2      0.00   0.00   0.00   0.00   0.00   0.00


SO BUILDHGT EP3     30.50  30.50  30.50  30.50  30.50  30.50
SO BUILDHGT EP3     30.50  30.50  30.50  30.50  30.50  42.70
SO BUILDHGT EP3     42.70  42.70  42.70  42.70  30.50  30.50
SO BUILDHGT EP3     30.50  30.50  30.50  30.50  30.50  30.50
SO BUILDHGT EP3     30.50  30.50  30.50  30.50  30.50  30.50
SO BUILDHGT EP3     30.50  30.50  30.50  30.50  30.50  30.50
SO BUILDWID EP3     17.61  19.48  20.76  21.41  21.41  20.76
SO BUILDWID EP3     19.48  17.61  15.20  17.61  19.48 106.13
SO BUILDWID EP3    122.48 135.12 143.65 147.81  17.61  15.20
SO BUILDWID EP3     42.14  46.40  49.25  21.41  21.41  20.76
SO BUILDWID EP3     19.48  17.61  15.20  17.61  19.48  20.76
SO BUILDWID EP3     21.41  21.41  20.76  19.48  17.61  15.20
SO BUILDLEN EP3     17.61  19.48  20.76  21.41  21.41  20.76
SO BUILDLEN EP3     19.48  17.61  15.20  17.61  19.48 143.65
SO BUILDLEN EP3    135.12 122.48 106.13  86.55  17.61  15.20
SO BUILDLEN EP3     40.92  45.50  48.70  21.41  21.41  20.76
SO BUILDLEN EP3     19.48  17.61  15.20  17.61  19.48  20.76
SO BUILDLEN EP3     21.41  21.41  20.76  19.48  17.61  15.20
SO XBADJ    EP3     -7.78  -8.63  -9.22  -9.53  -9.54  -9.27
SO XBADJ    EP3     -8.72  -7.90  -6.84  -8.21  -9.34 -275.37
SO XBADJ    EP3   -280.29 -276.70 -264.71 -244.67 -9.56  -8.51
SO XBADJ    EP3   -180.77 -183.62 -180.90 -11.89 -11.87 -11.49
SO XBADJ    EP3    -10.76  -9.71  -8.36  -9.40 -10.15 -10.59
SO XBADJ    EP3    -10.71 -10.50  -9.98  -9.15  -8.04  -6.69
SO YBADJ    EP3     -0.59  -0.40  -0.21   0.00   0.20   0.40
SO YBADJ    EP3      0.59   0.76   0.91   1.02   1.11  70.74
SO YBADJ    EP3     34.32  -3.14 -40.51 -76.64   0.91   0.76
SO YBADJ    EP3     17.27 -10.83 -38.60   0.00  -0.20  -0.40
SO YBADJ    EP3     -0.59  -0.76  -0.91  -1.02  -1.11  -1.16
SO YBADJ    EP3     -1.18  -1.16  -1.11  -1.02  -0.91  -0.76


SO BUILDHGT EP4     76.20  76.20  76.20  76.20  76.20  76.20
SO BUILDHGT EP4     82.30  82.30  82.30  82.30  82.30  82.30
```

```
SO BUILDHGT EP4     76.20  76.20  76.20  76.20  76.20  76.20
SO BUILDHGT EP4     76.20  76.20  76.20  76.20  76.20  76.20
SO BUILDHGT EP4     82.30  82.30  82.30  82.30  82.30  82.30
SO BUILDHGT EP4     76.20  76.20  76.20  76.20  76.20  76.20
SO BUILDWID EP4     32.35  42.42  51.20  58.42  63.87  67.37
SO BUILDWID EP4    109.95  89.27  65.87  89.27 109.95  84.08
SO BUILDWID EP4     63.87  58.42  51.20  42.42  32.35  21.30
SO BUILDWID EP4     32.35  42.42  51.20  58.42  63.87  67.37
SO BUILDWID EP4    109.95  89.27  65.87  89.27 109.95  84.08
SO BUILDWID EP4     63.87  58.42  51.20  42.42  32.35  21.30
SO BUILDLEN EP4     68.20  68.83  67.37  63.87  58.42  51.20
SO BUILDLEN EP4    154.55 149.80  54.06 149.80 154.55  79.75
SO BUILDLEN EP4     58.42  63.87  67.37  68.83  68.20  65.50
SO BUILDLEN EP4     68.20  68.83  67.37  63.87  58.42  51.20
SO BUILDLEN EP4    154.55 149.80  54.06 149.80 154.55  79.75
SO BUILDLEN EP4     58.42  63.87  67.37  68.83  68.20  65.50
SO XBADJ    EP4    -13.95 -15.29 -16.17 -16.55 -16.43 -15.81
SO XBADJ    EP4   -257.73 -266.59 -267.34 -271.40 -267.22 -180.07
SO XBADJ    EP4    -42.86 -48.05 -51.78 -53.93 -54.45 -53.31
SO XBADJ    EP4    -54.25 -53.54 -51.21 -47.32 -41.99 -35.38
SO XBADJ    EP4    103.18 116.79 126.84 121.60 112.67 100.32
SO XBADJ    EP4    -15.56 -15.82 -15.60 -14.90 -13.75 -12.19
SO YBADJ    EP4      4.13   7.57  10.78  13.65  16.12  18.09
SO YBADJ    EP4     80.44  47.89  13.87 -20.56 -54.37 -64.92
SO YBADJ    EP4     15.38  12.78   9.79   6.50   3.01  -0.57
SO YBADJ    EP4     -4.13  -7.57 -10.78 -13.65 -16.12 -18.09
SO YBADJ    EP4    -80.44 -47.89 -13.87  20.56  54.37  64.92
SO YBADJ    EP4    -15.38 -12.78  -9.79  -6.50  -3.01   0.57


SO BUILDHGT EP5     82.30  82.30  82.30  33.90  33.90  18.90
SO BUILDHGT EP5     18.90  18.90  18.90  18.90  18.90  18.90
SO BUILDHGT EP5     18.90  18.90  18.90  18.90  18.90  18.90
SO BUILDHGT EP5     18.90  18.90  18.90  18.90  18.90  18.90
SO BUILDHGT EP5     18.90  18.90  18.90  32.00  32.00  32.00
SO BUILDHGT EP5     18.90  18.90  33.90  33.90  82.30  82.30
SO BUILDWID EP5    149.80 154.55 154.61  75.99  68.86  23.35
SO BUILDWID EP5     22.33  20.63  18.30  20.63  22.33  23.35
SO BUILDWID EP5     23.66  23.25  22.14  20.35  17.95  15.00
SO BUILDWID EP5     17.95  20.35  22.14  23.25  23.66  23.35
SO BUILDWID EP5     22.33  20.63  18.30  43.19  44.29  44.32
SO BUILDWID EP5     23.66  23.25  80.81  83.18 149.80 140.50
SO BUILDLEN EP5     89.27 109.95 127.29  68.86  75.99  22.14
SO BUILDLEN EP5     20.35  17.95  15.00  17.95  20.35  22.14
SO BUILDLEN EP5     23.25  23.66  23.35  22.33  20.63  18.30
SO BUILDLEN EP5     20.63  22.33  23.35  23.66  23.25  22.14
SO BUILDLEN EP5     20.35  17.95  15.00  32.94  34.48  38.38
SO BUILDLEN EP5     23.25  23.66  59.64  48.60  89.27  65.87
SO XBADJ    EP5   -314.80 -319.77 -315.01 -205.49 -206.01 -10.23
SO XBADJ    EP5     -8.61  -6.73  -4.65  -5.60  -6.38  -6.97
SO XBADJ    EP5     -7.35  -7.50  -7.42  -7.12  -6.61  -5.89
SO XBADJ    EP5     -7.60  -9.07 -10.28 -11.17 -11.72 -11.91
SO XBADJ    EP5    -11.74 -11.22 -10.35 -180.78 -183.64 -184.32
SO XBADJ    EP5    -15.91 -16.16 -156.74 -156.99 -301.02 -300.27
SO YBADJ    EP5     -7.34 -54.14 -99.30  -2.57 -32.23  -4.25
SO YBADJ    EP5     -4.04  -3.71  -3.26  -2.72  -2.09  -1.40
SO YBADJ    EP5     -0.66   0.09   0.84   1.56   2.24   2.85
SO YBADJ    EP5      3.37   3.80   4.10   4.28   4.33   4.25
SO YBADJ    EP5      4.04   3.71   3.26  36.81   6.24 -24.38
SO YBADJ    EP5      0.66  -0.09  44.35  21.64  85.51  39.69


SO BUILDHGT EP6     76.20  76.20  76.20  76.20  82.30  82.30
SO BUILDHGT EP6     82.30  82.30  25.90  33.90  33.90  25.90
SO BUILDHGT EP6     25.90  32.00  32.00  32.00  32.00  33.50
SO BUILDHGT EP6     25.90  76.20  76.20  76.20  76.20  76.20
SO BUILDHGT EP6     25.90  25.90  25.90  25.90  25.90  25.90
SO BUILDHGT EP6     25.90  25.90  25.90  25.90  25.90  33.50
SO BUILDWID EP6     32.35  42.42  51.20  58.42  85.21  84.08
SO BUILDWID EP6    109.95  89.27  33.60  36.09  48.60  56.55
SO BUILDWID EP6     65.30  41.21  34.80  34.39  32.94  88.10
SO BUILDWID EP6     78.74  42.42  51.20  58.42  63.87  67.37
SO BUILDWID EP6     46.08  34.21  33.60  34.21  46.08  56.55
SO BUILDWID EP6     65.30  72.06  76.64  78.89  78.74  88.10
SO BUILDLEN EP6     68.20  68.83  67.37  63.87  83.75  79.75
SO BUILDLEN EP6    154.55 149.80  90.32  83.02  83.18  76.64
SO BUILDLEN EP6     72.06  43.42  29.79  26.21  21.84 112.87
SO BUILDLEN EP6     34.21  68.83  67.37  63.87  58.42  51.20
SO BUILDLEN EP6     78.89  78.74  90.32  78.74  78.89  76.64
```

```
SO BUILDLEN EP6      72.06  65.30  56.55  46.08  34.21  47.00
SO XBADJ   EP6     -139.02 -142.67 -141.97 -136.97 -262.20 -339.98
SO XBADJ   EP6     -341.23 -332.10 -83.70 -221.94 -219.07 -86.03
SO XBADJ   EP6      -81.53 -128.30 -131.23 -130.19 -125.18  65.66
SO XBADJ   EP6      -25.38  73.83  74.60  73.10  69.38  63.55
SO XBADJ   EP6       -2.22   2.68  -6.62   8.39   9.03   9.39
SO XBADJ   EP6        9.47   9.26   8.77   8.01   7.00 -178.53
SO YBADJ   EP6       28.33   9.68  -9.26 -27.93  47.67  51.91
SO YBADJ   EP6      -15.77 -61.37  10.29  -1.20 -32.51  -8.56
SO YBADJ   EP6      -16.72  30.89  14.44  -5.99 -26.23 -51.05
SO YBADJ   EP6      -47.76  -9.68   9.26  27.93  45.74  62.16
SO YBADJ   EP6      -31.05 -24.11 -10.29  -8.27   0.15   8.56
SO YBADJ   EP6       16.72  24.37  31.27  37.23  42.05  51.05

SO BUILDHGT U3ZLDSD   30.50  30.50  30.50  30.50  30.50  30.50
SO BUILDHGT U3ZLDSD   30.50  42.70  42.70  42.70  42.70  30.50
SO BUILDHGT U3ZLDSD   30.50  30.50  30.50  30.50  30.50  30.50
SO BUILDHGT U3ZLDSD   30.50  30.50  30.50  30.50  30.50  30.50
SO BUILDHGT U3ZLDSD   30.50  30.50  30.50  30.50  30.50  30.50
SO BUILDHGT U3ZLDSD   30.50  30.50  30.50  30.50  30.50  30.50
SO BUILDWID U3ZLDSD   42.14  46.40  49.25  50.60  50.41  48.70
SO BUILDWID U3ZLDSD   45.50  64.34  40.17  64.34  86.55  48.70
SO BUILDWID U3ZLDSD   50.41  50.60  49.25  46.40  42.14  36.60
SO BUILDWID U3ZLDSD   42.14  46.40  49.25  50.60  50.41  48.70
SO BUILDWID U3ZLDSD   45.50  40.92  35.10  40.92  45.50  48.70
SO BUILDWID U3ZLDSD   50.41  50.60  49.25  46.40  42.14  36.60
SO BUILDLEN U3ZLDSD   40.92  45.50  48.70  50.41  50.60  49.25
SO BUILDLEN U3ZLDSD   46.40 147.49 142.68 147.49 147.81  49.25
SO BUILDLEN U3ZLDSD   50.60  50.41  48.70  45.50  40.92  35.10
SO BUILDLEN U3ZLDSD   40.92  45.50  48.70  50.41  50.60  49.25
SO BUILDLEN U3ZLDSD   46.40  42.14  36.60  42.14  46.40  49.25
SO BUILDLEN U3ZLDSD   50.60  50.41  48.70  45.50  40.92  35.10
SO XBADJ   U3ZLDSD  -22.50 -25.82 -28.36 -30.03 -30.79 -30.62
SO XBADJ   U3ZLDSD  -29.51 -261.69 -263.46 -264.20 -256.91 -29.67
SO XBADJ   U3ZLDSD  -29.57 -28.58 -26.72 -24.04 -20.64 -16.60
SO XBADJ   U3ZLDSD  -18.42 -19.68 -20.34 -20.38 -19.81 -18.63
SO XBADJ   U3ZLDSD  -16.89 -14.63 -11.93 -14.96 -17.53 -19.58
SO XBADJ   U3ZLDSD  -21.03 -21.84 -21.98 -21.46 -20.29 -18.50
SO YBADJ   U3ZLDSD    6.11   5.67   5.05   4.27   3.37   2.37
SO YBADJ   U3ZLDSD    1.29  40.47   7.21 -26.26 -58.93  -4.01
SO YBADJ   U3ZLDSD   -4.82  -5.49  -5.99  -6.31  -6.44  -6.37
SO YBADJ   U3ZLDSD   -6.11  -5.67  -5.05  -4.27  -3.37  -2.37
SO YBADJ   U3ZLDSD   -1.29  -0.17   0.95   2.04   3.07   4.01
SO YBADJ   U3ZLDSD    4.82   5.49   5.99   6.31   6.44   6.37

   SRCGROUP ALL
SO FINISHED
**
****************************************
** AERMOD Receptor Pathway
****************************************
**
**
RE STARTING
   INCLUDED seci1.rou
RE FINISHED
**
****************************************
** AERMOD Meteorology Pathway
****************************************
**
**
ME STARTING
   SURFFILE C:\AMODMET\JAXAYS86.SFC
   PROFFILE C:\AMODMET\JAXAYS86.PFL
   SURFDATA 13889 1986 JACKSONVILLE/INT'L_ARPT
   UAIRDATA 13861 1986 WAYCROSS/WSMO
   PROFBASE 26 FEET
ME FINISHED
**
****************************************
** AERMOD Output Pathway
****************************************
**
**
OU STARTING
   RECTABLE ALLAVE FIRST
OU FINISHED
```

AERBOB RELEASE 020304

AERMOD OUTPUT FILE NUMBER 1 :pmsig.o86
AERMOD OUTPUT FILE NUMBER 2 :pmsig.o87
AERMOD OUTPUT FILE NUMBER 3 :pmsig.o88
AERMOD OUTPUT FILE NUMBER 4 :pmsig.o89
AERMOD OUTPUT FILE NUMBER 5 :pmsig.o90
First title for last output file is: 1986 SECI UNITS 3, PM10 SIG ANALYSIS AERMOD 2/18/06
Second title for last output file is: JAX/WAYCROSS 1986-1990 MET DATA

AVERAGING TIME	YEAR	CONC (ug/m3)	X (m)	Y (m)	PERIOD ENDING (YYMMDDHH)
SOURCE GROUP ID: ALL					
Annual					
	1986	0.635	439646.	3289357.	86123124
	1987	0.564	439657.	3289309.	87123124
	1988	0.543	439646.	3289357.	88123124
	1989	0.646	439646.	3289357.	89123124
	1990	0.564	439646.	3289357.	90123124
HIGH 24-Hour					
	1986	3.141	439612.	3289501.	86042324
	1987	2.732	439669.	3289261.	87120124
	1988	3.468	437855.	3290267.	88040324
	1989	3.975	439657.	3289309.	89052724
	1990	2.350	439669.	3289261.	90111224

All receptor computations reported with respect to a user-specified origin
GRID 0.00 0.00
DISCRETE 0.00 0.00

```
CO STARTING
   TITLEONE 1986 SECI UNITS 3, CO ANALYSIS AERMOD          2/18/06
   TITLETWO JAX/WAYCROSS 1986-1990 MET DATA
   MODELOPT DFAULT CONC
   AVERTIME 8 1
   POLLUTID GEN
**   EVENTFIL EVPMSIG.I86 SOCONT
   RUNORNOT RUN
CO FINISHED
**
**************************************
** AERMOD Source Pathway
**************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **

   LOCATION UN3100  POINT 439047.950 3289334.740 25.000
   LOCATION U3ZLDSD POINT 439045.610 3289724.910 25.000

   SRCPARAM UN3100      141.8  205.8 325.400 18.80 7.930
   SRCPARAM U3ZLDSD       0.23  32.0 333.200 13.72 0.710

SO BUILDHGT U3ZLDSD   30.50  30.50  30.50  30.50  30.50  30.50
SO BUILDHGT U3ZLDSD   30.50  42.70  42.70  42.70  42.70  30.50
SO BUILDHGT U3ZLDSD   30.50  30.50  30.50  30.50  30.50  30.50
SO BUILDHGT U3ZLDSD   30.50  30.50  30.50  30.50  30.50  30.50
SO BUILDHGT U3ZLDSD   30.50  30.50  30.50  30.50  30.50  30.50
SO BUILDHGT U3ZLDSD   30.50  30.50  30.50  30.50  30.50  30.50
SO BUILDWID U3ZLDSD   42.14  46.40  49.25  50.60  50.41  48.70
SO BUILDWID U3ZLDSD   45.50  64.34  40.17  64.34  86.55  48.70
SO BUILDWID U3ZLDSD   50.41  50.60  49.25  46.40  42.14  36.60
SO BUILDWID U3ZLDSD   42.14  46.40  49.25  50.60  50.41  48.70
SO BUILDWID U3ZLDSD   45.50  40.92  35.10  40.92  45.50  48.70
SO BUILDWID U3ZLDSD   50.41  50.60  49.25  46.40  42.14  36.60
SO BUILDLEN U3ZLDSD   40.92  45.50  48.70  50.41  50.60  49.25
SO BUILDLEN U3ZLDSD   46.40 147.49 142.68 147.49 147.81  49.25
SO BUILDLEN U3ZLDSD   50.60  50.41  48.70  45.50  40.92  35.10
SO BUILDLEN U3ZLDSD   40.92  45.50  48.70  50.41  50.60  49.25
SO BUILDLEN U3ZLDSD   46.40  42.14  36.60  42.14  46.40  49.25
SO BUILDLEN U3ZLDSD   50.60  50.41  48.70  45.50  40.92  35.10
SO XBADJ    U3ZLDSD  -22.50 -25.82 -28.36 -30.03 -30.79 -30.62
SO XBADJ    U3ZLDSD  -29.51 -261.69 -263.46 -264.20 -256.91 -29.67
SO XBADJ    U3ZLDSD  -29.57 -28.58 -26.72 -24.04 -20.64 -16.60
SO XBADJ    U3ZLDSD  -18.42 -19.68 -20.34 -20.38 -19.81 -18.63
SO XBADJ    U3ZLDSD  -16.89 -14.63 -11.93 -14.96 -17.53 -19.58
SO XBADJ    U3ZLDSD  -21.03 -21.84 -21.98 -21.46 -20.29 -18.50
SO YBADJ    U3ZLDSD    6.11   5.67   5.05   4.27   3.37   2.37
SO YBADJ    U3ZLDSD    1.29  40.47   7.21 -26.26 -58.93  -4.01
SO YBADJ    U3ZLDSD   -4.82  -5.49  -5.99  -6.31  -6.44  -6.37
SO YBADJ    U3ZLDSD   -6.11  -5.67  -5.05  -4.27  -3.37  -2.37
SO YBADJ    U3ZLDSD   -1.29  -0.17   0.95   2.04   3.07   4.01
SO YBADJ    U3ZLDSD    4.82   5.49   5.99   6.31   6.44   6.37

   SRCGROUP ALL

SO FINISHED
**
**************************************
** AERMOD Receptor Pathway
**************************************
**
**
RE STARTING
   INCLUDED seci1.rou
RE FINISHED
**
**************************************
** AERMOD Meteorology Pathway
**************************************
**
**
ME STARTING
   SURFFILE C:\AMODMET\JAXAYS86.SFC
   PROFFILE C:\AMODMET\JAXAYS86.PFL
   SURFDATA 13889 1986 JACKSONVILLE/INT'L_ARPT
```

```
   UAIRDATA 13861 1986 WAYCROSS/WSMO
   PROFBASE 26 FEET
ME FINISHED
**
****************************************
** AERMOD Output Pathway
****************************************
**
**
OU STARTING
   RECTABLE ALLAVE FIRST
OU FINISHED
```

AERBOB RELEASE 020304
AERMOD OUTPUT FILE NUMBER 1 :COSIG.O86
AERMOD OUTPUT FILE NUMBER 2 :COSIG.O87
AERMOD OUTPUT FILE NUMBER 3 :COSIG.O88
AERMOD OUTPUT FILE NUMBER 4 :COSIG.O89
AERMOD OUTPUT FILE NUMBER 5 :COSIG.O90
First title for last output file is: 1986 SECI UNITS 3, CO ANALYSIS AERMOD 2/18/06
Second title for last output file is: JAX/WAYCROSS 1986-1990 MET DATA

AVERAGING TIME	YEAR	CONC (ug/m3)	X (m)	Y (m)	PERIOD ENDING (YYMMDDHH)
SOURCE GROUP ID: ALL					
HIGH 8-Hour					
	1986	18.84032	437791.	3290132.	86070716
	1987	17.81688	440462.	3288575.	87050816
	1988	16.78169	440462.	3288724.	88092516
	1989	18.46493	440462.	3289223.	89080616
	1990	15.67963	437834.	3290222.	90050816
HIGH 1-Hour					
	1986	39.18043	440500.	3287600.	86012516
	1987	34.80597	436800.	3285200.	87022710
	1988	29.14928	439500.	3290200.	88071712
	1989	29.23715	441800.	3287950.	89070308
	1990	28.89597	439600.	3290000.	90091415

All receptor computations reported with respect to a user-specified origin
GRID 0.00 0.00
DISCRETE 0.00 0.00

PROJECT PM_{10} ANALYSIS AT PSD CLASS I AREAS

CALPUFF INPUT FILES

```
SECI UNIT 3 CUMULATIVE MAX. FUTURE SHORT-TERM EMIS SECI ONLY     2/19/06
RECEPTORS AT OKEFENOKEE NWA                        SECI 0.165 LB/MMBTU
1990 NORTH CENTRAL FL - S. GA  WIND DOMAIN
---------------- Run title (3 lines) ------------------------------------------

                CALPUFF MODEL CONTROL FILE
                --------------------------

-------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names

--------------
Default Name  Type        File Name
------------  ----        ---------
CALMET.DAT    input   * METDAT =          *
   or
ISCMET.DAT    input   * ISCDAT =          *
   or
PLMMET.DAT    input   * PLMDAT =          *
   or
PROFILE.DAT   input   * PRFDAT =          *
SURFACE.DAT   input   * SFCDAT =          *
RESTARTB.DAT  input   * RSTARTB=          *
-------------------------------------------------------------------------------
CALPUFF.LST   output  ! PUFLST = SGS3.LST !
CONC.DAT      output  ! CONDAT = SGS3.CON !
DFLX.DAT      output  * DFDAT  =          *
WFLX.DAT      output  * WFDAT  =          *

VISB.DAT      output  ! VISDAT = VISB90.DAT   !
RESTARTE.DAT  output  * RSTARTE=          *
-------------------------------------------------------------------------------
Emission Files
--------------
PTEMARB.DAT   input   * PTDAT  =          *
VOLEMARB.DAT  input   * VOLDAT =          *
BAEMARB.DAT   input   * ARDAT  =          *
LNEMARB.DAT   input   * LNDAT  =          *
-------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input   ! OZDAT  = ..\OZONE\OZONE90.DAT  !
VD.DAT        input   * VDDAT  =          *
CHEM.DAT      input   * CHEMDAT=          *
H2O2.DAT      input   * H2O2DAT=          *
HILL.DAT      input   * HILDAT=           *
HILLRCT.DAT   input   * RCTDAT=           *
COASTLN.DAT   input   * CSTDAT=           *
FLUXBDY.DAT   input   * BDYDAT=           *
BCON.DAT      input   * BCNDAT=           *
DEBUG.DAT     output  * DEBUG=            *
MASSFLX.DAT   output  * FLXDAT=           *
MASSBAL.DAT   output  * BALDAT=           *
FOG.DAT       output  * FOGDAT=           *
-------------------------------------------------------------------------------
All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
         T = lower case      ! LCFILES = T !
         F = UPPER CASE
NOTE: (1) file/path names can be up to 70 characters in length


Provision for multiple input files
----------------------------------

     Number of CALMET.DAT files for run (NMETDAT)
                              Default: 1       ! NMETDAT =  24  !

     Number of PTEMARB.DAT files for run (NPTDAT)
                              Default: 0       ! NPTDAT =  0  !

     Number of BAEMARB.DAT files for run (NARDAT)
                              Default: 0       ! NARDAT =  0  !

     Number of VOLEMARB.DAT files for run (NVOLDAT)
                              Default: 0       ! NVOLDAT =  0  !

!END!
```

```
-------------
Subgroup (0a)
-------------

 The following CALMET.DAT filenames are processed in sequence if NMETDAT>1

Default Name  Type        File Name
------------  ----        ---------
CALMET.DAT   input   ! METDAT =c:\CALMET\NCF90\JANA.DAT ! !END!
CALMET.DAT   input   ! METDAT =c:\CALMET\NCF90\JANB.DAT ! !END!
CALMET.DAT   input   ! METDAT =c:\CALMET\NCF90\FEBA.DAT ! !END!
CALMET.DAT   input   ! METDAT =c:\CALMET\NCF90\FEBB.DAT ! !END!
CALMET.DAT   input   ! METDAT =c:\CALMET\NCF90\MARA.DAT ! !END!
CALMET.DAT   input   ! METDAT =c:\CALMET\NCF90\MARB.DAT ! !END!
CALMET.DAT   input   ! METDAT =c:\CALMET\NCF90\APRA.DAT ! !END!
CALMET.DAT   input   ! METDAT =c:\CALMET\NCF90\APRB.DAT ! !END!
CALMET.DAT   input   ! METDAT =c:\CALMET\NCF90\MAYA.DAT ! !END!
CALMET.DAT   input   ! METDAT =c:\CALMET\NCF90\MAYB.DAT ! !END!
CALMET.DAT   input   ! METDAT =c:\CALMET\NCF90\JUNA.DAT ! !END!
CALMET.DAT   input   ! METDAT =c:\CALMET\NCF90\JUNB.DAT ! !END!
CALMET.DAT   input   ! METDAT =c:\CALMET\NCF90\JULA.DAT ! !END!
CALMET.DAT   input   ! METDAT =c:\CALMET\NCF90\JULB.DAT ! !END!
CALMET.DAT   input   ! METDAT =c:\CALMET\NCF90\AUGA.DAT ! !END!
CALMET.DAT   input   ! METDAT =c:\CALMET\NCF90\AUGB.DAT ! !END!
CALMET.DAT   input   ! METDAT =c:\CALMET\NCF90\SEPA.DAT ! !END!
CALMET.DAT   input   ! METDAT =c:\CALMET\NCF90\SEPB.DAT ! !END!
CALMET.DAT   input   ! METDAT =c:\CALMET\NCF90\OCTA.DAT ! !END!
CALMET.DAT   input   ! METDAT =c:\CALMET\NCF90\OCTB.DAT ! !END!
CALMET.DAT   input   ! METDAT =c:\CALMET\NCF90\NOVA.DAT ! !END!
CALMET.DAT   input   ! METDAT =c:\CALMET\NCF90\NOVB.DAT ! !END!
CALMET.DAT   input   ! METDAT =c:\CALMET\NCF90\DECA.DAT ! !END!
CALMET.DAT   input   ! METDAT =c:\CALMET\NCF90\DECB.DAT ! !END!


-------------------------------------------------------------------------------

INPUT GROUP: 1 -- General run control parameters
--------------

   Option to run all periods found
   in the met. file     (METRUN)   Default: 0       ! METRUN =   0  !

       METRUN = 0 - Run period explicitly defined below
       METRUN = 1 - Run all periods in met. file

    Starting date:   Year (IBYR) -- No default       ! IBYR =  1990 !
    (used only if   Month (IBMO) -- No default       ! IBMO =  1    !
     METRUN = 0)       Day (IBDY) -- No default       ! IBDY =  6    !
                  Hour (IBHR) -- No default       ! IBHR =  1    !

    Base time zone        (XBTZ) -- No default       ! XBTZ =  5    !
      PST = 8., MST = 7.
      CST = 6., EST = 5.

    Length of run (hours) (IRLG) -- No default       ! IRLG = 8615 !

    Number of chemical species (NSPEC)
                           Default: 5       ! NSPEC = 12    !

    Number of chemical species
    to be emitted  (NSE)            Default: 3       ! NSE =   10    !

    Flag to stop run after
    SETUP phase (ITEST)             Default: 2       ! ITEST =  2    !
    (Used to allow checking
    of the model inputs, files, etc.)
         ITEST = 1 - STOPS program after SETUP phase
         ITEST = 2 - Continues with execution of program
                   after SETUP

    Restart Configuration:

      Control flag (MRESTART)      Default: 0       ! MRESTART =  0   !

         0 = Do not read or write a restart file
         1 = Read a restart file at the beginning of
            the run
         2 = Write a restart file during run
```

```
         3 = Read a restart file at beginning of run
             and write a restart file during run

       Number of periods in Restart
       output cycle (NRESPD)       Default: 0      ! NRESPD =  0  !

         0 = File written only at last period
        >0 = File updated every NRESPD periods

     Meteorological Data Format (METFM)
                               Default: 1      ! METFM =  1  !

         METFM = 1 - CALMET binary file (CALMET.MET)
         METFM = 2 - ISC ASCII file (ISCMET.MET)
         METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
         METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
                     surface parameters file (SURFACE.DAT)

     PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
     Averaging Time (minutes) (AVET)
                               Default: 60.0   ! AVET = 60.  !
     PG Averaging Time (minutes) (PGTIME)
                               Default: 60.0   ! PGTIME = 60. !

!END!

-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Technical options
--------------


     Vertical distribution used in the
     near field (MGAUSS)              Default: 1     ! MGAUSS =  1  !
        0 = uniform
        1 = Gaussian

     Terrain adjustment method
     (MCTADJ)                      Default: 3     ! MCTADJ =  3  !
        0 = no adjustment
        1 = ISC-type of terrain adjustment
        2 = simple, CALPUFF-type of terrain
            adjustment
        3 = partial plume path adjustment

     Subgrid-scale complex terrain
     flag (MCTSG)                  Default: 0     ! MCTSG =  0  !
        0 = not modeled
        1 = modeled

     Near-field puffs modeled as
     elongated 0 (MSLUG)              Default: 0     ! MSLUG =  0  !
        0 = no
        1 = yes (slug model used)

     Transitional plume rise modeled ?
     (MTRANS)                      Default: 1     ! MTRANS =  1  !
        0 = no  (i.e., final rise only)
        1 = yes (i.e., transitional rise computed)

     Stack tip downwash? (MTIP)        Default: 1     ! MTIP =  1  !
        0 = no  (i.e., no stack tip downwash)
        1 = yes (i.e., use stack tip downwash)

     Method used to simulate building
     downwash? (MBDW)                  Default: 1     ! MBDW =  1  !
        1 = ISC method
        2 = PRIME method

     Vertical wind shear modeled above
     stack top? (MSHEAR)              Default: 0     ! MSHEAR =  0  !
        0 = no  (i.e., vertical wind shear not modeled)
        1 = yes (i.e., vertical wind shear modeled)

     Puff splitting allowed? (MSPLIT)     Default: 0     ! MSPLIT =  0  !
        0 = no (i.e., puffs not split)
        1 = yes (i.e., puffs are split)
```

```
Chemical mechanism flag (MCHEM)      Default: 1     ! MCHEM =  1  !
  0 = chemical transformation not
      modeled
  1 = transformation rates computed
      internally (MESOPUFF II scheme)
  2 = user-specified transformation
      rates used
  3 = transformation rates computed
      internally (RIVAD/ARM3 scheme)
  4 = secondary organic aerosol formation
      computed (MESOPUFF II scheme for OH)

Aqueous phase transformation flag (MAQCHEM)
(Used only if MCHEM = 1, or 3)       Default: 0     ! MAQCHEM =  0  !
  0 = aqueous phase transformation
      not modeled
  1 = transformation rates adjusted
      for aqueous phase reactions

Wet removal modeled ? (MWET)         Default: 1     ! MWET =  1  !
  0 = no
  1 = yes

Dry deposition modeled ? (MDRY)      Default: 1     ! MDRY =  1  !
  0 = no
  1 = yes
  (dry deposition method specified
   for each species in Input Group 3)

Method used to compute dispersion
coefficients (MDISP)                 Default: 3     ! MDISP =  3  !

  1 = dispersion coefficients computed from measured values
      of turbulence, sigma v, sigma w
  2 = dispersion coefficients from internally calculated
      sigma v, sigma w using micrometeorological variables
      (u*, w*, L, etc.)
  3 = PG dispersion coefficients for RURAL areas (computed using
      the ISCST multi-segment approximation) and MP coefficients in
      urban areas
  4 = same as 3 except PG coefficients computed using
      the MESOPUFF II eqns.
  5 = CTDM sigmas used for stable and neutral conditions.
      For unstable conditions, sigmas are computed as in
      MDISP = 3, described above.  MDISP = 5 assumes that
      measured values are read

Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
(Used only if MDISP = 1 or 5)        Default: 3     ! MTURBVW =  3  !
  1 = use sigma-v or sigma-theta measurements
      from PROFILE.DAT to compute sigma-y
      (valid for METFM = 1, 2, 3, 4)
  2 = use sigma-w measurements
      from PROFILE.DAT to compute sigma-z
      (valid for METFM = 1, 2, 3, 4)
  3 = use both sigma-(v/theta) and sigma-w
      from PROFILE.DAT to compute sigma-y and sigma-z
      (valid for METFM = 1, 2, 3, 4)
  4 = use sigma-theta measurements
      from PLMMET.DAT to compute sigma-y
      (valid only if METFM = 3)

Back-up method used to compute dispersion
when measured turbulence data are
missing (MDISP2)                     Default: 3     ! MDISP2 =  3  !
(used only if MDISP = 1 or 5)
  2 = dispersion coefficients from internally calculated
      sigma v, sigma w using micrometeorological variables
      (u*, w*, L, etc.)
  3 = PG dispersion coefficients for RURAL areas (computed using
      the ISCST multi-segment approximation) and MP coefficients in
      urban areas
  4 = same as 3 except PG coefficients computed using
      the MESOPUFF II eqns.

PG sigma-y,z adj. for roughness?     Default: 0     ! MROUGH =  0  !
(MROUGH)
  0 = no
```

```
  1 = yes

Partial plume penetration of        Default: 1     ! MPARTL =  1  !
elevated inversion?
(MPARTL)
  0 = no
  1 = yes

Strength of temperature inversion    Default: 0     ! MTINV =  0  !
provided in PROFILE.DAT extended records?
(MTINV)
  0 = no (computed from measured/default gradients)
  1 = yes

PDF used for dispersion under convective conditions?
                          Default: 0     ! MPDF =  0  !
(MPDF)
  0 = no
  1 = yes

Sub-Grid TIBL module used for shore line?
                          Default: 0     ! MSGTIBL = 0  !
(MSGTIBL)
  0 = no
  1 = yes

Boundary conditions (concentration) modeled?
                          Default: 0     ! MBCON = 0  !
(MBCON)
  0 = no
  1 = yes, using formatted BCON.DAT file
  2 = yes, using unformatted CONC.DAT file

Note:  MBCON > 0 requires that the last species modeled
     be 'BCON'.  Mass is placed in species BCON when
     generating boundary condition puffs so that clean
     air entering the modeling domain can be simulated
     in the same way as polluted air.  Specify zero
     emission of species BCON for all regular sources.


Analyses of fogging and icing impacts due to emissions from
arrays of mechanically-forced cooling towers can be performed
using CALPUFF in conjunction with a cooling tower emissions
processor (CTEMISS) and its associated postprocessors.  Hourly
emissions of water vapor and temperature from each cooling tower
cell are computed for the current cell configuration and ambient
conditions by CTEMISS. CALPUFF models the dispersion of these
emissions and provides cloud information in a specialized format
for further analysis. Output to FOG.DAT is provided in either
'plume mode' or 'receptor mode' format.

Configure for FOG Model output?
                          Default: 0     ! MFOG =  0   !
(MFOG)
  0 = no
  1 = yes  - report results in PLUME Mode format
  2 = yes  - report results in RECEPTOR Mode format


Test options specified to see if
they conform to regulatory
values? (MREG)                 Default: 1     ! MREG =  1   !

  0 = NO checks are made
  1 = Technical options must conform to USEPA
     Long Range Transport (LRT) guidance
            METFM    1 or 2
            AVET     60. (min)
            PGTIME   60. (min)
            MGAUSS   1
            MCTADJ   3
            MTRANS   1
            MTIP     1
            MCHEM    1 or 3 (if modeling SOx, NOx)
            MWET     1
            MDRY     1
            MDISP    2 or 3
            MPDF     0 if MDISP=3
```

```
                1 if MDISP=2
             MROUGH  0
             MPARTL  1
             SYTDEP  550. (m)
             MHFTSZ  0


!END!


-------------------------------------------------------------------------------

INPUT GROUP: 3a, 3b -- Species list
-------------------

------------
Subgroup (3a)
------------

 The following species are modeled:

! CSPEC =        SO2 !      !END!
! CSPEC =        SO4 !      !END!
! CSPEC =        NOX !      !END!
! CSPEC =       HNO3 !      !END!
! CSPEC =        NO3 !      !END!
! CSPEC =     PM0063 !      !END!
! CSPEC =     PM0100 !      !END!
! CSPEC =     PM0125 !      !END!
! CSPEC =     PM0250 !      !END!
! CSPEC =     PM0600 !      !END!
! CSPEC =     PM1000 !      !END!
! CSPEC =         CO !      !END!

                                       Dry              OUTPUT GROUP
   SPECIES       MODELED          EMITTED      DEPOSITED            NUMBER
    NAME      (0=NO, 1=YES)   (0=NO, 1=YES)  (0=NO,             (0=NONE,
  (Limit: 12                                 1=COMPUTED-GAS      1=1st CGRUP,
   Characters                                  2=COMPUTED-PARTICLE  2=2nd CGRUP,
   in length)                                3=USER-SPECIFIED)    3= etc.)

!       SO2 =       1,            1,         1,            0  !
!       SO4 =       1,            1,         2,            0  !
!       NOX =       1,            1,         1,            0  !
!      HNO3 =       1,            0,         1,            0  !
!       NO3 =       1,            0,         2,            0  !
!    PM0063 =       1,            1,         2,            1  !
!    PM0100 =       1,            1,         2,            1  !
!    PM0125 =       1,            1,         2,            1  !
!    PM0250 =       1,            1,         2,            1  !
!    PM0600 =       1,            1,         2,            1  !
!    PM1000 =       1,            1,         2,            1  !
!        CO =       1,            1,         0,            0  !

!END!

-------------
Subgroup (3b)
-------------
 The following names are used for Species-Groups in which results
 for certain species are combined (added) prior to output.  The
 CGRUP name will be used as the species name in output files.
 Use this feature to model specific particle-size distributions
 by treating each size-range as a separate species.
 Order must be consistent with 3(a) above.

! CGRUP =        PMF !    !END!

INPUT GROUP: 4 -- Map Projection and Grid control parameters
--------------

    Projection for all (X,Y):
    -------------------------

    Map projection
    (PMAP)               Default: UTM    ! PMAP = UTM  !

       UTM :  Universal Transverse Mercator
       TTM :  Tangential Transverse Mercator
```

```
        LCC :  Lambert Conformal Conic
         PS :  Polar Stereographic
         EM :  Equatorial Mercator
       LAZA :  Lambert Azimuthal Equal Area

     False Easting and Northing (km) at the projection origin
     (Used only if PMAP= TTM, LCC, or LAZA)
     (FEAST)              Default=0.0     ! FEAST  = 0.000  !
     (FNORTH)             Default=0.0     ! FNORTH = 0.000  !

     UTM zone (1 to 60)
     (Used only if PMAP=UTM)
     (IUTMZN)             No Default      ! IUTMZN =  17   !

     Hemisphere for UTM projection?
     (Used only if PMAP=UTM)
     (UTMHEM)             Default: N      ! UTMHEM = N  !
        N   :  Northern hemisphere projection
        S   :  Southern hemisphere projection

     Latitude and Longitude (decimal degrees) of projection origin
     (Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
     (RLAT0)              No Default      ! RLAT0 =  48.7N !
     (RLON0)              No Default      ! RLON0 = 138.8W !

        TTM :  RLON0 identifies central (true N/S) meridian of projection
               RLAT0 selected for convenience
        LCC :  RLON0 identifies central (true N/S) meridian of projection
               RLAT0 selected for convenience
        PS  :  RLON0 identifies central (grid N/S) meridian of projection
               RLAT0 selected for convenience
        EM  :  RLON0 identifies central meridian of projection
               RLAT0 is REPLACED by 0.0N (Equator)
        LAZA:  RLON0 identifies longitude of tangent-point of mapping plane
               RLAT0 identifies latitude of tangent-point of mapping plane

     Matching parallel(s) of latitude (decimal degrees) for projection
     (Used only if PMAP= LCC or PS)
     (XLAT1)              No Default      ! XLAT1 = 30N  !
     (XLAT2)              No Default      ! XLAT2 = 60N  !

        LCC :  Projection cone slices through Earth's surface at XLAT1 and XLAT2
        PS  :  Projection plane slices through Earth at XLAT1
               (XLAT2 is not used)

     ----------
     Note:  Latitudes and longitudes should be positive, and include a
            letter N,S,E, or W indicating north or south latitude, and
            east or west longitude.  For example,
            35.9  N Latitude  =  35.9N
            118.7 E Longitude = 118.7E


     Datum-region
     ------------

     The Datum-Region for the coordinates is identified by a character
     string.  Many mapping products currently available use the model of the
     Earth known as the World Geodetic System 1984 (WGS-G ).  Other local
     models may be in use, and their selection in CALMET will make its output
     consistent with local mapping products.  The list of Datum-Regions with
     official transformation parameters is provided by the National Imagery and
     Mapping Agency (NIMA).

     NIMA Datum - Regions(Examples)
     ------------------------------------------------------------------------------
     WGS-G    WGS-84 GRS 80 Spheroid, Global coverage (WGS84)
     NAS-C    NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS (NAD27)
     NWS-27   NWS 6370KM Radius, Sphere
     NWS-84   NWS 6370KM Radius, Sphere
     ESR-S    ESRI REFERENCE 6371KM Radius, Sphere

     Datum-region for output coordinates
     (DATUM)              Default: WGS-G    ! DATUM = NAS-C !


METEOROLOGICAL Grid:

         No. X grid cells (NX)      No default     ! NX = 112   !
```

```
        No. Y grid cells (NY)      No default    ! NY = 171   !
     No. vertical layers (NZ)      No default    ! NZ =  10   !

       Grid spacing (DGRIDKM)      No default    ! DGRIDKM = 4. !
                                   Units: km

            Cell face heights
               (ZFACE(nz+1))       No defaults
                                   Units: m
! ZFACE = 0.,20.,40.,80.,160.,300.,600.,1000.,1500.,2200.,3000. !

        Reference Coordinates
       of SOUTHWEST corner of
            grid cell(1, 1):

       X coordinate (XORIGKM)      No default    ! XORIGKM =  77. !
       Y coordinate (YORIGKM)      No default    ! YORIGKM = 2966. !
                                   Units: km


COMPUTATIONAL Grid:

   The computational grid is identical to or a subset of the MET. grid.
   The lower left (LL) corner of the computational grid is at grid point
   (IBCOMP, JBCOMP) of the MET. grid.  The upper right (UR) corner of the
   computational grid is at grid point (IECOMP, JECOMP) of the MET. grid.
   The grid spacing of the computational grid is the same as the MET. grid.

     X index of LL corner (IBCOMP)      No default     ! IBCOMP =  1   !
           (1 <= IBCOMP <= NX)

     Y index of LL corner (JBCOMP)      No default     ! JBCOMP =  1   !
           (1 <= JBCOMP <= NY)


     X index of UR corner (IECOMP)      No default     ! IECOMP =  112 !
           (1 <= IECOMP <= NX)

     Y index of UR corner (JECOMP)      No default     ! JECOMP =  171  !
           (1 <= JECOMP <= NY)


SAMPLING Grid (GRIDDED RECEPTORS):

   The lower left (LL) corner of the sampling grid is at grid point
   (IBSAMP, JBSAMP) of the MET. grid.  The upper right (UR) corner of the
   sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
   The sampling grid must be identical to or a subset of the computational
   grid.  It may be a nested grid inside the computational grid.
   The grid spacing of the sampling grid is DGRIDKM/MESHDN.

     Logical flag indicating if gridded
     receptors are used (LSAMP)         Default: T     ! LSAMP = F !
     (T=yes, F=no)

     X index of LL corner (IBSAMP)      No default     ! IBSAMP =  1   !
      (IBCOMP <= IBSAMP <= IECOMP)

     Y index of LL corner (JBSAMP)      No default     ! JBSAMP =  1   !
      (JBCOMP <= JBSAMP <= JECOMP)


     X index of UR corner (IESAMP)      No default     ! IESAMP =  112 !
      (IBCOMP <= IESAMP <= IECOMP)

     Y index of UR corner (JESAMP)      No default     ! JESAMP =  171  !
      (JBCOMP <= JESAMP <= JECOMP)


    Nesting factor of the sampling
     grid (MESHDN)                      Default: 1     ! MESHDN =  1  !
     (MESHDN is an integer >= 1)

!END!

-------------------------------------------------------------------------------
```

```
INPUT GROUP: 5 -- Output Options
--------------
                              *                 *
   FILE                DEFAULT VALUE       VALUE THIS RUN
   ----                -------------       --------------

  Concentrations (ICON)          1          ! ICON =  1  !
  Dry Fluxes (IDRY)              1          ! IDRY =  0  !
  Wet Fluxes (IWET)              1          ! IWET =  0  !
  Relative Humidity (IVIS)       1          ! IVIS =  1  !
   (relative humidity file is
    required for visibility
    analysis)
  Use data compression option in output file?
  (LCOMPRS)                  Default: T     ! LCOMPRS = T !

  *
   0 = Do not create file, 1 = create file


   DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

     Mass flux across specified boundaries
     for selected species reported hourly?
     (IMFLX)                Default: 0      ! IMFLX =  0  !
       0 = no
       1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
            are specified in Input Group 0)

     Mass balance for each species
     reported hourly?
     (IMBAL)                Default: 0      ! IMBAL =  0  !
       0 = no
       1 = yes (MASSBAL.DAT filename is
          specified in Input Group 0)


   LINE PRINTER OUTPUT OPTIONS:

     Print concentrations (ICPRT)   Default: 0     ! ICPRT =  0  !
     Print dry fluxes (IDPRT)       Default: 0     ! IDPRT =  0  !
     Print wet fluxes (IWPRT)       Default: 0     ! IWPRT =  0  !
     (0 = Do not print, 1 = Print)

     Concentration print interval
     (ICFRQ) in hours          Default: 1     ! ICFRQ =  24  !
     Dry flux print interval
     (IDFRQ) in hours          Default: 1     ! IDFRQ =  1  !
     Wet flux print interval
     (IWFRQ) in hours          Default: 1     ! IWFRQ =  1  !

     Units for Line Printer Output
     (IPRTU)                Default: 1      ! IPRTU =  3  !
                 for          for
             Concentration   Deposition
        1 =     g/m**3       g/m**2/s
        2 =    mg/m**3      mg/m**2/s
        3 =    ug/m**3      ug/m**2/s
        4 =    ng/m**3      ng/m**2/s
        5 =    Odour Units

     Messages tracking progress of run
     written to the screen ?
     (IMESG)                Default: 1      ! IMESG =  2  !
       0 = no
       1 = yes (advection step, puff ID)
       2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)


   SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

          ---- CONCENTRATIONS ----  ------ DRY FLUXES ------  ------ WET FLUXES ------  -- MASS FLUX --
 SPECIES
 /GROUP    PRINTED? SAVED ON DISK? PRINTED?  SAVED ON DISK?  PRINTED?  SAVED ON DISK?  SAVED ON DISK?
 -------  ------------------------ ------------------------ ------------------------ ---------------
!       SO2 =   0,        1,        0,        0,        0,        0,        0  !
!       SO4 =   0,        1,        0,        0,        0,        0,        0  !
!       NOX =   0,        1,        0,        0,        0,        0,        0  !
```

```
!    HNO3 =   0,      1,      0,      0,      0,      0,      0 !
!     NO3 =   0,      1,      0,      0,      0,      0,      0 !
!     PMF =   0,      1,      0,      0,      0,      0,      0 !
!      CO =   0,      1,      0,      0,      0,      0,      0 !

  Note:  Species BCON (for MBCON > 0) does not need to be saved on disk.


    OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

      Logical for debug output
      (LDEBUG)                    Default: F     ! LDEBUG = F !

      First puff to track
      (IPFDEB)                    Default: 1     ! IPFDEB =  1  !

      Number of puffs to track
      (NPFDEB)                    Default: 1     ! NPFDEB =  1  !

      Met. period to start output
      (NN1)                       Default: 1     ! NN1 =  1  !

      Met. period to end output
      (NN2)                       Default: 10    ! NN2 =  10  !

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
-------------------------

---------------
Subgroup (6a)
---------------
      Number of terrain features (NHILL)      Default: 0     ! NHILL =  0  !

      Number of special complex terrain
      receptors  (NCTREC)                     Default: 0     ! NCTREC =  0  !

      Terrain and CTSG Receptor data for
      CTSG hills input in CTDM format ?
      (MHILL)                     No Default     ! MHILL =  2  !
      1 = Hill and Receptor data created
          by CTDM processors & read from
          HILL.DAT and HILLRCT.DAT files
      2 = Hill data created by OPTHILL &
          input below in Subgroup (6b);
          Receptor data in Subgroup (6c)

      Factor to convert horizontal dimensions  Default: 1.0   ! XHILL2M = 1. !
      to meters (MHILL=1)

      Factor to convert vertical dimensions    Default: 1.0   ! ZHILL2M = 1. !
      to meters (MHILL=1)

      X-origin of CTDM system relative to      No Default     ! XCTDMKM = 0.0E00 !
      CALPUFF coordinate system, in Kilometers (MHILL=1)

      Y-origin of CTDM system relative to      No Default     ! YCTDMKM = 0.0E00 !
      CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

---------------
Subgroup (6b)
---------------

                      1 **
    HILL information


HILL       XC       YC     THETAH  ZGRID  RELIEF    EXPO 1   EXPO 2   SCALE 1    SCALE 2   AMAX1    AMAX2
 NO.      (km)     (km)    (deg.)   (m)     (m)      (m)      (m)       (m)        (m)      (m)
----      ----     ----    ------  -----  ------   ------   ------   -------    -------    -----    -----

---------------
```

```
Subgroup (6c)
---------------

  COMPLEX TERRAIN RECEPTOR INFORMATION

             XRCT       YRCT      ZRCT       XHH
             (km)       (km)       (m)
            ------     -----    ------      ----


-------------------
1
   Description of Complex Terrain Variables:
      XC, YC  = Coordinates of center of hill
      THETAH  = Orientation of major axis of hill (clockwise from
            North)
      ZGRID   = Height of the  0  of the grid above mean sea
            level
      RELIEF  = Height of the crest of the hill above the grid elevation
      EXPO 1  = Hill-shape exponent for the major axis
      EXPO 2  = Hill-shape exponent for the major axis
      SCALE 1 = Horizontal length scale along the major axis
      SCALE 2 = Horizontal length scale along the minor axis
      AMAX    = Maximum allowed axis length for the major axis
      BMAX    = Maximum allowed axis length for the major axis

      XRCT, YRCT = Coordinates of the complex terrain receptors
      ZRCT    = Height of the ground (MSL) at the complex terrain
            Receptor
      XHH     = Hill number associated with each complex terrain receptor
            (NOTE: MUST BE ENTERED AS A REAL NUMBER)

  **
   NOTE: DATA for each hill and CTSG receptor are treated as a separate
      input subgroup and therefore must end with an input group terminator.

-------------------------------------------------------------------------------


INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases
--------------

    SPECIES   DIFFUSIVITY    ALPHA STAR    REACTIVITY  MESOPHYLL RESISTANCE    HENRY'S LAW COEFFICIENT
     NAME      (cm**2/s)                     (s/cm)       (dimensionless)
    -------   -----------   ----------   ---------- ------------------   -----------------------
  !  SO2 =      0.1509,       1000.,        8.,          0.,                .04 !
  !  NOX =      0.1656,         1.,         8.,          5.,               3.5 !
  !  HNO3 =      0.1628,        1.,        18.,          0.,               8E-8 !

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 8 -- Size parameters for dry deposition of particles
--------------

   For SINGLE SPECIES, the mean and standard deviation are used to
   compute a deposition velocity for NINT (see group 9) size-ranges,
   and these are then averaged to obtain a mean deposition velocity.

   For GROUPED SPECIES, the size distribution should be explicitly
   specified (by the 'species' in the group), and the standard deviation
   for each should be entered as 0.  The model will then use the
   deposition velocity for the stated mean diameter.

    SPECIES    GEOMETRIC MASS MEAN      GEOMETRIC STANDARD
     NAME          DIAMETER                 DEVIATION
                   (microns)              (microns)
    -------    ------------------      -----------------
!      SO4 =        0.48,                 2.  !
!      NO3 =        0.48,                 2.  !
!    PM0063 =        0.63,                 0.  !
!    PM0100 =        1.00,                 0.  !
!    PM0125 =        1.25,                 0.  !
!    PM0250 =        2.50,                 0.  !
!    PM0600 =        6.00,                 0.  !
!    PM1000 =       10.00,                 0.  !
```

```
!END!


-------------------------------------------------------------------------------

INPUT GROUP: 9 -- Miscellaneous dry deposition parameters
--------------

    Reference cuticle resistance (s/cm)
    (RCUTR)                       Default: 30    ! RCUTR = 30.0 !
    Reference ground resistance  (s/cm)
    (RGR)                         Default: 10    !   RGR = 10.0 !
    Reference pollutant reactivity
    (REACTR)                      Default: 8     ! REACTR = 8.0 !

    Number of particle-size intervals used to
    evaluate effective particle deposition velocity
    (NINT)                        Default: 9     !   NINT = 9  !

    Vegetation state in unirrigated areas
    (IVEG)                        Default: 1     !   IVEG = 1  !
      IVEG=1 for active and unstressed vegetation
      IVEG=2 for active and stressed vegetation
      IVEG=3 for inactive vegetation

!END!


-------------------------------------------------------------------------------

INPUT GROUP: 10 -- Wet Deposition Parameters
---------------


                 Scavenging Coefficient -- Units: (sec)**(-1)

       Pollutant     Liquid Precip.     Frozen Precip.
       ---------     --------------     --------------
!         SO2 =         3.0E-05,            0.0E00 !
!         SO4 =         1.0E-04,            3.0E-05 !
!        HNO3 =         6.0E-05,            0.0E00 !
!         NO3 =         1.0E-04,            3.0E-05 !
!      PM0063 =         1.0E-04,            3.0E-05 !
!      PM0100 =         1.0E-04,            3.0E-05 !
!      PM0125 =         1.0E-04,            3.0E-05 !
!      PM0250 =         1.0E-04,            3.0E-05 !
!      PM0600 =         1.0E-04,            3.0E-05 !
!      PM1000 =         1.0E-04,            3.0E-05 !

!END!


-------------------------------------------------------------------------------

INPUT GROUP: 11 -- Chemistry Parameters
---------------

    Ozone data input option (MOZ)     Default: 1            ! MOZ =  1   !
    (Used only if MCHEM = 1, 3, or 4)
      0 = use a monthly background ozone value
      1 = read hourly ozone concentrations from
          the OZONE.DAT data file

    Monthly ozone concentrations
    (Used only if MCHEM = 1, 3, or 4 and
     MOZ = 0 or MOZ = 1 and all hourly O3 data missing)
    (BCKO3) in ppb                    Default: 12*80.
    ! BCKO3 = 12*50. !

    Monthly ammonia concentrations
    (Used only if MCHEM = 1, or 3)
    (BCKNH3) in ppb                   Default: 12*10.
    ! BCKNH3 = 12*1. !

    Nighttime SO2 loss rate (RNITE1)
```

```
    in percent/hour              Default: 0.2        ! RNITE1 = .2 !

    Nighttime NOx loss rate (RNITE2)
    in percent/hour              Default: 2.0        ! RNITE2 = 2.0 !

    Nighttime HNO3 formation rate (RNITE3)
    in percent/hour              Default: 2.0        ! RNITE3 = 2.0 !

    H2O2 data input option (MH2O2)    Default: 1         ! MH2O2 =  1  !
    (Used only if MAQCHEM = 1)
      0 = use a monthly background H2O2 value
      1 = read hourly H2O2 concentrations from
          the H2O2.DAT data file

    Monthly H2O2 concentrations
    (Used only if MQACHEM = 1 and
     MH2O2 = 0 or MH2O2 = 1 and all hourly H2O2 data missing)
    (BCKH2O2) in ppb               Default: 12*1.
    ! BCKH2O2 = 12*1 !


--- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
    (used only if MCHEM = 4)

    The SOA module uses monthly values of:
         Fine particulate concentration in ug/m^3 (BCKPMF)
         Organic fraction of fine particulate     (OFRAC)
         VOC / NOX ratio (after reaction)         (VCNX)
    to characterize the air mass when computing
    the formation of SOA from VOC emissions.
    Typical values for several distinct air mass types are:

      Month    1    2    3    4    5    6    7    8    9   10   11   12
              Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec

    Clean Continental
      BCKPMF   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
      OFRAC  .15  .15  .20  .20  .20  .20  .20  .20  .20  .20  .20  .15
      VCNX   50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

    Clean Marine (surface)
      BCKPMF  .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5
      OFRAC  .25  .25  .30  .30  .30  .30  .30  .30  .30  .30  .30  .25
      VCNX   50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

    Urban - low biogenic (controls present)
      BCKPMF  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.
      OFRAC  .20  .20  .25  .25  .25  .25  .25  .25  .20  .20  .20  .20
      VCNX    4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.

    Urban - high biogenic (controls present)
      BCKPMF  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.
      OFRAC  .25  .25  .30  .30  .30  .55  .55  .55  .35  .35  .35  .25
      VCNX   15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.

    Regional Plume
      BCKPMF  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.
      OFRAC  .20  .20  .25  .35  .25  .40  .40  .40  .30  .30  .30  .20
      VCNX   15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.

    Urban - no controls present
      BCKPMF 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100.
      OFRAC  .30  .30  .35  .35  .35  .55  .55  .55  .35  .35  .35  .30
      VCNX    2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.

    Default: Clean Continental
    ! BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !
    ! OFRAC  = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.15 !
    ! VCNX   = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00 !


!END!

-------------------------------------------------------------------------------


INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
---------------
```

```
Horizontal size of puff (m) beyond which
time-dependent dispersion equations (Heffter)
are used to determine sigma-y and
sigma-z (SYTDEP)               Default: 550.   ! SYTDEP = 5.5E02 !

Switch for using Heffter equation for sigma z
as above (0 = Not use Heffter; 1 = use Heffter
(MHFTSZ)                       Default: 0      ! MHFTSZ =  0  !

Stability class used to determine plume
growth rates for puffs above the boundary
layer (JSUP)                   Default: 5      ! JSUP =  5  !

Vertical dispersion constant for stable
conditions (k1 in Eqn. 2.7-3)  (CONK1)   Default: 0.01   ! CONK1 = .01 !

Vertical dispersion constant for neutral/
unstable conditions (k2 in Eqn. 2.7-4)
(CONK2)                        Default: 0.1    ! CONK2 = .1 !

Factor for determining Transition-point from
Schulman-Scire to Huber-Snyder Building Downwash
scheme (SS used for Hs < Hb + TBD * HL)
(TBD)                          Default: 0.5    ! TBD = .5 !
   TBD < 0   ==> always use Huber-Snyder
   TBD = 1.5 ==> always use Schulman-Scire
   TBD = 0.5 ==> ISC Transition-point

Range of land use categories for which
urban dispersion is assumed
(IURB1, IURB2)                 Default: 10     ! IURB1 =  10  !
                               19     ! IURB2 =  19  !

Site characterization parameters for single-point Met data files ---------
(needed for METFM = 2,3,4)

   Land use category for modeling domain
   (ILANDUIN)                  Default: 20     ! ILANDUIN =  20  !

   Roughness length (m) for modeling domain
   (Z0IN)                      Default: 0.25   ! Z0IN = .25 !

   Leaf area index for modeling domain
   (XLAIIN)                    Default: 3.0    ! XLAIIN = 3.0 !

   Elevation above sea level (m)
   (ELEVIN)                    Default: 0.0    ! ELEVIN = .0 !

   Latitude (degrees) for met location
   (XLATIN)                    Default: -999.  ! XLATIN = -999.0 !

   Longitude (degrees) for met location
   (XLONIN)                    Default: -999.  ! XLONIN = -999.0 !

Specialized information for interpreting single-point Met data files -----

   Anemometer height (m) (Used only if METFM = 2,3)
   (ANEMHT)                    Default: 10.    ! ANEMHT = 10.0 !

   Form of lateral turbulance data in PROFILE.DAT file
   (Used only if METFM = 4 or MTURBVW = 1 or 3)
   (ISIGMAV)                   Default: 1      ! ISIGMAV =  1  !
      0 = read sigma-theta
      1 = read sigma-v

   Choice of mixing heights (Used only if METFM = 4)
   (IMIXCTDM)                  Default: 0      ! IMIXCTDM =  0  !
      0 = read PREDICTED mixing heights
      1 = read OBSERVED mixing heights

Maximum length of a slug (met. grid units)
(XMXLEN)                       Default: 1.0    ! XMXLEN = 1.0 !

Maximum travel distance of a puff/slug (in
grid units) during one sampling step
(XSAMLEN)                      Default: 1.0    ! XSAMLEN = 1.0 !

Maximum Number of slugs/puffs release from
```

```
                    Default  PPC : .50,  .50,  .50,  .50,  .35,  .35
                                   ---   ---   ---   ---   ---   ---
                       ! PPC = 0.50, 0.50, 0.50, 0.50, 0.35, 0.35 !

  Slug-to-puff transition criterion factor
  equal to sigma-y/length of slug
  (SL2PF)                   Default: 10.        ! SL2PF = 10.0 !

  Puff-splitting control variables ------------------------

   VERTICAL SPLIT
   --------------

   Number of puffs that result every time a puff
   is split - nsplit=2 means that 1 puff splits
   into 2
   (NSPLIT)                  Default:   3       ! NSPLIT =  3  !

   Time(s) of a day when split puffs are eligible to
   be split once again; this is typically set once
   per day, around sunset before nocturnal shear develops.
   24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
   0=do not re-split    1=eligible for re-split
   (IRESPLIT(24))               Default:  Hour 17 = 1
   !  IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

   Split is allowed only if last hour's mixing
   height (m) exceeds a minimum value
   (ZISPLIT)                 Default: 100.      ! ZISPLIT = 100.0 !

   Split is allowed only if ratio of last hour's
   mixing ht to the maximum mixing ht experienced
   by the puff is less than a maximum value (this
   postpones a split until a nocturnal layer develops)
   (ROLDMAX)                    Default: 0.25      ! ROLDMAX = 0.25 !


   HORIZONTAL SPLIT
   ----------------

   Number of puffs that result every time a puff
   is split - nsplith=5 means that 1 puff splits
   into 5
   (NSPLITH)                 Default:   5       ! NSPLITH =  5  !

   Minimum sigma-y (Grid Cells Units) of puff
   before it may be split
   (SYSPLITH)                  Default:  1.0      ! SYSPLITH = 1.0 !

   Minimum puff elongation rate (SYSPLITH/hr) due to
   wind shear, before it may be split
   (SHSPLITH)                  Default:  2.       ! SHSPLITH = 2.0 !

   Minimum concentration (g/m^3) of each
   species in puff before it may be split
   Enter array of NSPEC values; if a single value is
   entered, it will be used for ALL species
   (CNSPLITH)                  Default:  1.0E-07   ! CNSPLITH = 1.0E-07 !

  Integration control variables ------------------------

   Fractional convergence criterion for numerical SLUG
   sampling integration
   (EPSSLUG)                   Default:   1.0e-04  ! EPSSLUG = 1.0E-04 !

   Fractional convergence criterion for numerical AREA
   source integration
   (EPSAREA)                   Default:   1.0e-06  ! EPSAREA = 1.0E-06 !

   Trajectory step-length (m) used for numerical rise
   integration
   (DSRISE)                  Default:   1.0      ! DSRISE = 1.0 !

  Boundary Condition (BC) Puff control variables ------------------------

   Minimum height (m) to which BC puffs are mixed as they are emitted
   (MBCON=2 ONLY).  Actual height is reset to the current mixing height
   at the release point if greater than this minimum.
   (HTMINBC)                  Default:   500.     ! HTMINBC = 500. !
```

```
     Search radius (km) about a receptor for sampling nearest BC puff.
     BC puffs are typically emitted with a spacing of one grid cell
     length, so the search radius should be greater than DGRIDKM.
     (RSAMPBC)                     Default: 10.     ! RSAMPBC = 10. !

     Near-Surface depletion adjustment to concentration profile used when
     sampling BC puffs?
     (MDEPBC)                      Default: 1       ! MDEPBC = 1. !
       0 = Concentration is NOT adjusted for depletion
       1 = Adjust Concentration for depletion

!END!


-------------------------------------------------------------------------------


INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters
--------------------------------

---------------
Subgroup (13a)
---------------

     Number of point sources with
     parameters provided below      (NPT1)  No default  !  NPT1 =   1 !

     Units used for point source
     emissions below              (IPTU)  Default: 1  !  IPTU =   3  !
          1 =       g/s
          2 =       kg/hr
          3 =       lb/hr
          4 =    tons/yr
          5 =    Odour Unit * m**3/s  (vol. flux of odour compound)
          6 =    Odour Unit * m**3/min
          7 =    metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (13d)        (NSPT1) Default: 0  !  NSPT1 = 0  !

     Number of point sources with
     variable emission parameters
     provided in external file      (NPT2)  No default  !  NPT2 =  0  !

     (If NPT2 > 0, these point
     source emissions are read from
     the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------
                                  a
          POINT SOURCE: CONSTANT DATA
          -----------------------------
                                                          b       c
 Source     X UTM      Y UTM     Stack   Base     Stack    Exit  Exit    Bldg.  Emission
  No.    Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.   Dwash   Rates
            (km)       (km)       (m)      (m)       (m)   (m/s) (deg. K)
 ------  ---------- ---------- ------  ------   -------- ----- -------- ----- --------
Subgroup (13b)

SECI
UNIT 3  0.165 LB/MMBTU

   ! SRCNAM = SGS3  !
   ! X =  439.048, 3289.335, 205.80, 25.00, 7.93, 18.8, 325.4, 0.0, 1237.50, 37.5, 525.0, 0.0, 0.0,
             53.3, 49.9, 6.8, 24.8, 27.0, 25.9, 1155.0!
   !END!

   a
    Data for each source are treated as a separate input subgroup
    and therefore must end with an input group terminator.

    SRCNAM  is a 12-character name for a source
```

```
        (No default)
   X     is an array holding the source data listed by the column headings
        (No default)
   SIGYZI  is an array holding the initial sigma-y and sigma-z (m)
        (Default: 0.,0.)
   FMFAC   is a vertical momentum flux factor (0. or 1.0) used to represent
        the effect of rain-caps or other physical configurations that
        reduce momentum rise associated with the actual exit velocity.
        (Default: 1.0  -- full momentum used)

  b
  0. = No building downwash modeled, 1. = downwash modeled
  NOTE: must be entered as a REAL number (i.e., with decimal point)

  c
  An emission rate must be entered for every pollutant modeled.
  Enter emission rate of zero for secondary pollutants that are
  modeled, but not emitted.  Units are specified by IPTU
  (e.g. 1 for g/s).

--------------
Subgroup (13c)
--------------

      BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH
      -------------------------------------------------------
Source                                                a
 No.   Effective building width and height (in meters) every 10 degrees
-----  ----------------------------------------------------------------


--------------
Subgroup (13d)
--------------
                            a
      POINT SOURCE: VARIABLE EMISSIONS DATA
      -------------------------------------

  Use this subgroup to describe temporal variations in the emission
  rates given in 13b.  Factors entered multiply the rates in 13b.
  Skip sources here that have constant emissions.  For more elaborate
  variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

  IVARY determines the type of variation, and is source-specific:
  (IVARY)                      Default: 0
       0 =      Constant
       1 =      Diurnal cycle (24 scaling factors: hours 1-24)
       2 =      Monthly cycle (12 scaling factors: months 1-12)
       3 =      Hour & Season (4 groups of 24 hourly scaling factors,
                         where first group is DEC-JAN-FEB)
       4 =      Speed & Stab. (6 groups of 6 scaling factors, where
                         first group is Stability Class A,
                         and the speed classes have upper
                         bounds (m/s) defined in Group 12
       5 =      Temperature  (12 scaling factors, where temperature
                         classes have upper bounds (C) of:
                         0, 5, 10, 15, 20, 25, 30, 35, 40,
                         45, 50, 50+)


--------
  a
  Data for each species are treated as a separate input subgroup
  and therefore must end with an input group terminator.


-------------------------------------------------------------------------------


INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters
--------------------------------

--------------
Subgroup (14a)
--------------

  Number of polygon area sources with
  parameters specified below (NAR1)      No default  !  NAR1 =  0  !
```

```
     Units used for area source
     emissions below          (IARU)     Default: 1  !  IARU =   1  !
         1 =      g/m**2/s
         2 =      kg/m**2/hr
         3 =      lb/m**2/hr
         4 =     tons/m**2/yr
         5 =     Odour Unit * m/s  (vol. flux/m**2 of odour compound)
         6 =     Odour Unit * m/min
         7 =     metric tons/m**2/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (14d)      (NSAR1) Default: 0  !  NSAR1 =  0  !

     Number of buoyant polygon area sources
     with variable location and emission
     parameters (NAR2)                  No default  !  NAR2 =  0   !
     (If NAR2 > 0, ALL parameter data for
     these sources are read from the file: BAEMARB.DAT)

!END!

---------------
Subgroup (14b)
---------------
                                   a
          AREA SOURCE: CONSTANT DATA
          ----------------------------
                                                     b
Source          Effect.   Base      Initial    Emission
 No.           Height   Elevation   Sigma z     Rates
                (m)       (m)        (m)
-------        ------   ------    --------   ---------


--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.
    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IARU
     (e.g. 1 for g/m**2/s).

---------------
Subgroup (14c)
---------------

          COORDINATES (UTM-km) FOR EACH VERTEX(4) OF EACH POLYGON
          --------------------------------------------------------
Source                                                   a
 No.      Ordered list of X followed by list of Y, grouped by source
------    ------------------------------------------------------------


--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.


---------------
Subgroup (14d)
---------------
                                          a
          AREA SOURCE: VARIABLE EMISSIONS DATA
          --------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 14b.  Factors entered multiply the rates in 14b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                       Default: 0
         0 =      Constant
         1 =      Diurnal cycle (24 scaling factors: hours 1-24)
```

```
      2 =     Monthly cycle (12 scaling factors: months 1-12)
      3 =     Hour & Season (4 groups of 24 hourly scaling factors,
                      where first group is DEC-JAN-FEB)
      4 =     Speed & Stab. (6 groups of 6 scaling factors, where
                      first group is Stability Class A,
                      and the speed classes have upper
                      bounds (m/s) defined in Group 12
      5 =     Temperature   (12 scaling factors, where temperature
                      classes have upper bounds (C) of:
                      0, 5, 10, 15, 20, 25, 30, 35, 40,
                      45, 50, 50+)


--------
  a
   Data for each species are treated as a separate input subgroup
   and therefore must end with an input group terminator.


-------------------------------------------------------------------------------

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters
---------------------------

--------------
Subgroup (15a)
--------------

   Number of buoyant line sources
   with variable location and emission
   parameters (NLN2)                   No default  !  NLN2 =  0   !

   (If NLN2 > 0, ALL parameter data for
    these sources are read from the file: LNEMARB.DAT)

   Number of buoyant line sources (NLINES)       No default   ! NLINES =  0  !

   Units used for line source
   emissions below            (ILNU)        Default: 1  !  ILNU =   1  !
       1 =       g/s
       2 =      kg/hr
       3 =      lb/hr
       4 =     tons/yr
       5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
       6 =     Odour Unit * m**3/min
       7 =     metric tons/yr

   Number of source-species
   combinations with variable
   emissions scaling factors
   provided below in (15c)       (NSLN1) Default: 0  !  NSLN1 =  0  !

   Maximum number of segments used to model
   each line (MXNSEG)                    Default: 7   ! MXNSEG =  7  !

   The following variables are required only if NLINES > 0.  They are
   used in the buoyant line source plume rise calculations.

     Number of distances at which              Default: 6   ! NLRISE =  6  !
     transitional rise is computed

     Average building length (XL)            No default   ! XL = .0 !
                                        (in meters)

     Average building height (HBL)           No default   ! HBL = .0 !
                                        (in meters)

     Average building width (WBL)            No default   ! WBL = .0 !
                                        (in meters)

     Average line source width (WML)          No default   ! WML = .0 !
                                        (in meters)

     Average separation between buildings (DXL)  No default   ! DXL = .0 !
                                        (in meters)

     Average buoyancy parameter (FPRIMEL)       No default   ! FPRIMEL = .0 !
                                        (in m**4/s**3)
```

```
!END!

---------------
Subgroup (15b)
---------------

        BUOYANT LINE SOURCE: CONSTANT DATA
        ----------------------------------
                                                              a
Source    Beg. X     Beg. Y     End. X    End. Y    Release   Base        Emission
 No.    Coordinate  Coordinate  Coordinate Coordinate Height   Elevation    Rates
          (km)        (km)        (km)       (km)      (m)       (m)
------  ----------  ----------  ---------  ---------  -------  ---------  ---------

--------

   a
    Data for each source are treated as a separate input subgroup
    and therefore must end with an input group terminator.

   b
    An emission rate must be entered for every pollutant modeled.
    Enter emission rate of zero for secondary pollutants that are
    modeled, but not emitted.  Units are specified by ILNTU
    (e.g. 1 for g/s).

---------------
Subgroup (15c)
---------------
                                         a
        BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA
        ----------------------------------------------

    Use this subgroup to describe temporal variations in the emission
    rates given in 15b.  Factors entered multiply the rates in 15b.
    Skip sources here that have constant emissions.

    IVARY determines the type of variation, and is source-specific:
    (IVARY)                     Default: 0
         0 =      Constant
         1 =      Diurnal cycle (24 scaling factors: hours 1-24)
         2 =      Monthly cycle (12 scaling factors: months 1-12)
         3 =      Hour & Season (4 groups of 24 hourly scaling factors,
                          where first group is DEC-JAN-FEB)
         4 =      Speed & Stab. (6 groups of 6 scaling factors, where
                          first group is Stability Class A,
                          and the speed classes have upper
                          bounds (m/s) defined in Group 12
         5 =      Temperature   (12 scaling factors, where temperature
                          classes have upper bounds (C) of:
                          0, 5, 10, 15, 20, 25, 30, 35, 40,
                          45, 50, 50+)


--------
   a
    Data for each species are treated as a separate input subgroup
    and therefore must end with an input group terminator.


-------------------------------------------------------------------------------


INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters
---------------------------


---------------
Subgroup (16a)
---------------

    Number of volume sources with
    parameters provided in 16b,c (NVL1)     No default  !  NVL1 =  0   !

    Units used for volume source
    emissions below in 16b       (IVLU)     Default: 1  !  IVLU =  3  !
         1 =      g/s
         2 =      kg/hr
```

```
         3 =    lb/hr
         4 =   tons/yr
         5 =   Odour Unit * m**3/s  (vol. flux of odour compound)
         6 =   Odour Unit * m**3/min
         7 =   metric tons/yr

      Number of source-species
      combinations with variable
      emissions scaling factors
      provided below in (16c)      (NSVL1)    Default: 0  !  NSVL1 =  0  !

      Number of volume sources with
      variable location and emission
      parameters                  (NVL2)    No default  !  NVL2 =   0   !

      (If NVL2 > 0, ALL parameter data for
       these sources are read from the VOLEMARB.DAT file(s) )

!END!

--------------
Subgroup (16b)
--------------
                              a
        VOLUME SOURCE: CONSTANT DATA
        ------------------------------
                                                                      b
     X UTM      Y UTM     Effect.   Base     Initial   Initial   Emission
   Coordinate  Coordinate  Height  Elevation  Sigma y   Sigma z    Rates
     (km)       (km)        (m)      (m)       (m)       (m)
   ----------  ----------  ------   ------   --------  --------  --------
                                                       SO2    SO4    NOX  HNO3  NO3  PM10   CO

--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IVLU
     (e.g. 1 for g/s).

--------------
Subgroup (16c)
--------------
                                  a
       VOLUME SOURCE: VARIABLE EMISSIONS DATA
       ---------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 16b.  Factors entered multiply the rates in 16b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                    Default: 0
         0 =     Constant
         1 =     Diurnal cycle (24 scaling factors: hours 1-24)
         2 =     Monthly cycle (12 scaling factors: months 1-12)
         3 =     Hour & Season (4 groups of 24 hourly scaling factors,
                         where first group is DEC-JAN-FEB)
         4 =     Speed & Stab. (6 groups of 6 scaling factors, where
                         first group is Stability Class A,
                         and the speed classes have upper
                         bounds (m/s) defined in Group 12
         5 =     Temperature   (12 scaling factors, where temperature
                         classes have upper bounds (C) of:
                         0, 5, 10, 15, 20, 25, 30, 35, 40,
                         45, 50, 50+)

--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.
```

INPUT GROUPS: 17a & 17b -- Non-gridded (discrete) receptor information
----

Subgroup (17a)

Number of non-gridded receptors (NREC) No default ! NREC = 268 !

!END!

Subgroup (17b)
----

a
NON-GRIDDED (DISCRETE) RECEPTOR DATA

```
              X UTM      Y UTM      Ground      Height  b
Receptor   Coordinate  Coordinate  Elevation  Above Ground
  No.         (km)        (km)        (m)         (m)
--------   ----------  ----------  ---------  ------------
```

RECEPTORS OBTAINED FROM THE NPS/FWS EXTRACTION PROGRAM
ALL RECEPTORS ARE UTM ZONE 17 (KM)

180 OKEFENOKEE NWA RECEPTORS REPRESENTING ALL NPS BOUNDARY RECEPTORS AND
AND INTERIOR RECEPTORS WITH GREATER SPACING

```
 1 ! X = 386.913, 3381.527, 36.000 ! !END!
 2 ! X = 388.530, 3383.358, 36.000 ! !END!
 3 ! X = 385.314, 3381.544, 36.000 ! !END!
 4 ! X = 386.932, 3383.374, 36.000 ! !END!
 5 ! X = 390.147, 3385.188, 36.000 ! !END!
 6 ! X = 385.334, 3383.391, 36.000 ! !END!
 7 ! X = 388.549, 3385.205, 36.000 ! !END!
 8 ! X = 383.736, 3383.408, 36.000 ! !END!
 9 ! X = 388.568, 3387.052, 36.000 ! !END!
10 ! X = 382.137, 3383.425, 36.000 ! !END!
11 ! X = 386.971, 3387.068, 37.000 ! !END!
12 ! X = 380.539, 3383.443, 36.000 ! !END!
13 ! X = 388.588, 3388.899, 36.000 ! !END!
14 ! X = 378.941, 3383.461, 36.000 ! !END!
15 ! X = 390.204, 3390.730, 36.000 ! !END!
16 ! X = 377.343, 3383.479, 37.000 ! !END!
17 ! X = 388.607, 3390.746, 36.000 ! !END!
18 ! X = 380.580, 3387.137, 36.000 ! !END!
19 ! X = 375.744, 3383.497, 36.000 ! !END!
20 ! X = 388.626, 3392.593, 36.000 ! !END!
21 ! X = 374.146, 3383.516, 36.000 ! !END!
22 ! X = 390.242, 3394.424, 36.000 ! !END!
23 ! X = 382.218, 3390.814, 36.000 ! !END!
24 ! X = 372.548, 3383.534, 36.000 ! !END!
25 ! X = 388.645, 3394.440, 36.000 ! !END!
26 ! X = 387.048, 3394.457, 36.000 ! !END!
27 ! X = 370.949, 3383.553, 30.000 ! !END!
28 ! X = 374.189, 3387.210, 36.000 ! !END!
29 ! X = 369.351, 3383.573, 27.000 ! !END!
30 ! X = 383.855, 3394.491, 36.000 ! !END!
31 ! X = 387.068, 3396.304, 36.000 ! !END!
32 ! X = 375.829, 3390.886, 37.000 ! !END!
33 ! X = 367.753, 3383.592, 27.000 ! !END!
34 ! X = 387.087, 3398.151, 36.000 ! !END!
35 ! X = 367.775, 3385.439, 30.000 ! !END!
36 ! X = 385.491, 3398.168, 36.000 ! !END!
37 ! X = 377.469, 3394.562, 36.000 ! !END!
38 ! X = 366.177, 3385.459, 27.000 ! !END!
39 ! X = 367.798, 3387.286, 32.000 ! !END!
40 ! X = 387.107, 3399.998, 36.000 ! !END!
41 ! X = 382.299, 3398.202, 36.000 ! !END!
42 ! X = 390.317, 3401.812, 36.000 ! !END!
43 ! X = 364.579, 3385.479, 27.000 ! !END!
44 ! X = 388.721, 3401.829, 36.000 ! !END!
45 ! X = 369.441, 3390.961, 36.000 ! !END!
46 ! X = 387.126, 3401.845, 36.000 ! !END!
47 ! X = 364.603, 3387.326, 30.000 ! !END!
```

```
 48 ! X = 390.336, 3403.659, 36.000 ! !END!
 49 ! X = 371.082, 3394.636, 36.000 ! !END!
 50 ! X = 375.915, 3398.274, 36.000 ! !END!
 51 ! X = 363.005, 3387.346, 27.000 ! !END!
 52 ! X = 390.355, 3405.506, 36.000 ! !END!
 53 ! X = 380.744, 3401.914, 36.000 ! !END!
 54 ! X = 363.028, 3389.193, 27.000 ! !END!
 55 ! X = 388.760, 3405.523, 36.000 ! !END!
 56 ! X = 361.431, 3389.214, 27.000 ! !END!
 57 ! X = 363.052, 3391.041, 38.000 ! !END!
 58 ! X = 390.374, 3407.354, 37.000 ! !END!
 59 ! X = 382.380, 3405.591, 36.000 ! !END!
 60 ! X = 369.530, 3398.350, 36.000 ! !END!
 61 ! X = 361.455, 3391.061, 33.000 ! !END!
 62 ! X = 364.695, 3394.715, 38.000 ! !END!
 63 ! X = 374.362, 3401.987, 36.000 ! !END!
 64 ! X = 390.393, 3409.201, 36.000 ! !END!
 65 ! X = 361.478, 3392.908, 38.000 ! !END!
 66 ! X = 363.099, 3394.735, 38.000 ! !END!
 67 ! X = 387.204, 3409.234, 36.000 ! !END!
 68 ! X = 390.412, 3411.048, 36.000 ! !END!
 69 ! X = 361.502, 3394.755, 37.000 ! !END!
 70 ! X = 376.000, 3405.663, 36.000 ! !END!
 71 ! X = 363.122, 3396.582, 37.000 ! !END!
 72 ! X = 380.826, 3409.303, 36.000 ! !END!
 73 ! X = 367.980, 3402.064, 36.000 ! !END!
 74 ! X = 363.146, 3398.429, 36.000 ! !END!
 75 ! X = 390.430, 3412.895, 36.000 ! !END!
 76 ! X = 388.837, 3412.912, 36.000 ! !END!
 77 ! X = 361.550, 3398.450, 37.000 ! !END!
 78 ! X = 368.002, 3403.911, 36.000 ! !END!
 79 ! X = 363.169, 3400.277, 36.000 ! !END!
 80 ! X = 364.788, 3402.104, 36.000 ! !END!
 81 ! X = 369.620, 3405.739, 37.000 ! !END!
 82 ! X = 390.449, 3414.742, 36.000 ! !END!
 83 ! X = 366.407, 3403.931, 36.000 ! !END!
 84 ! X = 374.448, 3409.376, 36.000 ! !END!
 85 ! X = 382.461, 3412.980, 36.000 ! !END!
 86 ! X = 363.193, 3402.124, 36.000 ! !END!
 87 ! X = 368.025, 3405.758, 36.000 ! !END!
 88 ! X = 364.812, 3403.951, 36.000 ! !END!
 89 ! X = 369.643, 3407.586, 36.000 ! !END!
 90 ! X = 390.468, 3416.589, 36.000 ! !END!
 91 ! X = 363.216, 3403.971, 36.000 ! !END!
 92 ! X = 368.048, 3407.606, 37.000 ! !END!
 93 ! X = 387.282, 3416.623, 36.000 ! !END!
 94 ! X = 369.665, 3409.433, 36.000 ! !END!
 95 ! X = 376.086, 3413.052, 36.000 ! !END!
 96 ! X = 390.487, 3418.437, 36.000 ! !END!
 97 ! X = 369.688, 3411.280, 36.000 ! !END!
 98 ! X = 380.909, 3416.692, 36.000 ! !END!
 99 ! X = 390.506, 3420.284, 36.000 ! !END!
100 ! X = 388.914, 3420.300, 36.000 ! !END!
101 ! X = 369.710, 3413.128, 36.000 ! !END!
102 ! X = 368.116, 3413.147, 36.000 ! !END!
103 ! X = 374.535, 3416.765, 36.000 ! !END!
104 ! X = 390.525, 3422.131, 36.000 ! !END!
105 ! X = 361.693, 3409.533, 27.000 ! !END!
106 ! X = 382.543, 3420.369, 36.000 ! !END!
107 ! X = 366.522, 3413.167, 36.000 ! !END!
108 ! X = 360.098, 3409.554, 32.000 ! !END!
109 ! X = 364.928, 3413.187, 30.000 ! !END!
110 ! X = 390.544, 3423.978, 36.000 ! !END!
111 ! X = 361.717, 3411.381, 30.000 ! !END!
112 ! X = 376.171, 3420.441, 36.000 ! !END!
113 ! X = 360.122, 3411.401, 29.000 ! !END!
114 ! X = 368.162, 3416.842, 36.000 ! !END!
115 ! X = 364.952, 3415.034, 31.000 ! !END!
116 ! X = 361.741, 3413.228, 33.000 ! !END!
117 ! X = 384.176, 3424.045, 36.000 ! !END!
118 ! X = 390.563, 3425.825, 36.000 ! !END!
119 ! X = 358.528, 3411.422, 34.000 ! !END!
120 ! X = 363.358, 3415.055, 31.000 ! !END!
121 ! X = 360.147, 3413.249, 33.000 ! !END!
122 ! X = 356.934, 3411.444, 36.000 ! !END!
123 ! X = 361.764, 3415.075, 33.000 ! !END!
124 ! X = 390.582, 3427.672, 37.000 ! !END!
125 ! X = 369.800, 3420.517, 36.000 ! !END!
126 ! X = 377.807, 3424.117, 36.000 ! !END!
```

```
127 ! X = 388.991, 3427.689, 36.000 ! !END!
128 ! X = 355.340, 3411.465, 36.000 ! !END!
129 ! X = 387.399, 3427.706, 36.000 ! !END!
130 ! X = 356.959, 3413.291, 32.000 ! !END!
131 ! X = 361.788, 3416.922, 33.000 ! !END!
132 ! X = 353.746, 3411.487, 36.000 ! !END!
133 ! X = 382.624, 3427.757, 36.000 ! !END!
134 ! X = 352.151, 3411.509, 36.000 ! !END!
135 ! X = 387.419, 3429.553, 36.000 ! !END!
136 ! X = 371.438, 3424.192, 36.000 ! !END!
137 ! X = 353.771, 3413.334, 36.000 ! !END!
138 ! X = 385.827, 3429.570, 36.000 ! !END!
139 ! X = 363.429, 3420.596, 29.000 ! !END!
140 ! X = 384.236, 3429.587, 36.000 ! !END!
141 ! X = 352.177, 3413.356, 36.000 ! !END!
142 ! X = 376.257, 3427.830, 36.000 ! !END!
143 ! X = 353.796, 3415.181, 36.000 ! !END!
144 ! X = 355.415, 3417.007, 32.000 ! !END!
145 ! X = 384.256, 3431.434, 37.000 ! !END!
146 ! X = 357.033, 3418.833, 36.000 ! !END!
147 ! X = 352.202, 3415.203, 36.000 ! !END!
148 ! X = 382.665, 3431.452, 37.000 ! !END!
149 ! X = 365.069, 3424.271, 36.000 ! !END!
150 ! X = 361.860, 3422.464, 30.000 ! !END!
151 ! X = 353.821, 3417.029, 36.000 ! !END!
152 ! X = 368.276, 3426.078, 36.000 ! !END!
153 ! X = 358.651, 3420.659, 36.000 ! !END!
154 ! X = 381.074, 3431.470, 37.000 ! !END!
155 ! X = 355.440, 3418.854, 32.000 ! !END!
156 ! X = 363.476, 3424.291, 36.000 ! !END!
157 ! X = 366.684, 3426.098, 37.000 ! !END!
158 ! X = 360.268, 3422.485, 35.000 ! !END!
159 ! X = 369.891, 3427.906, 36.000 ! !END!
160 ! X = 357.058, 3420.680, 36.000 ! !END!
161 ! X = 361.884, 3424.311, 36.000 ! !END!
162 ! X = 365.092, 3426.118, 41.000 ! !END!
163 ! X = 358.675, 3422.506, 37.000 ! !END!
164 ! X = 368.299, 3427.925, 36.000 ! !END!
165 ! X = 376.300, 3431.524, 37.000 ! !END!
166 ! X = 381.095, 3433.317, 37.000 ! !END!
167 ! X = 379.504, 3433.335, 37.000 ! !END!
168 ! X = 369.913, 3429.753, 36.000 ! !END!
169 ! X = 373.118, 3431.562, 37.000 ! !END!
170 ! X = 368.322, 3429.772, 37.000 ! !END!
171 ! X = 371.527, 3431.581, 37.000 ! !END!
172 ! X = 369.936, 3431.600, 37.000 ! !END!
173 ! X = 379.525, 3435.182, 37.000 ! !END!
174 ! X = 373.140, 3433.409, 37.000 ! !END!
175 ! X = 377.934, 3435.200, 37.000 ! !END!
176 ! X = 376.344, 3435.219, 37.000 ! !END!
177 ! X = 374.753, 3435.237, 37.000 ! !END!
178 ! X = 373.162, 3435.256, 37.000 ! !END!
179 ! X = 377.955, 3437.047, 37.000 ! !END!
180 ! X = 376.365, 3437.066, 37.000 ! !END!
```

----

30 WOLF ISLAND RECEPTORS

```
181  ! X=  471.054,  3463.167,  1.0 ! !END!
182  ! X=  471.847,  3463.165,  1.0 ! !END!
183  ! X=  471.057,  3464.090,  1.0 ! !END!
184  ! X=  470.269,  3465.940,  3.0 ! !END!
185  ! X=  471.062,  3465.938,  2.0 ! !END!
186  ! X=  471.855,  3465.935,  1.0 ! !END!
187  ! X=  472.648,  3465.933,  1.0 ! !END!
188  ! X=  469.479,  3466.866,  1.0 ! !END!
189  ! X=  470.272,  3466.863,  1.0 ! !END!
190  ! X=  471.065,  3466.861,  1.0 ! !END!
191  ! X=  471.857,  3466.859,  1.0 ! !END!
192  ! X=  472.650,  3466.857,  1.0 ! !END!
193  ! X=  469.482,  3467.789,  1.0 ! !END!
194  ! X=  470.274,  3467.787,  1.0 ! !END!
195  ! X=  471.067,  3467.785,  1.0 ! !END!
196  ! X=  471.860,  3467.783,  1.0 ! !END!
197  ! X=  472.652,  3467.780,  1.0 ! !END!
198  ! X=  468.692,  3468.715,  1.0 ! !END!
199  ! X=  469.484,  3468.713,  1.0 ! !END!
```

```
200   ! X=  470.277,   3468.711,    1.0 !  !END!
201   ! X=  471.070,   3468.708,    1.0 !  !END!
202   ! X=  471.862,   3468.706,    1.0 !  !END!
203   ! X=  472.655,   3468.704,    1.0 !  !END!
204   ! X=  468.695,   3469.639,    1.0 !  !END!
205   ! X=  469.487,   3469.636,    1.0 !  !END!
206   ! X=  470.280,   3469.634,    1.0 !  !END!
207   ! X=  471.072,   3469.632,    1.0 !  !END!
208   ! X=  471.865,   3469.630,    1.0 !  !END!
209   ! X=  472.657,   3469.628,    1.0 !  !END!
210   ! X=  469.490,   3470.560,    1.0 !  !END!

-------------

58 RECEPTORS ON BOUNDARY OF CHASSAHOWITZA WILDER

211   ! X=  337.46,   3166.01,    0.0 !  !END!
212   ! X=  338.27,   3166.00,    1.0 !  !END!
213   ! X=  339.09,   3165.99,    1.0 !  !END!
214   ! X=  339.90,   3165.98,    3.0 !  !END!
215   ! X=  336.66,   3166.95,    0.0 !  !END!
216   ! X=  339.91,   3166.90,    2.0 !  !END!
217   ! X=  335.85,   3167.88,    0.0 !  !END!
218   ! X=  339.93,   3167.82,    2.0 !  !END!
219   ! X=  335.87,   3168.80,    0.0 !  !END!
220   ! X=  339.94,   3168.75,    2.0 !  !END!
221   ! X=  336.69,   3169.72,    0.0 !  !END!
222   ! X=  339.95,   3169.67,    2.0 !  !END!
223   ! X=  336.71,   3170.64,    0.0 !  !END!
224   ! X=  339.97,   3170.59,    3.0 !  !END!
225   ! X=  336.72,   3171.56,    0.0 !  !END!
226   ! X=  339.98,   3171.52,    2.0 !  !END!
227   ! X=  336.73,   3172.49,    0.0 !  !END!
228   ! X=  337.55,   3172.47,    0.0 !  !END!
229   ! X=  338.36,   3172.46,    0.0 !  !END!
230   ! X=  339.18,   3172.45,    1.0 !  !END!
231   ! X=  339.99,   3172.44,    1.0 !  !END!
232   ! X=  340.82,   3173.35,    2.0 !  !END!
233   ! X=  340.83,   3174.28,    1.0 !  !END!
234   ! X=  341.64,   3174.27,    2.0 !  !END!
235   ! X=  335.14,   3175.28,    0.0 !  !END!
236   ! X=  335.96,   3175.27,    0.0 !  !END!
237   ! X=  336.77,   3175.26,    0.0 !  !END!
238   ! X=  337.59,   3175.24,    0.0 !  !END!
239   ! X=  338.40,   3175.23,    0.0 !  !END!
240   ! X=  340.84,   3175.20,    1.0 !  !END!
241   ! X=  341.66,   3175.19,    1.0 !  !END!
242   ! X=  342.47,   3175.18,    1.0 !  !END!
243   ! X=  334.34,   3176.21,    0.0 !  !END!
244   ! X=  338.41,   3176.16,    0.0 !  !END!
245   ! X=  342.48,   3176.10,    1.0 !  !END!
246   ! X=  333.54,   3177.15,    0.0 !  !END!
247   ! X=  338.43,   3177.08,    0.0 !  !END!
248   ! X=  331.93,   3178.10,    0.0 !  !END!
249   ! X=  332.74,   3178.08,    0.0 !  !END!
250   ! X=  333.55,   3178.07,    1.0 !  !END!
251   ! X=  338.44,   3178.00,    1.0 !  !END!
252   ! X=  333.57,   3179.00,    0.0 !  !END!
253   ! X=  338.45,   3178.93,    1.0 !  !END!
254   ! X=  334.39,   3179.91,    0.0 !  !END!
255   ! X=  338.46,   3179.85,    1.0 !  !END!
256   ! X=  339.28,   3179.84,    1.0 !  !END!
257   ! X=  334.41,   3180.83,    0.0 !  !END!
258   ! X=  338.48,   3180.77,    0.0 !  !END!
259   ! X=  334.42,   3181.75,    0.0 !  !END!
260   ! X=  338.49,   3181.70,    1.0 !  !END!
261   ! X=  334.43,   3182.68,    0.0 !  !END!
262   ! X=  338.50,   3182.62,    1.0 !  !END!
263   ! X=  334.45,   3183.60,    0.0 !  !END!
264   ! X=  335.26,   3183.59,    1.0 !  !END!
265   ! X=  336.07,   3183.58,    1.0 !  !END!
266   ! X=  336.89,   3183.57,    2.0 !  !END!
267   ! X=  337.70,   3183.56,    2.0 !  !END!
268   ! X=  338.52,   3183.54,    2.0 !  !END!
```

a
Data for each receptor are treated as a separate input subgroup
and therefore must end with an input group terminator.

b
Receptor height above ground is optional. If no value is entered,

SGS UNIT 3- SO_2 INCREMENT ANALYSIS AT PSD CLASS I AREAS

CALPUFF INPUT FILES

```
SECI UNIT1&2 CUMULATIVE BASELINE SHORT TERM EMIS COMPETING SOURCES  12/21/05
RECEPTORS AT OKEFENOKEE NWA
1990 NORTH CENTRAL FL - S. GA  WIND DOMAIN
--------------- Run title (3 lines) ------------------------------------------

              CALPUFF MODEL CONTROL FILE
              --------------------------

-------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names

--------------
Default Name  Type          File Name
------------  ----          ---------
CALMET.DAT    input    * METDAT =           *
   or
ISCMET.DAT    input    * ISCDAT =           *
   or
PLMMET.DAT    input    * PLMDAT =           *
   or
PROFILE.DAT   input    * PRFDAT =           *
SURFACE.DAT   input    * SFCDAT =           *
RESTARTB.DAT  input    * RSTARTB=           *
-------------------------------------------------------------------------------
CALPUFF.LST   output   ! PUFLST = PSDSO2BAS.LST !
CONC.DAT      output   ! CONDAT = PSDSO2BAS.CON !
DFLX.DAT      output   * DFDAT  =           *
WFLX.DAT      output   * WFDAT  =           *

VISB.DAT      output   * VISDAT = VISB90.DAT   *
RESTARTE.DAT  output   * RSTARTE=           *
-------------------------------------------------------------------------------
Emission Files
--------------
PTEMARB.DAT   input    * PTDAT  =           *
VOLEMARB.DAT  input    * VOLDAT =           *
BAEMARB.DAT   input    * ARDAT  =           *
LNEMARB.DAT   input    * LNDAT  =           *
-------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input    * OZDAT  =           *
VD.DAT        input    * VDDAT  =           *
CHEM.DAT      input    * CHEMDAT=           *
H2O2.DAT      input    * H2O2DAT=           *
HILL.DAT      input    * HILDAT=            *
HILLRCT.DAT   input    * RCTDAT=            *
COASTLN.DAT   input    * CSTDAT=            *
FLUXBDY.DAT   input    * BDYDAT=            *
BCON.DAT      input    * BCNDAT=            *
DEBUG.DAT     output   * DEBUG =            *
MASSFLX.DAT   output   * FLXDAT=            *
MASSBAL.DAT   output   * BALDAT=            *
FOG.DAT       output   * FOGDAT=            *
-------------------------------------------------------------------------------
All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
        T = lower case      ! LCFILES = T !
        F = UPPER CASE
NOTE: (1) file/path names can be up to 70 characters in length


Provision for multiple input files
----------------------------------

     Number of CALMET.DAT files for run (NMETDAT)
                         Default: 1       ! NMETDAT =  24  !

     Number of PTEMARB.DAT files for run (NPTDAT)
                         Default: 0       ! NPTDAT =  0  !

     Number of BAEMARB.DAT files for run (NARDAT)
                         Default: 0       ! NARDAT =  0  !

     Number of VOLEMARB.DAT files for run (NVOLDAT)
                         Default: 0       ! NVOLDAT =  0  !
```

```
!END!

-------------
Subgroup (0a)
-------------

 The following CALMET.DAT filenames are processed in sequence if NMETDAT>1

Default Name  Type        File Name
------------  ----        ---------
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\JANA.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\JANB.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\FEBA.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\FEBB.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\MARA.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\MARB.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\APRA.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\APRB.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\MAYA.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\MAYB.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\JUNA.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\JUNB.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\JULA.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\JULB.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\AUGA.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\AUGB.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\SEPA.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\SEPB.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\OCTA.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\OCTB.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\NOVA.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\NOVB.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\DECA.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\DECB.DAT ! !END!


-------------------------------------------------------------------------------

INPUT GROUP: 1 -- General run control parameters
--------------

    Option to run all periods found
    in the met. file     (METRUN)   Default: 0       ! METRUN =   0  !

         METRUN = 0 - Run period explicitly defined below
         METRUN = 1 - Run all periods in met. file

     Starting date:    Year (IBYR) -- No default       ! IBYR =  1990 !
     (used only if     Month (IBMO) -- No default      ! IBMO =  1    !
      METRUN = 0)      Day (IBDY) -- No default        ! IBDY =  6    !
                       Hour (IBHR) -- No default       ! IBHR =  1    !

     Base time zone        (XBTZ) -- No default        ! XBTZ =  5    !
       PST = 8., MST = 7.
       CST = 6., EST = 5.

     Length of run (hours) (IRLG) -- No default        ! IRLG = 8615 !
     Number of chemical species (NSPEC)
                               Default: 5      ! NSPEC = 7    !

     Number of chemical species
     to be emitted  (NSE)          Default: 3      ! NSE =   5    !

     Flag to stop run after
     SETUP phase (ITEST)           Default: 2      ! ITEST =  2   !
     (Used to allow checking
     of the model inputs, files, etc.)
           ITEST = 1 - STOPS program after SETUP phase
           ITEST = 2 - Continues with execution of program
                       after SETUP

     Restart Configuration:

        Control flag (MRESTART)       Default: 0       ! MRESTART =  0  !

           0 = Do not read or write a restart file
           1 = Read a restart file at the beginning of
               the run
```

```
         2 = Write a restart file during run
         3 = Read a restart file at beginning of run
            and write a restart file during run

      Number of periods in Restart
      output cycle (NRESPD)       Default: 0      ! NRESPD =  0  !

         0 = File written only at last period
        >0 = File updated every NRESPD periods

    Meteorological Data Format (METFM)
                            Default: 1       ! METFM =  1  !

         METFM = 1 - CALMET binary file (CALMET.MET)
         METFM = 2 - ISC ASCII file (ISCMET.MET)
         METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
         METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
                  surface parameters file (SURFACE.DAT)

    PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
    Averaging Time (minutes) (AVET)
                            Default: 60.0   ! AVET = 60.  !
    PG Averaging Time (minutes) (PGTIME)
                            Default: 60.0   ! PGTIME = 60. !


!END!


--------------------------------------------------------------------------------

INPUT GROUP: 2 -- Technical options
--------------


    Vertical distribution used in the
    near field (MGAUSS)               Default: 1     ! MGAUSS =  1  !
      0 = uniform
      1 = Gaussian

    Terrain adjustment method
    (MCTADJ)                       Default: 3     ! MCTADJ =  3  !
      0 = no adjustment
      1 = ISC-type of terrain adjustment
      2 = simple, CALPUFF-type of terrain
         adjustment
      3 = partial plume path adjustment

    Subgrid-scale complex terrain
    flag (MCTSG)                   Default: 0     ! MCTSG =  0  !
      0 = not modeled
      1 = modeled

    Near-field puffs modeled as
    elongated 0 (MSLUG)               Default: 0     ! MSLUG =  0  !
      0 = no
      1 = yes (slug model used)

    Transitional plume rise modeled ?
    (MTRANS)                       Default: 1     ! MTRANS =  1  !
      0 = no  (i.e., final rise only)
      1 = yes (i.e., transitional rise computed)

    Stack tip downwash? (MTIP)         Default: 1     ! MTIP =  1  !
      0 = no  (i.e., no stack tip downwash)
      1 = yes (i.e., use stack tip downwash)

    Method used to simulate building
    downwash? (MBDW)                  Default: 1     ! MBDW =  1  !
      1 = ISC method
      2 = PRIME method

    Vertical wind shear modeled above
    stack top? (MSHEAR)               Default: 0     ! MSHEAR =  0  !
      0 = no  (i.e., vertical wind shear not modeled)
      1 = yes (i.e., vertical wind shear modeled)

    Puff splitting allowed? (MSPLIT)      Default: 0     ! MSPLIT =  0  !
```

```
   0 = no (i.e., puffs not split)
   1 = yes (i.e., puffs are split)

 Chemical mechanism flag (MCHEM)      Default: 1     ! MCHEM = 1  !
   0 = chemical transformation not
       modeled
   1 = transformation rates computed
       internally (MESOPUFF II scheme)
   2 = user-specified transformation
       rates used
   3 = transformation rates computed
       internally (RIVAD/ARM3 scheme)
   4 = secondary organic aerosol formation
       computed (MESOPUFF II scheme for OH)

 Aqueous phase transformation flag (MAQCHEM)
 (Used only if MCHEM = 1, or 3)       Default: 0     ! MAQCHEM = 0  !
   0 = aqueous phase transformation
       not modeled
   1 = transformation rates adjusted
       for aqueous phase reactions

 Wet removal modeled ? (MWET)         Default: 1     ! MWET = 1  !
   0 = no
   1 = yes

 Dry deposition modeled ? (MDRY)      Default: 1     ! MDRY = 1  !
   0 = no
   1 = yes
   (dry deposition method specified
    for each species in Input Group 3)

 Method used to compute dispersion
 coefficients (MDISP)                 Default: 3     ! MDISP = 3  !

   1 = dispersion coefficients computed from measured values
       of turbulence, sigma v, sigma w
   2 = dispersion coefficients from internally calculated
       sigma v, sigma w using micrometeorological variables
       (u*, w*, L, etc.)
   3 = PG dispersion coefficients for RURAL areas (computed using
       the ISCST multi-segment approximation) and MP coefficients in
       urban areas
   4 = same as 3 except PG coefficients computed using
       the MESOPUFF II eqns.
   5 = CTDM sigmas used for stable and neutral conditions.
       For unstable conditions, sigmas are computed as in
       MDISP = 3, described above.  MDISP = 5 assumes that
       measured values are read

 Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
 (Used only if MDISP = 1 or 5)        Default: 3     ! MTURBVW = 3  !
   1 = use sigma-v or sigma-theta measurements
       from PROFILE.DAT to compute sigma-y
       (valid for METFM = 1, 2, 3, 4)
   2 = use sigma-w measurements
       from PROFILE.DAT to compute sigma-z
       (valid for METFM = 1, 2, 3, 4)
   3 = use both sigma-(v/theta) and sigma-w
       from PROFILE.DAT to compute sigma-y and sigma-z
       (valid for METFM = 1, 2, 3, 4)
   4 = use sigma-theta measurements
       from PLMMET.DAT to compute sigma-y
       (valid only if METFM = 3)

 Back-up method used to compute dispersion
 when measured turbulence data are
 missing (MDISP2)                     Default: 3     ! MDISP2 = 3  !
 (used only if MDISP = 1 or 5)
   2 = dispersion coefficients from internally calculated
       sigma v, sigma w using micrometeorological variables
       (u*, w*, L, etc.)
   3 = PG dispersion coefficients for RURAL areas (computed using
       the ISCST multi-segment approximation) and MP coefficients in
       urban areas
   4 = same as 3 except PG coefficients computed using
       the MESOPUFF II eqns.
```

PG sigma-y,z adj. for roughness? Default: 0 ! MROUGH = 0 !
(MROUGH)
0 = no
1 = yes

Partial plume penetration of Default: 1 ! MPARTL = 1 !
elevated inversion?
(MPARTL)
0 = no
1 = yes

Strength of temperature inversion Default: 0 ! MTINV = 0 !
provided in PROFILE.DAT extended records?
(MTINV)
0 = no (computed from measured/default gradients)
1 = yes

PDF used for dispersion under convective conditions?
Default: 0 ! MPDF = 0 !
(MPDF)
0 = no
1 = yes

Sub-Grid TIBL module used for shore line?
Default: 0 ! MSGTIBL = 0 !
(MSGTIBL)
0 = no
1 = yes

Boundary conditions (concentration) modeled?
Default: 0 ! MBCON = 0 !
(MBCON)
0 = no
1 = yes, using formatted BCON.DAT file
2 = yes, using unformatted CONC.DAT file

Note: MBCON > 0 requires that the last species modeled
be 'BCON'. Mass is placed in species BCON when
generating boundary condition puffs so that clean
air entering the modeling domain can be simulated
in the same way as polluted air. Specify zero
emission of species BCON for all regular sources.

Analyses of fogging and icing impacts due to emissions from
arrays of mechanically-forced cooling towers can be performed
using CALPUFF in conjunction with a cooling tower emissions
processor (CTEMISS) and its associated postprocessors. Hourly
emissions of water vapor and temperature from each cooling tower
cell are computed for the current cell configuration and ambient
conditions by CTEMISS. CALPUFF models the dispersion of these
emissions and provides cloud information in a specialized format
for further analysis. Output to FOG.DAT is provided in either
'plume mode' or 'receptor mode' format.

Configure for FOG Model output?
Default: 0 ! MFOG = 0 !
(MFOG)
0 = no
1 = yes - report results in PLUME Mode format
2 = yes - report results in RECEPTOR Mode format

Test options specified to see if
they conform to regulatory
values? (MREG) Default: 1 ! MREG = 1 !

0 = NO checks are made
1 = Technical options must conform to USEPA
Long Range Transport (LRT) guidance
METFM 1 or 2
AVET 60. (min)
PGTIME 60. (min)
MGAUSS 1
MCTADJ 3
MTRANS 1
MTIP 1
MCHEM 1 or 3 (if modeling SOx, NOx)

```
              MWET    1
              MDRY    1
              MDISP   2 or 3
              MPDF    0 if MDISP=3
                      1 if MDISP=2
              MROUGH  0
              MPARTL  1
              SYTDEP  550. (m)
              MHFTSZ  0

!END!


--------------------------------------------------------------------------------

INPUT GROUP: 3a, 3b -- Species list
-------------------

------------
Subgroup (3a)
------------

  The following species are modeled:

! CSPEC =       SO2 !      !END!
! CSPEC =       SO4 !      !END!
! CSPEC =       NOX !      !END!
! CSPEC =      HNO3 !      !END!
! CSPEC =       NO3 !      !END!
! CSPEC =      PM10 !      !END!
! CSPEC =        CO !      !END!

                                          Dry              OUTPUT GROUP
   SPECIES        MODELED          EMITTED      DEPOSITED             NUMBER
    NAME       (0=NO, 1=YES)   (0=NO, 1=YES)  (0=NO,              (0=NONE,
  (Limit: 12                                  1=COMPUTED-GAS        1=1st CGRUP,
   Characters                                   2=COMPUTED-PARTICLE  2=2nd CGRUP,
   in length)                                 3=USER-SPECIFIED)    3= etc.)

!       SO2  =        1,           1,         1,            0  !
!       SO4  =        1,           1,         2,            0  !
!       NOX  =        1,           1,         1,            0  !
!      HNO3  =        1,           0,         1,            0  !
!       NO3  =        1,           0,         2,            0  !
!      PM10  =        1,           1,         2,            0  !
!        CO  =        1,           1,         0,            0  !

!END!

-------------
Subgroup (3b)
-------------
  The following names are used for Species-Groups in which results
  for certain species are combined (added) prior to output.  The
  CGRUP name will be used as the species name in output files.
  Use this feature to model specific particle-size distributions
  by treating each size-range as a separate species.
  Order must be consistent with 3(a) above.


INPUT GROUP: 4 -- Map Projection and Grid control parameters
--------------

    Projection for all (X,Y):
    -------------------------

    Map projection
    (PMAP)                Default: UTM    ! PMAP = UTM  !

       UTM :  Universal Transverse Mercator
       TTM :  Tangential Transverse Mercator
       LCC :  Lambert Conformal Conic
        PS :  Polar Stereographic
        EM :  Equatorial Mercator
      LAZA :  Lambert Azimuthal Equal Area

    False Easting and Northing (km) at the projection origin
```

```
  (Used only if PMAP= TTM, LCC, or LAZA)
  (FEAST)              Default=0.0    ! FEAST  = 0.000  !
  (FNORTH)             Default=0.0    ! FNORTH = 0.000  !

  UTM zone (1 to 60)
  (Used only if PMAP=UTM)
  (IUTMZN)             No Default     ! IUTMZN =  17   !

  Hemisphere for UTM projection?
  (Used only if PMAP=UTM)
  (UTMHEM)             Default: N     ! UTMHEM = N  !
     N  : Northern hemisphere projection
     S  : Southern hemisphere projection

  Latitude and Longitude (decimal degrees) of projection origin
  (Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
  (RLAT0)              No Default     ! RLAT0 =  48.7N !
  (RLON0)              No Default     ! RLON0 = 138.8W !

     TTM :  RLON0 identifies central (true N/S) meridian of projection
            RLAT0 selected for convenience
     LCC :  RLON0 identifies central (true N/S) meridian of projection
            RLAT0 selected for convenience
     PS  :  RLON0 identifies central (grid N/S) meridian of projection
            RLAT0 selected for convenience
     EM  :  RLON0 identifies central meridian of projection
            RLAT0 is REPLACED by 0.0N (Equator)
     LAZA:  RLON0 identifies longitude of tangent-point of mapping plane
            RLAT0 identifies latitude of tangent-point of mapping plane

  Matching parallel(s) of latitude (decimal degrees) for projection
  (Used only if PMAP= LCC or PS)
  (XLAT1)              No Default     ! XLAT1 = 30N  !
  (XLAT2)              No Default     ! XLAT2 = 60N  !

     LCC :  Projection cone slices through Earth's surface at XLAT1 and XLAT2
     PS  :  Projection plane slices through Earth at XLAT1
            (XLAT2 is not used)

  ----------
  Note:  Latitudes and longitudes should be positive, and include a
         letter N,S,E, or W indicating north or south latitude, and
         east or west longitude.  For example,
         35.9  N Latitude  =  35.9N
         118.7 E Longitude = 118.7E


  Datum-region
  ------------

  The Datum-Region for the coordinates is identified by a character
  string.  Many mapping products currently available use the model of the
  Earth known as the World Geodetic System 1984 (WGS-G ).  Other local
  models may be in use, and their selection in CALMET will make its output
  consistent with local mapping products.  The list of Datum-Regions with
  official transformation parameters is provided by the National Imagery and
  Mapping Agency (NIMA).

  NIMA Datum - Regions(Examples)
  ------------------------------------------------------------------------------
  WGS-G    WGS-84 GRS 80 Spheroid, Global coverage (WGS84)
  NAS-C    NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS (NAD27)
  NWS-27   NWS 6370KM Radius, Sphere
  NWS-84   NWS 6370KM Radius, Sphere
  ESR-S    ESRI REFERENCE 6371KM Radius, Sphere

  Datum-region for output coordinates
  (DATUM)              Default: WGS-G    ! DATUM = NAS-C !


METEOROLOGICAL Grid:

       No. X grid cells (NX)      No default     ! NX = 112   !
       No. Y grid cells (NY)      No default     ! NY = 171    !
     No. vertical layers (NZ)     No default     ! NZ =  10   !

      Grid spacing (DGRIDKM)      No default     ! DGRIDKM = 4. !
                                  Units: km
```

```
          Cell face heights
            (ZFACE(nz+1))     No defaults
                          Units: m
   ! ZFACE = 0.,20.,40.,80.,160.,300.,600.,1000.,1500.,2200.,3000. !

         Reference Coordinates
        of SOUTHWEST corner of
           grid cell(1, 1):

         X coordinate (XORIGKM)     No default     ! XORIGKM =  77. !
         Y coordinate (YORIGKM)     No default     ! YORIGKM = 2966. !
                          Units: km


COMPUTATIONAL Grid:

    The computational grid is identical to or a subset of the MET. grid.
    The lower left (LL) corner of the computational grid is at grid point
    (IBCOMP, JBCOMP) of the MET. grid.  The upper right (UR) corner of the
    computational grid is at grid point (IECOMP, JECOMP) of the MET. grid.
    The grid spacing of the computational grid is the same as the MET. grid.

       X index of LL corner (IBCOMP)      No default      ! IBCOMP =  1   !
              (1 <= IBCOMP <= NX)

       Y index of LL corner (JBCOMP)      No default      ! JBCOMP =  1   !
              (1 <= JBCOMP <= NY)


       X index of UR corner (IECOMP)      No default      ! IECOMP =  112 !
              (1 <= IECOMP <= NX)

       Y index of UR corner (JECOMP)      No default      ! JECOMP =  171  !
              (1 <= JECOMP <= NY)



SAMPLING Grid (GRIDDED RECEPTORS):

    The lower left (LL) corner of the sampling grid is at grid point
    (IBSAMP, JBSAMP) of the MET. grid.  The upper right (UR) corner of the
    sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
    The sampling grid must be identical to or a subset of the computational
    grid.  It may be a nested grid inside the computational grid.
    The grid spacing of the sampling grid is DGRIDKM/MESHDN.

       Logical flag indicating if gridded
       receptors are used (LSAMP)         Default: T      ! LSAMP = F !
       (T=yes, F=no)

       X index of LL corner (IBSAMP)      No default      ! IBSAMP =  1   !
        (IBCOMP <= IBSAMP <= IECOMP)

       Y index of LL corner (JBSAMP)      No default      ! JBSAMP =  1   !
        (JBCOMP <= JBSAMP <= JECOMP)


       X index of UR corner (IESAMP)      No default      ! IESAMP =  112 !
        (IBCOMP <= IESAMP <= IECOMP)

       Y index of UR corner (JESAMP)      No default      ! JESAMP =  171  !
        (JBCOMP <= JESAMP <= JECOMP)


      Nesting factor of the sampling
       grid (MESHDN)                Default: 1      ! MESHDN =  1  !
       (MESHDN is an integer >= 1)

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 5 -- Output Options
--------------
```

```
   FILE               DEFAULT VALUE        VALUE THIS RUN
   ----               -------------        --------------

  Concentrations (ICON)        1              ! ICON = 1  !
  Dry Fluxes (IDRY)            1              ! IDRY = 0  !
  Wet Fluxes (IWET)            1              ! IWET = 0  !
  Relative Humidity (IVIS)     1              ! IVIS = 0  !
   (relative humidity file is
    required for visibility
    analysis)
  Use data compression option in output file?
  (LCOMPRS)                  Default: T      ! LCOMPRS = T !

  *
   0 = Do not create file, 1 = create file


   DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

      Mass flux across specified boundaries
      for selected species reported hourly?
      (IMFLX)                 Default: 0      ! IMFLX = 0 !
        0 = no
        1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
              are specified in Input Group 0)

      Mass balance for each species
      reported hourly?
      (IMBAL)                 Default: 0      ! IMBAL = 0 !
        0 = no
        1 = yes (MASSBAL.DAT filename is
            specified in Input Group 0)


   LINE PRINTER OUTPUT OPTIONS:

      Print concentrations (ICPRT)   Default: 0      ! ICPRT = 0  !
      Print dry fluxes (IDPRT)       Default: 0      ! IDPRT = 0  !
      Print wet fluxes (IWPRT)       Default: 0      ! IWPRT = 0  !
      (0 = Do not print, 1 = Print)

      Concentration print interval
      (ICFRQ) in hours            Default: 1      ! ICFRQ = 24  !
      Dry flux print interval
      (IDFRQ) in hours            Default: 1      ! IDFRQ = 1  !
      Wet flux print interval
      (IWFRQ) in hours            Default: 1      ! IWFRQ = 1  !

      Units for Line Printer Output
      (IPRTU)                 Default: 1      ! IPRTU = 3  !
                   for           for
               Concentration   Deposition
         1 =     g/m**3         g/m**2/s
         2 =    mg/m**3        mg/m**2/s
         3 =    ug/m**3        ug/m**2/s
         4 =    ng/m**3        ng/m**2/s
         5 =    Odour Units

      Messages tracking progress of run
      written to the screen ?
      (IMESG)                 Default: 1      ! IMESG = 2  !
        0 = no
        1 = yes (advection step, puff ID)
        2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)


   SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

           ---- CONCENTRATIONS ----  ------ DRY FLUXES ------  ------ WET FLUXES ------  -- MASS FLUX --
SPECIES
/GROUP    PRINTED? SAVED ON DISK? PRINTED?  SAVED ON DISK?  PRINTED?  SAVED ON DISK?  SAVED ON DISK?
-------  ----------------------- -----------------------  -----------------------  ---------------
!     SO2 =   0,        1,        0,        1,        0,        1,        0  !
!     SO4 =   0,        1,        0,        1,        0,        1,        0  !
!     NOX =   0,        1,        0,        1,        0,        1,        0  !
!    HNO3 =   0,        1,        0,        1,        0,        1,        0  !
!     NO3 =   0,        1,        0,        1,        0,        1,        0  !
!    PM10 =   0,        1,        0,        1,        0,        1,        0  !
```

```
!       CO =   0,        1,       0,       1,       0,       1,       0 !

 Note:  Species BCON (for MBCON > 0) does not need to be saved on disk.


   OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

     Logical for debug output
     (LDEBUG)                     Default: F     ! LDEBUG = F !

     First puff to track
     (IPFDEB)                    Default: 1     ! IPFDEB =  1  !

     Number of puffs to track
     (NPFDEB)                     Default: 1     ! NPFDEB =  1  !

     Met. period to start output
     (NN1)                      Default: 1     ! NN1 =  1   !

     Met. period to end output
     (NN2)                      Default: 10    ! NN2 =  10  !

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
-------------------------


---------------
Subgroup (6a)
---------------
     Number of terrain features (NHILL)      Default: 0     ! NHILL =  0   !

     Number of special complex terrain
     receptors  (NCTREC)                  Default: 0     ! NCTREC =  0   !

     Terrain and CTSG Receptor data for
     CTSG hills input in CTDM format ?
     (MHILL)                           No Default     ! MHILL =  2   !
     1 = Hill and Receptor data created
        by CTDM processors & read from
        HILL.DAT and HILLRCT.DAT files
     2 = Hill data created by OPTHILL &
        input below in Subgroup (6b);
        Receptor data in Subgroup (6c)

     Factor to convert horizontal dimensions  Default: 1.0    ! XHILL2M = 1. !
     to meters (MHILL=1)

     Factor to convert vertical dimensions    Default: 1.0   ! ZHILL2M = 1. !
     to meters (MHILL=1)

     X-origin of CTDM system relative to      No Default     ! XCTDMKM = 0.0E00 !
     CALPUFF coordinate system, in Kilometers (MHILL=1)

     Y-origin of CTDM system relative to      No Default     ! YCTDMKM = 0.0E00 !
     CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

---------------
Subgroup (6b)
---------------

                1 **
    HILL information


HILL      XC      YC      THETAH  ZGRID  RELIEF    EXPO 1   EXPO 2   SCALE 1    SCALE 2    AMAX1     AMAX2
 NO.     (km)    (km)    (deg.)   (m)     (m)       (m)      (m)      (m)        (m)        (m)
----     ----    ----    ------  -----  ------    ------   ------   -------    -------    -----     -----

---------------
Subgroup (6c)
---------------
```

```
   COMPLEX TERRAIN RECEPTOR INFORMATION

              XRCT      YRCT     ZRCT       XHH
              (km)      (km)      (m)
             ------    -----    ------     ----


-------------------
1
    Description of Complex Terrain Variables:
       XC, YC  = Coordinates of center of hill
       THETAH  = Orientation of major axis of hill (clockwise from
              North)
       ZGRID   = Height of the  0  of the grid above mean sea
              level
       RELIEF  = Height of the crest of the hill above the grid elevation
       EXPO 1  = Hill-shape exponent for the major axis
       EXPO 2  = Hill-shape exponent for the major axis
       SCALE 1 = Horizontal length scale along the major axis
       SCALE 2 = Horizontal length scale along the minor axis
       AMAX    = Maximum allowed axis length for the major axis
       BMAX    = Maximum allowed axis length for the major axis

       XRCT, YRCT = Coordinates of the complex terrain receptors
       ZRCT    = Height of the ground (MSL) at the complex terrain
              Receptor
       XHH     = Hill number associated with each complex terrain receptor
              (NOTE: MUST BE ENTERED AS A REAL NUMBER)

  **
    NOTE: DATA for each hill and CTSG receptor are treated as a separate
        input subgroup and therefore must end with an input group terminator.

-------------------------------------------------------------------------------


INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases
--------------

     SPECIES   DIFFUSIVITY    ALPHA STAR    REACTIVITY  MESOPHYLL RESISTANCE    HENRY'S LAW COEFFICIENT
      NAME      (cm**2/s)                     (s/cm)            (dimensionless)
     -------  -----------   ----------   ---------- -------------------  ----------------------
 !   SO2 =      0.1509,      1000.,         8.,         0.,              .04 !
 !   NOX =      0.1656,         1.,         8.,         5.,              3.5 !
 !   HNO3 =     0.1628,         1.,        18.,         0.,             8E-8 !

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 8 -- Size parameters for dry deposition of particles
--------------

    For SINGLE SPECIES, the mean and standard deviation are used to
    compute a deposition velocity for NINT (see group 9) size-ranges,
    and these are then averaged to obtain a mean deposition velocity.

    For GROUPED SPECIES, the size distribution should be explicitly
    specified (by the 'species' in the group), and the standard deviation
    for each should be entered as 0.  The model will then use the
    deposition velocity for the stated mean diameter.

     SPECIES   GEOMETRIC MASS MEAN     GEOMETRIC STANDARD
      NAME          DIAMETER                DEVIATION
                   (microns)              (microns)
     -------   -------------------      ------------------
!       SO4 =        0.48,                   2.  !
!       NO3 =        0.48,                   2.  !
!      PM10 =        0.48,                   2.  !

!END!


-------------------------------------------------------------------------------
```

```
INPUT GROUP: 9 -- Miscellaneous dry deposition parameters
--------------

     Reference cuticle resistance (s/cm)
     (RCUTR)                    Default: 30    ! RCUTR = 30.0 !
     Reference ground resistance  (s/cm)
     (RGR)                      Default: 10    !  RGR = 10.0 !
     Reference pollutant reactivity
     (REACTR)                   Default: 8     ! REACTR = 8.0 !

     Number of particle-size intervals used to
     evaluate effective particle deposition velocity
     (NINT)                     Default: 9     !  NINT =  9  !

     Vegetation state in unirrigated areas
     (IVEG)                     Default: 1     !  IVEG =  1   !
        IVEG=1 for active and unstressed vegetation
        IVEG=2 for active and stressed vegetation
        IVEG=3 for inactive vegetation

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 10 -- Wet Deposition Parameters
---------------


              Scavenging Coefficient -- Units: (sec)**(-1)

       Pollutant     Liquid Precip.      Frozen Precip.
       ---------     --------------      --------------
!        SO2 =        3.0E-05,             0.0E00 !
!        SO4 =        1.0E-04,            3.0E-05 !
!       HNO3 =         6.0E-05,             0.0E00 !
!        NO3 =        1.0E-04,            3.0E-05 !
!       PM10 =         1.0E-04,            3.0E-05 !

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 11 -- Chemistry Parameters
---------------

     Ozone data input option (MOZ)     Default: 1          ! MOZ =  0   !
     (Used only if MCHEM = 1, 3, or 4)
        0 = use a monthly background ozone value
        1 = read hourly ozone concentrations from
            the OZONE.DAT data file

     Monthly ozone concentrations
     (Used only if MCHEM = 1, 3, or 4 and
      MOZ = 0 or MOZ = 1 and all hourly O3 data missing)
     (BCKO3) in ppb                  Default: 12*80.
     !  BCKO3 = 12*50. !

     Monthly ammonia concentrations
     (Used only if MCHEM = 1, or 3)
     (BCKNH3) in ppb                 Default: 12*10.
     !  BCKNH3 = 12*1. !

     Nighttime SO2 loss rate (RNITE1)
     in percent/hour                 Default: 0.2        ! RNITE1 = .2 !

     Nighttime NOx loss rate (RNITE2)
     in percent/hour                 Default: 2.0        ! RNITE2 = 2.0 !

     Nighttime HNO3 formation rate (RNITE3)
     in percent/hour                 Default: 2.0        ! RNITE3 = 2.0 !

     H2O2 data input option (MH2O2)    Default: 1          ! MH2O2 =  1   !
     (Used only if MAQCHEM = 1)
```

```
      0 = use a monthly background H2O2 value
      1 = read hourly H2O2 concentrations from
        the H2O2.DAT data file

    Monthly H2O2 concentrations
    (Used only if MQACHEM = 1 and
     MH2O2 = 0 or MH2O2 = 1 and all hourly H2O2 data missing)
    (BCKH2O2) in ppb              Default: 12*1.
    ! BCKH2O2 = 12*1 !


--- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
    (used only if MCHEM = 4)

    The SOA module uses monthly values of:
       Fine particulate concentration in ug/m^3 (BCKPMF)
       Organic fraction of fine particulate     (OFRAC)
       VOC / NOX ratio (after reaction)         (VCNX)
    to characterize the air mass when computing
    the formation of SOA from VOC emissions.
    Typical values for several distinct air mass types are:

      Month   1   2   3   4   5   6   7   8   9  10  11  12
             Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

    Clean Continental
      BCKPMF  1.  1.  1.  1.  1.  1.  1.  1.  1.  1.  1.  1.
      OFRAC  .15 .15 .20 .20 .20 .20 .20 .20 .20 .20 .20 .15
      VCNX   50. 50. 50. 50. 50. 50. 50. 50. 50. 50. 50. 50.

    Clean Marine (surface)
      BCKPMF .5  .5  .5  .5  .5  .5  .5  .5  .5  .5  .5  .5
      OFRAC  .25 .25 .30 .30 .30 .30 .30 .30 .30 .30 .30 .25
      VCNX   50. 50. 50. 50. 50. 50. 50. 50. 50. 50. 50. 50.

    Urban - low biogenic (controls present)
      BCKPMF 30. 30. 30. 30. 30. 30. 30. 30. 30. 30. 30. 30.
      OFRAC  .20 .20 .25 .25 .25 .25 .25 .25 .20 .20 .20 .20
      VCNX    4.  4.  4.  4.  4.  4.  4.  4.  4.  4.  4.  4.

    Urban - high biogenic (controls present)
      BCKPMF 60. 60. 60. 60. 60. 60. 60. 60. 60. 60. 60. 60.
      OFRAC  .25 .25 .30 .30 .30 .55 .55 .55 .35 .35 .35 .25
      VCNX   15. 15. 15. 15. 15. 15. 15. 15. 15. 15. 15. 15.

    Regional Plume
      BCKPMF 20. 20. 20. 20. 20. 20. 20. 20. 20. 20. 20. 20.
      OFRAC  .20 .20 .25 .35 .25 .40 .40 .40 .30 .30 .30 .20
      VCNX   15. 15. 15. 15. 15. 15. 15. 15. 15. 15. 15. 15.

    Urban - no controls present
      BCKPMF 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100.
      OFRAC  .30 .30 .35 .35 .35 .55 .55 .55 .35 .35 .35 .30
      VCNX    2.  2.  2.  2.  2.  2.  2.  2.  2.  2.  2.  2.

    Default: Clean Continental
    ! BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !
    ! OFRAC  = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.15 !
    ! VCNX   = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00 !


!END!


-------------------------------------------------------------------------------


INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
---------------

    Horizontal size of puff (m) beyond which
    time-dependent dispersion equations (Heffter)
    are used to determine sigma-y and
    sigma-z (SYTDEP)                 Default: 550.   ! SYTDEP = 5.5E02 !

    Switch for using Heffter equation for sigma z
    as above (0 = Not use Heffter; 1 = use Heffter
    (MHFTSZ)                         Default: 0      ! MHFTSZ =  0  !
```

```
Stability class used to determine plume
growth rates for puffs above the boundary
layer (JSUP)                    Default: 5    ! JSUP = 5  !

Vertical dispersion constant for stable
conditions (k1 in Eqn. 2.7-3) (CONK1)   Default: 0.01  ! CONK1 = .01 !

Vertical dispersion constant for neutral/
unstable conditions (k2 in Eqn. 2.7-4)
(CONK2)                         Default: 0.1   ! CONK2 = .1 !

Factor for determining Transition-point from
Schulman-Scire to Huber-Snyder Building Downwash
scheme (SS used for Hs < Hb + TBD * HL)
(TBD)                           Default: 0.5   ! TBD = .5 !
  TBD < 0   ==> always use Huber-Snyder
  TBD = 1.5 ==> always use Schulman-Scire
  TBD = 0.5 ==> ISC Transition-point

Range of land use categories for which
urban dispersion is assumed
(IURB1, IURB2)                  Default: 10    ! IURB1 = 10 !
                                19    ! IURB2 = 19 !

Site characterization parameters for single-point Met data files ---------
(needed for METFM = 2,3,4)

  Land use category for modeling domain
  (ILANDUIN)                    Default: 20    ! ILANDUIN = 20 !

  Roughness length (m) for modeling domain
  (Z0IN)                        Default: 0.25  ! Z0IN = .25 !

  Leaf area index for modeling domain
  (XLAIIN)                      Default: 3.0   ! XLAIIN = 3.0 !

  Elevation above sea level (m)
  (ELEVIN)                      Default: 0.0   ! ELEVIN = .0 !

  Latitude (degrees) for met location
  (XLATIN)                      Default: -999. ! XLATIN = -999.0 !

  Longitude (degrees) for met location
  (XLONIN)                      Default: -999. ! XLONIN = -999.0 !

Specialized information for interpreting single-point Met data files -----

  Anemometer height (m) (Used only if METFM = 2,3)
  (ANEMHT)                      Default: 10.   ! ANEMHT = 10.0 !

  Form of lateral turbulance data in PROFILE.DAT file
  (Used only if METFM = 4 or MTURBVW = 1 or 3)
  (ISIGMAV)                     Default: 1     ! ISIGMAV = 1 !
     0 = read sigma-theta
     1 = read sigma-v

  Choice of mixing heights (Used only if METFM = 4)
  (IMIXCTDM)                    Default: 0     ! IMIXCTDM = 0 !
     0 = read PREDICTED mixing heights
     1 = read OBSERVED mixing heights

Maximum length of a slug (met. grid units)
(XMXLEN)                        Default: 1.0   ! XMXLEN = 1.0 !

Maximum travel distance of a puff/slug (in
grid units) during one sampling step
(XSAMLEN)                       Default: 1.0   ! XSAMLEN = 1.0 !

Maximum Number of slugs/puffs release from
one source during one time step
(MXNEW)                         Default: 99    ! MXNEW = 99 !

Maximum Number of sampling steps for
one puff/slug during one time step
(MXSAM)                         Default: 99    ! MXSAM = 99 !

Number of iterations used when computing
```

```
the transport wind for a sampling step
that includes gradual rise (for CALMET
and PROFILE winds)
(NCOUNT)                        Default: 2     ! NCOUNT =  2  !

Minimum sigma y for a new puff/slug (m)
(SYMIN)                         Default: 1.0   ! SYMIN = 1.0  !

Minimum sigma z for a new puff/slug (m)
(SZMIN)                         Default: 1.0   ! SZMIN = 1.0  !

Default minimum turbulence velocities
sigma-v and sigma-w for each
stability class (m/s)
(SVMIN(6) and SWMIN(6))    Default SVMIN : .50,  .50,  .50,  .50,  .50,  .50
                           Default SWMIN : .20,  .12,  .08,  .06,  .03,  .016

             Stability Class :  A    B    C    D    E    F
                               ---  ---  ---  ---  ---  ---
                  ! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500!
                  ! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016!

Divergence criterion for dw/dz across puff
used to initiate adjustment for horizontal
convergence (1/s)
Partial adjustment starts at CDIV(1), and
full adjustment is reached at CDIV(2)
(CDIV(2))                       Default: 0.0,0.0  ! CDIV = .0, .0 !

Minimum wind speed (m/s) allowed for
non-calm conditions. Also used as minimum
speed returned when using power-law
extrapolation toward surface
(WSCALM)                        Default: 0.5   ! WSCALM = .5 !

Maximum mixing height (m)
(XMAXZI)                        Default: 3000.  ! XMAXZI = 3000.0 !

Minimum mixing height (m)
(XMINZI)                        Default: 50.    ! XMINZI = 50.0 !

Default wind speed classes --
5 upper bounds (m/s) are entered;
the 6th class has no upper limit
(WSCAT(5))                 Default   :
                         ISC RURAL : 1.54, 3.09, 5.14, 8.23, 10.8 (10.8+)

             Wind Speed Class :  1    2    3    4    5
                                ---  ---  ---  ---  ---
                  ! WSCAT = 1.54, 3.09, 5.14, 8.23, 10.80 !

Default wind speed profile power-law
exponents for stabilities 1-6
(PLX0(6))                  Default   : ISC RURAL values
                         ISC RURAL : .07, .07, .10, .15, .35, .55
                         ISC URBAN : .15, .15, .20, .25, .30, .30

             Stability Class :  A    B    C    D    E    F
                               ---  ---  ---  ---  ---  ---
                  ! PLX0 = 0.07, 0.07, 0.10, 0.15, 0.35, 0.55 !

Default potential temperature gradient
for stable classes E, F (degK/m)
(PTG0(2))                  Default: 0.020, 0.035
                  ! PTG0 = 0.020,  0.035 !

Default plume path coefficients for
each stability class (used when option
for partial plume height terrain adjustment
is selected -- MCTADJ=3)
(PPC(6))          Stability Class :  A    B    C    D    E    F
                         Default  PPC : .50,  .50,  .50,  .50,  .35,  .35
                               ---  ---  ---  ---  ---  ---
                  !  PPC = 0.50, 0.50, 0.50, 0.50, 0.35, 0.35 !

Slug-to-puff transition criterion factor
equal to sigma-y/length of slug
(SL2PF)                    Default: 10.     ! SL2PF = 10.0 !
```

Puff-splitting control variables -----------------------

VERTICAL SPLIT

Number of puffs that result every time a puff
is split - nsplit=2 means that 1 puff splits
into 2
(NSPLIT) Default: 3 ! NSPLIT = 3 !

Time(s) of a day when split puffs are eligible to
be split once again; this is typically set once
per day, around sunset before nocturnal shear develops.
24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
0=do not re-split 1=eligible for re-split
(IRESPLIT(24)) Default: Hour 17 = 1
! IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

Split is allowed only if last hour's mixing
height (m) exceeds a minimum value
(ZISPLIT) Default: 100. ! ZISPLIT = 100.0 !

Split is allowed only if ratio of last hour's
mixing ht to the maximum mixing ht experienced
by the puff is less than a maximum value (this
postpones a split until a nocturnal layer develops)
(ROLDMAX) Default: 0.25 ! ROLDMAX = 0.25 !

HORIZONTAL SPLIT

Number of puffs that result every time a puff
is split - nsplith=5 means that 1 puff splits
into 5
(NSPLITH) Default: 5 ! NSPLITH = 5 !

Minimum sigma-y (Grid Cells Units) of puff
before it may be split
(SYSPLITH) Default: 1.0 ! SYSPLITH = 1.0 !

Minimum puff elongation rate (SYSPLITH/hr) due to
wind shear, before it may be split
(SHSPLITH) Default: 2. ! SHSPLITH = 2.0 !

Minimum concentration (g/m^3) of each
species in puff before it may be split
Enter array of NSPEC values; if a single value is
entered, it will be used for ALL species
(CNSPLITH) Default: 1.0E-07 ! CNSPLITH = 1.0E-07 !

Integration control variables -----------------------

Fractional convergence criterion for numerical SLUG
sampling integration
(EPSSLUG) Default: 1.0e-04 ! EPSSLUG = 1.0E-04 !

Fractional convergence criterion for numerical AREA
source integration
(EPSAREA) Default: 1.0e-06 ! EPSAREA = 1.0E-06 !

Trajectory step-length (m) used for numerical rise
integration
(DSRISE) Default: 1.0 ! DSRISE = 1.0 !

Boundary Condition (BC) Puff control variables -----------------------

Minimum height (m) to which BC puffs are mixed as they are emitted
(MBCON=2 ONLY). Actual height is reset to the current mixing height
at the release point if greater than this minimum.
(HTMINBC) Default: 500. ! HTMINBC = 500. !

Search radius (km) about a receptor for sampling nearest BC puff.
BC puffs are typically emitted with a spacing of one grid cell
length, so the search radius should be greater than DGRIDKM.
(RSAMPBC) Default: 10. ! RSAMPBC = 10. !

```
      Near-Surface depletion adjustment to concentration profile used when
      sampling BC puffs?
      (MDEPBC)                    Default:  1       ! MDEPBC = 0. !
        0 = Concentration is NOT adjusted for depletion
        1 = Adjust Concentration for depletion

!END!


-------------------------------------------------------------------------------


INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters
--------------------------------

---------------
Subgroup (13a)
---------------

     Number of point sources with
     parameters provided below      (NPT1)  No default  !  NPT1 =  79 !

     Units used for point source
     emissions below              (IPTU)  Default: 1  !  IPTU =   1  !
          1 =        g/s
          2 =       kg/hr
          3 =       lb/hr
          4 =     tons/yr
          5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
          6 =     Odour Unit * m**3/min
          7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (13d)       (NSPT1) Default: 0  !  NSPT1 = 0  !

     Number of point sources with
     variable emission parameters
     provided in external file     (NPT2)  No default  !  NPT2 =  0  !

     (If NPT2 > 0, these point
     source emissions are read from
     the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------
                                     a
          POINT SOURCE: CONSTANT DATA
          -----------------------------
                                                              b          c
  Source      X UTM      Y UTM      Stack   Base     Stack    Exit  Exit     Bldg.  Emission
   No.    Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.   Dwash   Rates
             (km)        (km)        (m)       (m)        (m)   (m/s) (deg. K)
  ------   ---------- ---------- ------  ------   -------- ----- -------- ----- --------
Subgroup (13b)

GP PALATKA BASELINE SOURCES,
     1  ! SRCNAM = RB1B      !
     1  ! X =  434.0536, 3283.4072,  76.20,   0.00,   3.66,   8.80,  360.0, 1.0,  0.621E+01, 0.0 , 0.0, 0.0, 0.0 !  !END!
     2  ! SRCNAM = RB2B      !
     2  ! X =  434.0536, 3283.4072,  76.20,   0.00,   3.66,   8.80,  372.0, 1.0,  0.888E+01, 0.0 , 0.0, 0.0, 0.0  !  !END!
     3  ! SRCNAM = RB3B      !
     3  ! X =  434.0195, 3283.3848,  40.50,   0.00,   3.41,   7.28,  372.0, 1.0,  0.858E+01, 0.0 , 0.0, 0.0, 0.0  !  !END!
     4  ! SRCNAM = RB4B      !
     4  ! X =  433.8823, 3283.4380,  70.10,   0.00,   3.66,  16.86,  474.0, 1.0,   0.350E+02, 0.0 , 0.0, 0.0, 0.0  !  !END!
     5  ! SRCNAM = SDT1B     !
     5  ! X =  434.0593, 3283.4109,  30.50,   0.00,   0.76,   7.53,  366.0, 1.0,  0.130E+00, 0.0 , 0.0, 0.0, 0.0  !  !END!
     6  ! SRCNAM = SDT2B     !
     6  ! X =  434.0593, 3283.4109,  30.50,   0.00,   0.91,   9.51,  375.0, 1.0,  0.180E+00, 0.0 , 0.0, 0.0, 0.0  !  !END!
     7  ! SRCNAM = SDT3B     !
     7  ! X =  434.0253, 3283.3884,  33.20,   0.00,   0.76,   3.57,  369.0, 1.0,  0.180E+00, 0.0 , 0.0, 0.0, 0.0  !  !END!
     8  ! SRCNAM = SDT4B     !
     8  ! X =  433.9347, 3283.4775,  62.80,   0.00,   1.52,   8.26,  346.0, 1.0,  0.710E+00, 0.0 , 0.0, 0.0, 0.0  !  !END!
     9  ! SRCNAM = LK1B      !
```

```
  9 ! X =  434.1219, 3283.3010,  15.20,  0.00,  1.28,   5.24, 401.0, 0.0,  0.240E+00, 0.0 , 0.0, 0.0, 0.0 ! !END!
 10 ! SRCNAM = LK2B     !
 10 ! X =  434.1174, 3283.2988,  15.90,  0.00,  1.71,  10.67, 341.0, 1.0,  0.240E+00, 0.0 , 0.0, 0.0, 0.0 ! !END!
 11 ! SRCNAM = LK3B     !
 11 ! X =  434.1193, 3283.2705,  15.90,  0.00,  1.71,   8.47, 342.0, 0.0,  0.480E+00, 0.0 , 0.0, 0.0, 0.0 ! !END!
 12 ! SRCNAM = LK4B     !
 12 ! X =  434.1067, 3283.2471,  45.40,  0.00,  1.31,  16.46, 351.0, 0.0,  0.140E+01, 0.0 , 0.0, 0.0, 0.0 ! !END!
 13 ! SRCNAM = PB4B     !
 13 ! X =  433.9980, 3283.4814,  37.20,  0.00,  1.22,  14.54, 477.0, 1.0,  0.452E+02, 0.0 , 0.0, 0.0, 0.0 ! !END!
 14 ! SRCNAM = PB5B     !
 14 ! X =  433.9773, 3283.4470,  72.90,  0.00,  2.74,  15.97, 520.0, 1.0,  0.161E+03, 0.0 , 0.0, 0.0, 0.0 ! !END!
 15 ! SRCNAM = CB4B     !
 15 ! X =  433.9825, 3283.4504,  72.90,  0.00,  3.05,  10.52, 477.0, 1.0,  0.121E+03, 0.0 , 0.0, 0.0, 0.0 ! !END!

COMPETING SOURCES - AMERISTEEL
 16 ! SRCNAM = ST12     !
 16 ! X =  405.6990, 3350.1089,  35.05, 26.20,  3.05,  19.76, 383.2, 1.0,  0.128E+01, 0.0 , 0.0, 0.0, 0.0 ! !END!
 17 ! SRCNAM = ST34     !
 17 ! X =  405.7320, 3350.1169,  35.05, 26.20,  3.05,  20.70, 383.2, 1.0,  0.140E+00, 0.0 , 0.0, 0.0, 0.0 ! !END!
 18 ! SRCNAM = REHEAT    !
 18 ! X =  405.7580, 3350.3579,  48.77, 26.20,  2.10,   5.93, 755.4, 1.0,  0.678E-02, 0.0 , 0.0, 0.0, 0.0 ! !END!

OTHER COMPETING SOURCES
OTHER PSD BASELINE SOURCES FROM DEP 1/11/02 FILE (7_3_12_99.DAT)
UPDATED G-P 2004/2005
UPDATED THROUGH GERDAU-AMERISTEEL

MILLENIUM SPECIALITY PRODUCTS
 19 ! SRCNAM = EBOILER3  !
 19 ! X =  436.7900, 3360.7400,  12.20,  5.00,  1.10,  10.10, 658.0, 0.0,  0.849E+01, 0.0 , 0.0, 0.0, 0.0 ! !END!

JEA SOUTHSIDE
 20 ! SRCNAM = JEASS1    !
 20 ! X =  437.6700, 3353.8899,  40.70,  2.00,  2.44,  15.50, 446.0, 0.0,  0.527E+02, 0.0 , 0.0, 0.0, 0.0 ! !END!
 21 ! SRCNAM = JEASS2    !
 21 ! X =  437.6700, 3353.9099,  40.70,  2.00,  2.44,  15.50, 446.0, 0.0,  0.527E+02, 0.0 , 0.0, 0.0, 0.0 ! !END!
 22 ! SRCNAM = JEASS5B   !
 22 ! X =  437.6820, 3353.8411,  44.20,  2.00,  2.96,  21.30, 415.0, 0.0,  0.104E+03, 0.0 , 0.0, 0.0, 0.0 ! !END!
 23 ! SRCNAM = JEASS5A   !
 23 ! X =  437.6820, 3353.8491,  44.20,  2.00,  2.96,  21.30, 415.0, 0.0,  0.104E+03, 0.0 , 0.0, 0.0, 0.0 ! !END!
 24 ! SRCNAM = JEASS4    !
 24 ! X =  437.6700, 3353.9619,  43.70,  1.00,  3.25,  18.50, 408.0, 0.0,  0.110E+03, 0.0 , 0.0, 0.0, 0.0 ! !END!
 25 ! SRCNAM = JEASS3    !
 25 ! X =  437.6780, 3353.9331,  40.70,  2.00,  3.05,  13.40, 424.0, 0.0,  0.798E+02, 0.0 , 0.0, 0.0, 0.0 ! !END!

JEFFERSON SMURFIT CORP, JAX
 26 ! SRCNAM = EMILL1    !
 26 ! X =  439.9000, 3359.3000,  53.40,  2.00,  3.20,  22.90, 410.0, 0.0,  0.168E+02, 0.0 , 0.0, 0.0, 0.0 ! !END!
 27 ! SRCNAM = EMILL2    !
 27 ! X =  439.9000, 3359.3000,  15.80,  2.00,  1.50,   6.70, 347.0, 0.0,  0.980E+00, 0.0 , 0.0, 0.0, 0.0 ! !END!
 28 ! SRCNAM = EMILL3    !
 28 ! X =  439.9000, 3359.3000,  76.20,  2.00,  3.80,   8.00, 455.0, 0.0,  0.365E+02, 0.0 , 0.0, 0.0, 0.0 ! !END!

JEA KENNEDY
 29 ! SRCNAM = EKEN      !
 29 ! X =  440.0000, 3359.2000,  45.70,  1.00,  3.20,  10.40, 394.0, 0.0,  0.751E+02, 0.0 , 0.0, 0.0, 0.0 ! !END!
 30 ! SRCNAM = KNDY9     !
 30 ! X =  440.0700, 3359.1299,  45.70,  1.00,  3.20,  12.20, 416.0, 0.0,  0.750E+02, 0.0 , 0.0, 0.0, 0.0 ! !END!
 31 ! SRCNAM = KNDY10A   !
 31 ! X =  440.0850, 3359.0901,  41.50,  1.00,  2.74,  24.30, 427.0, 0.0,  0.925E+02, 0.0 , 0.0, 0.0, 0.0 ! !END!
 32 ! SRCNAM = KNDY10B   !
 32 ! X =  440.0850, 3359.1001,  41.50,  1.00,  2.74,  24.30, 427.0, 0.0,  0.925E+02, 0.0 , 0.0, 0.0, 0.0 ! !END!

JEA NORTHSIDE
 33 ! SRCNAM = EJEAN2    !
 33 ! X =  446.9100, 3365.2200,  88.40,  3.00,  5.00,  13.10, 394.0, 0.0,  0.585E+03, 0.0 , 0.0, 0.0, 0.0 ! !END!
 34 ! SRCNAM = EJEAN1    !
 34 ! X =  446.9700, 3365.2300,  76.20,  2.00,  4.87,  23.10, 403.0, 0.0,  0.691E+03, 0.0 , 0.0, 0.0, 0.0 ! !END!

RAYONIER, INC
 35 ! SRCNAM = ERAY      !
 35 ! X =  454.7000, 3392.2000,  54.90,  2.00,  3.00,   9.80, 329.0, 0.0,  0.398E+02, 0.0 , 0.0, 0.0, 0.0 ! !END!

GILMAN PAPER COMPANY
 36 ! SRCNAM = EPAPER1   !
 36 ! X =  448.2000, 3401.3000,  83.80,  3.00,  4.30,   7.30, 450.0, 0.0,  0.281E+03, 0.0 , 0.0, 0.0, 0.0 ! !END!
 37 ! SRCNAM = EPAPER2   !
 37 ! X =  448.2000, 3401.3000,  36.60,  3.00,  1.80,  20.00, 700.0, 0.0,  0.600E+02, 0.0 , 0.0, 0.0, 0.0 ! !END!
```

```
38 ! SRCNAM = EPAPER3  !
38 ! X =  448.2000, 3401.3000,  47.20,  3.00,  2.30, 13.10, 426.0, 0.0,  0.760E+01, 0.0 , 0.0, 0.0, 0.0 !  !END!
39 ! SRCNAM = EPAPER4  !
39 ! X =  448.2000, 3401.3000,  53.30,  3.00,  1.60, 25.20, 394.0, 0.0,  0.760E+01, 0.0 , 0.0, 0.0, 0.0 !  !END!
40 ! SRCNAM = EPAPER5  !
40 ! X =  448.2000, 3401.3000,  76.20,  3.00,  2.60, 22.10, 427.0, 0.0,  0.158E+02, 0.0 , 0.0, 0.0, 0.0 !  !END!
```

JEFFERSON SMURFIT CORP, FERNANDINA BEACH

```
41 ! SRCNAM = EBMILL1  !
41 ! X =  456.2000, 3394.2000,  69.20,  6.00,  2.40, 16.90, 483.0, 0.0,  0.145E+03, 0.0 , 0.0, 0.0, 0.0 !  !END!
42 ! SRCNAM = EBMILL2  !
42 ! X =  456.2000, 3394.2000,  69.20,  6.00,  3.40, 16.30, 480.0, 0.0,  0.170E+03, 0.0 , 0.0, 0.0, 0.0 !  !END!
43 ! SRCNAM = EBMILL3  !
43 ! X =  456.2000, 3394.2000,  75.90,  6.00,  3.50, 18.80, 493.0, 0.0,  0.351E+02, 0.0 , 0.0, 0.0, 0.0 !  !END!
44 ! SRCNAM = EBMILL4  !
44 ! X =  456.2000, 3394.2000,  40.80,  6.00,  2.70, 13.30, 390.0, 0.0,  0.105E+02, 0.0 , 0.0, 0.0, 0.0 !  !END!
45 ! SRCNAM = EBMILL5  !
45 ! X =  456.2000, 3394.2000,  13.40,  6.00,  1.10, 12.30, 361.0, 0.0,  0.130E+01, 0.0 , 0.0, 0.0, 0.0 !  !END!
46 ! SRCNAM = EBMILL6  !
46 ! X =  456.2000, 3394.2000,  13.40,  6.00,  1.40, 17.60, 360.0, 0.0,  0.130E+01, 0.0 , 0.0, 0.0, 0.0 !  !END!
47 ! SRCNAM = EBMILL7  !
47 ! X =  456.2000, 3394.2000,  69.50,  6.00,  1.80,  5.20, 350.0, 0.0,  0.200E+00, 0.0 , 0.0, 0.0, 0.0 !  !END!
48 ! SRCNAM = EBMILL8  !
48 ! X =  456.2000, 3394.2000,  33.20,  6.00,  0.60,  5.80, 360.0, 0.0,  0.690E+00, 0.0 , 0.0, 0.0, 0.0 !  !END!
```

PCS- CLEVE HOLLADAY FDEP 4/2/04

```
49 ! SRCNAM = SULACA&B  !
49 ! X =  328.3000, 3368.8000,  61.00, 24.00,  1.80, 15.50, 350.0, 0.0,  0.305E+03, 0.0 , 0.0, 0.0, 0.0 !  !END!
50 ! SRCNAM = EULACC&D  !
50 ! X =  328.3000, 3368.8000,  45.70, 24.00,  1.59, 28.70, 356.0, 0.0,  0.756E+02, 0.0 , 0.0, 0.0, 0.0 !  !END!
```

FPL PALATKA

```
51 ! SRCNAM = FPLPALAT  !
51 ! X =  442.8000, 3277.6001,  45.70,  1.52,  3.96,  9.50, 408.1, 0.0,  0.257E+03, 0.0 , 0.0, 0.0, 0.0 !  !END!
```

STONE CONTAINER

```
52 ! SRCNAM = ES1      !
52 ! X =  443.0000, 3365.3999,  41.50,  3.00,  2.46, 13.01, 332.0, 0.0,  0.578E+02, 0.0 , 0.0, 0.0, 0.0 !  !END!
53 ! SRCNAM = ES2      !
53 ! X =  443.0000, 3365.3999,  41.50,  3.00,  2.46, 13.01, 332.0, 0.0,  0.578E+02, 0.0 , 0.0, 0.0, 0.0 !  !END!
54 ! SRCNAM = ES3      !
54 ! X =  443.0000, 3365.3999,  32.30,  3.00,  1.83, 14.02, 455.0, 0.0,  0.421E+02, 0.0 , 0.0, 0.0, 0.0 !  !END!
55 ! SRCNAM = ES4      !
55 ! X =  443.0000, 3365.3999,  32.30,  3.00,  2.13, 14.51, 439.0, 0.0,  0.616E+02, 0.0 , 0.0, 0.0, 0.0 !  !END!
56 ! SRCNAM = ES5      !
56 ! X =  443.0000, 3365.3999,  32.30,  3.00,  2.13, 14.51, 439.0, 0.0,  0.612E+02, 0.0 , 0.0, 0.0, 0.0 !  !END!
57 ! SRCNAM = ES6      !
57 ! X =  443.0000, 3365.3999,  38.40,  3.00,  2.59, 15.97, 341.0, 0.0,  0.129E+02, 0.0 , 0.0, 0.0, 0.0 !  !END!
58 ! SRCNAM = ES7      !
58 ! X =  443.0000, 3365.3999,  38.40,  3.00,  2.74, 15.61, 345.0, 0.0,  0.165E+02, 0.0 , 0.0, 0.0, 0.0 !  !END!
59 ! SRCNAM = ES8      !
59 ! X =  443.0000, 3365.3999,  38.40,  3.00,  2.74, 14.60, 344.0, 0.0,  0.165E+02, 0.0 , 0.0, 0.0, 0.0 !  !END!
60 ! SRCNAM = ES9      !
60 ! X =  443.0000, 3365.3999,  36.60,  3.00,  1.07,  3.96, 344.0, 0.0,  0.400E+00, 0.0 , 0.0, 0.0, 0.0 !  !END!
61 ! SRCNAM = ES10     !
61 ! X =  443.0000, 3365.3999,  37.80,  3.00,  1.22,  4.27, 344.0, 0.0,  0.500E+00, 0.0 , 0.0, 0.0, 0.0 !  !END!
62 ! SRCNAM = ES11     !
62 ! X =  443.0000, 3365.3999,  37.80,  3.00,  1.22,  4.27, 344.0, 0.0,  0.500E+00, 0.0 , 0.0, 0.0, 0.0 !  !END!
63 ! SRCNAM = ES12     !
63 ! X =  443.0000, 3365.3999,  21.00,  3.00,  1.77,  3.11, 343.0, 0.0,  0.800E+00, 0.0 , 0.0, 0.0, 0.0 !  !END!
64 ! SRCNAM = ES13     !
64 ! X =  443.0000, 3365.3999,  22.90,  3.00,  1.42,  6.52, 336.0, 0.0,  0.800E+00, 0.0 , 0.0, 0.0, 0.0 !  !END!
65 ! SRCNAM = ES14     !
65 ! X =  443.0000, 3365.3999,  22.90,  3.00,  1.12,  8.17, 336.0, 0.0,  0.800E+00, 0.0 , 0.0, 0.0, 0.0 !  !END!
66 ! SRCNAM = ES15     !
66 ! X =  443.0000, 3365.3999,  41.50,  3.00,  2.46, 13.01, 332.0, 0.0,  0.790E+01, 0.0 , 0.0, 0.0, 0.0 !  !END!
67 ! SRCNAM = ES16     !
67 ! X =  443.0000, 3365.3999,  41.50,  3.00,  2.46, 13.01, 332.0, 0.0,  0.940E+01, 0.0 , 0.0, 0.0, 0.0 !  !END!
68 ! SRCNAM = ES17     !
68 ! X =  443.0000, 3365.3999,  32.30,  3.00,  1.83, 14.02, 455.0, 0.0,  0.407E+02, 0.0 , 0.0, 0.0, 0.0 !  !END!
69 ! SRCNAM = ES18     !
69 ! X =  443.0000, 3365.3999,  32.30,  3.00,  2.13, 14.51, 439.0, 0.0,  0.596E+02, 0.0 , 0.0, 0.0, 0.0 !  !END!
70 ! SRCNAM = ES19     !
70 ! X =  443.0000, 3365.3999,  32.30,  3.00,  2.13, 14.51, 439.0, 0.0,  0.594E+02, 0.0 , 0.0, 0.0, 0.0 !  !END!
71 ! SRCNAM = ES20     !
71 ! X =  443.0000, 3365.3999,  38.40,  3.00,  2.59, 15.97, 341.0, 0.0,  0.123E+02, 0.0 , 0.0, 0.0, 0.0 !  !END!
72 ! SRCNAM = ES21     !
72 ! X =  443.0000, 3365.3999,  38.40,  3.00,  2.74, 15.61, 345.0, 0.0,  0.157E+02, 0.0 , 0.0, 0.0, 0.0 !  !END!
```

```
73 ! SRCNAM = ES22      !
73 ! X =  443.0000, 3365.3999,  38.40,  3.00,  2.74,  14.60, 344.0, 0.0,  0.159E+02, 0.0 , 0.0, 0.0, 0.0  !  !END!
74 ! SRCNAM = ES23      !
74 ! X =  443.0000, 3365.3999,  36.60,  3.00,  1.07,   3.96, 344.0, 0.0,  0.400E+00, 0.0 , 0.0, 0.0, 0.0  !  !END!
75 ! SRCNAM = ES24      !
75 ! X =  443.0000, 3365.3999,  37.80,  3.00,  1.22,   4.27, 344.0, 0.0,  0.500E+00, 0.0 , 0.0, 0.0, 0.0  !  !END!
76 ! SRCNAM = ES25      !
76 ! X =  443.0000, 3365.3999,  37.80,  3.00,  1.22,   4.27, 344.0, 0.0,  0.500E+00, 0.0 , 0.0, 0.0, 0.0  !  !END!
77 ! SRCNAM = ES26      !
77 ! X =  443.0000, 3365.3999,  21.00,  3.00,  1.77,   3.11, 343.0, 0.0,  0.600E+00, 0.0 , 0.0, 0.0, 0.0  !  !END!
78 ! SRCNAM = ES27      !
78 ! X =  443.0000, 3365.3999,  22.90,  3.00,  1.42,   6.52, 336.0, 0.0,  0.700E+00, 0.0 , 0.0, 0.0, 0.0  !  !END!
79 ! SRCNAM = ES28      !
79 ! X =  443.0000, 3365.3999,  22.90,  3.00,  1.12,   8.17, 336.0, 0.0,  0.700E+00, 0.0 , 0.0, 0.0, 0.0  !  !END!

 a
  Data for each source are treated as a separate input subgroup
  and therefore must end with an input group terminator.

  SRCNAM  is a 12-character name for a source
          (No default)
  X       is an array holding the source data listed by the column headings
          (No default)
  SIGYZI  is an array holding the initial sigma-y and sigma-z (m)
          (Default: 0.,0.)
  FMFAC   is a vertical momentum flux factor (0. or 1.0) used to represent
          the effect of rain-caps or other physical configurations that
          reduce momentum rise associated with the actual exit velocity.
          (Default: 1.0  -- full momentum used)

 b
  0. = No building downwash modeled, 1. = downwash modeled
  NOTE: must be entered as a REAL number (i.e., with decimal point)

 c
  An emission rate must be entered for every pollutant modeled.
  Enter emission rate of zero for secondary pollutants that are
  modeled, but not emitted.  Units are specified by IPTU
  (e.g. 1 for g/s).

---------------
Subgroup (13c)
---------------

     BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH
     -------------------------------------------------------
Source                                                a
 No.     Effective building width and height (in meters) every 10 degrees
------   --------------------------------------------------------------

   1 ! SRCNAM = RB1B      !
   1 ! HEIGHT = 30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
         30.48, 30.48, 30.48, 59.04, 59.04, 59.04,
         59.04, 32.80, 30.48, 30.48, 30.48, 30.48,
         30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
         30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
         30.48, 30.48, 30.48, 30.48, 30.48, 30.48 !
   1 ! WIDTH =  56.04, 51.67, 45.73, 38.40, 23.71, 23.71,
         28.98, 36.89, 43.68, 41.77, 41.68, 40.29,
         37.69, 33.14, 19.55, 22.83, 25.43, 58.70,
         56.04, 51.67, 45.73, 38.40, 23.71, 23.71,
         28.98, 36.89, 43.68, 49.14, 53.11, 25.43,
         22.83, 19.55, 19.55, 22.83, 25.43, 58.70 !

!END!
   2 ! SRCNAM = RB2B      !
   2 ! HEIGHT = 30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
         30.48, 30.48, 30.48, 59.04, 59.04, 59.04,
         59.04, 32.80, 30.48, 30.48, 30.48, 30.48,
         30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
         30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
         30.48, 30.48, 30.48, 30.48, 30.48, 30.48 !
   2 ! WIDTH =  56.04, 51.67, 45.73, 38.40, 23.71, 23.71,
         28.98, 36.89, 43.68, 41.77, 41.68, 40.29,
         37.69, 33.14, 19.55, 22.83, 25.43, 58.70,
         56.04, 51.67, 45.73, 38.40, 23.71, 23.71,
         28.98, 36.89, 43.68, 49.14, 53.11, 25.43,
         22.83, 19.55, 19.55, 22.83, 25.43, 58.70 !
```

```
!END!
   3 ! SRCNAM = RB3B     !
   3 ! HEIGHT = 30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
         30.48, 30.48, 30.48, 30.48, 30.48, 59.04,
         59.04, 59.04, 32.80, 32.80, 32.80, 30.48,
         30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
         30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
         30.48, 30.48, 30.48, 30.48, 30.48, 30.48 !
   3 ! WIDTH =  56.04, 51.67, 45.73, 38.40, 23.71, 23.71,
         28.98, 36.89, 43.68, 49.14, 53.11, 39.33,
         37.69, 33.94, 33.14, 37.01, 39.75, 58.70,
         56.04, 51.67, 45.73, 38.40, 23.71, 23.71,
         28.98, 36.89, 43.68, 49.14, 53.11, 17.25,
         14.82, 11.94, 11.94, 14.82, 17.25, 58.70 !

!END!
   4 ! SRCNAM = RB4B     !
   4 ! HEIGHT = 59.04, 59.04, 59.04, 59.04, 59.04, 59.04,
         59.04, 59.04, 59.04, 59.04, 25.91, 25.91,
         25.91,  0.00,  0.00, 25.91, 25.91, 25.91,
         59.04, 59.04, 59.04, 59.04, 59.04, 59.04,
         59.04, 59.04, 59.04, 59.04, 30.48, 25.91,
         25.91,  0.00,  0.00, 25.91, 25.91, 25.91 !
   4 ! WIDTH =  36.43, 36.43, 36.43, 34.69, 30.09, 30.09,
         34.69, 36.43, 36.43, 36.43, 35.93, 31.81,
         26.72,  0.00,  0.00, 26.72, 31.81, 35.93,
         36.43, 36.43, 36.43, 34.69, 30.09, 30.09,
         34.69, 36.43, 36.43, 36.43, 53.11, 31.81,
         26.72,  0.00,  0.00, 26.72, 31.81, 35.93 !

!END!
   5 ! SRCNAM = SDT1B    !
   5 ! HEIGHT = 30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
         30.48, 30.48, 30.48, 59.04, 59.04, 59.04,
         32.80, 32.80, 30.48, 30.48, 30.48, 30.48,
         30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
         30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
         30.48, 30.48, 30.48, 30.48, 30.48, 30.48 !
   5 ! WIDTH =  56.04, 51.67, 45.73, 38.40, 23.71, 23.71,
         28.98, 36.89, 43.68, 41.79, 41.68, 40.29,
         37.01, 33.14, 19.55, 22.83, 25.43, 58.70,
         56.04, 51.67, 45.73, 38.40, 23.71, 23.71,
         28.98, 36.89, 43.68, 49.14, 53.11, 25.43,
         22.83, 19.55, 19.55, 22.83, 25.43, 58.70 !

!END!
   6 ! SRCNAM = SDT2B    !
   6 ! HEIGHT = 30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
         30.48, 30.48, 30.48, 59.04, 59.04, 59.04,
         32.80, 32.80, 30.48, 30.48, 30.48, 30.48,
         30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
         30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
         30.48, 30.48, 30.48, 30.48, 30.48, 30.48 !
   6 ! WIDTH =  56.04, 51.67, 45.73, 38.40, 23.71, 23.71,
         28.98, 36.89, 43.68, 41.79, 41.68, 40.29,
         37.01, 33.14, 19.55, 22.83, 25.43, 58.70,
         56.04, 51.67, 45.73, 38.40, 23.71, 23.71,
         28.98, 36.89, 43.68, 49.14, 53.11, 25.43,
         22.83, 19.55, 19.55, 22.83, 25.43, 58.70 !

!END!
   7 ! SRCNAM = SDT3B    !
   7 ! HEIGHT = 30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
         30.48, 30.48, 30.48, 30.48, 30.48, 59.04,
         59.04, 59.04, 32.80, 32.80, 30.48, 30.48,
         30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
         30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
         30.48, 30.48, 30.48, 30.48, 30.48, 30.48 !
   7 ! WIDTH =  56.04, 51.67, 45.73, 38.40, 23.71, 23.71,
         28.98, 36.89, 43.68, 49.14, 53.11, 40.03,
         37.69, 33.94, 33.14, 37.01, 17.25, 58.70,
         56.04, 51.67, 45.73, 38.40, 23.71, 23.71,
         28.98, 36.89, 43.68, 49.14, 53.11, 17.25,
         14.82, 11.94, 11.94, 14.82, 17.25, 58.70 !

!END!
   8 ! SRCNAM = SDT4B    !
```

```
    8 ! HEIGHT = 59.04, 59.04, 59.04, 59.04, 59.04, 59.04,
          59.04, 59.04, 59.04, 59.04, 59.04, 59.04,
          59.04, 59.04, 59.04, 59.04, 59.04, 59.04,
          59.04, 59.04, 59.04, 59.04, 59.04, 59.04,
          59.04, 59.04, 59.04, 59.04, 59.04, 59.04,
          59.04, 59.04, 59.04, 59.04, 59.04, 59.04 !
    8 ! WIDTH =  41.79, 40.64, 38.25, 34.69, 30.09, 30.09,
          34.69, 38.25, 40.64, 41.79, 41.68, 40.29,
          37.69, 33.94, 33.94, 37.69, 40.29, 41.68,
          41.79, 40.64, 38.25, 34.69, 30.09, 30.09,
          34.69, 38.25, 40.64, 41.79, 41.68, 40.29,
          37.69, 33.94, 33.94, 37.69, 40.29, 41.68 !

!END!
   10 ! SRCNAM = LK2B      !
   10 ! HEIGHT =  0.00,  0.00,  0.00,  0.00,  0.00,  0.00,
           0.00,  0.00,  0.00,  0.00,  0.00,  0.00,
           0.00,  0.00, 30.48, 30.48,  0.00,  0.00,
           0.00,  0.00,  0.00,  0.00,  0.00,  0.00,
           0.00,  0.00,  0.00,  0.00,  0.00,  0.00,
           0.00,  0.00,  0.00,  0.00,  0.00,  0.00 !
   10 ! WIDTH =   0.00,  0.00,  0.00,  0.00,  0.00,  0.00,
           0.00,  0.00,  0.00,  0.00,  0.00,  0.00,
           0.00,  0.00, 19.55, 22.08,  0.00,  0.00,
           0.00,  0.00,  0.00,  0.00,  0.00,  0.00,
           0.00,  0.00,  0.00,  0.00,  0.00,  0.00,
           0.00,  0.00,  0.00,  0.00,  0.00,  0.00 !

!END!
   13 ! SRCNAM = PB4B      !
   13 ! HEIGHT = 32.80, 32.80, 32.80, 32.80, 32.80, 59.04,
          59.04, 59.04, 59.04, 59.04, 59.04, 32.80,
          32.80, 32.80, 32.80, 32.80, 32.80, 32.80,
          32.80, 32.80, 32.80, 32.80, 32.80, 59.04,
          59.04, 59.04, 59.04, 59.04, 59.04, 32.80,
          32.80, 32.80, 32.80, 32.80, 32.80, 32.80 !
   13 ! WIDTH =  41.57, 40.60, 38.38, 35.00, 45.36, 30.09,
          34.69, 38.25, 40.64, 41.70, 41.68, 39.75,
          37.01, 33.14, 33.14, 37.01, 39.75, 41.29,
          41.57, 40.60, 38.38, 35.00, 45.36, 30.09,
          34.69, 38.25, 40.64, 41.70, 41.68, 39.75,
          37.01, 33.14, 33.14, 37.01, 39.75, 41.29 !

!END!
   14 ! SRCNAM = PB5B      !
   14 ! HEIGHT = 32.80, 32.80, 32.80, 32.80,  0.00,  0.00,
          25.91, 59.04, 59.04, 59.04, 59.04, 59.04,
          59.04, 59.04, 59.04, 32.80, 32.80, 32.80,
          32.80, 32.80, 32.80, 32.80, 21.70, 21.70,
          25.91, 59.04, 59.04, 59.04, 59.04, 59.04,
          59.04, 59.04, 59.04, 32.80, 32.80, 32.80 !
   14 ! WIDTH =  41.57, 40.60, 38.38, 35.00,  0.00,  0.00,
          40.77, 38.25, 40.64, 41.79, 41.68, 40.29,
          37.69, 33.94, 33.94, 37.01, 39.75, 41.29,
          41.57, 40.60, 38.38, 35.00, 129.69, 129.69,
          46.62, 38.25, 40.64, 41.79, 41.68, 40.29,
          37.69, 33.94, 33.94, 37.01, 39.75, 41.29 !

!END!
   15 ! SRCNAM = CB4B      !
   15 ! HEIGHT = 32.80, 32.80, 32.80, 32.80,  0.00,  0.00,
          25.91, 59.04, 59.04, 59.04, 59.04, 59.04,
          59.04, 59.04, 32.80, 32.80, 32.80, 32.80,
          32.80, 32.80, 32.80, 32.80, 21.70, 21.70,
          25.91, 59.04, 59.04, 59.04, 59.04, 59.04,
          59.04, 59.04, 32.80, 32.80, 32.80, 32.80 !
   15 ! WIDTH =  41.57, 40.60, 38.38, 35.00,  0.00,  0.00,
          40.77, 38.25, 40.64, 41.79, 41.68, 40.29,
          37.69, 33.94, 33.14, 37.01, 39.75, 41.29,
          41.57, 40.60, 38.38, 35.00, 129.69, 129.69,
          46.62, 38.25, 40.64, 41.79, 41.68, 40.29,
          37.69, 33.94, 33.14, 37.01, 39.75, 41.29 !

!END!
   16 ! SRCNAM = ST12      !
   16 ! HEIGHT = 13.41, 13.41, 13.41, 33.53, 33.53, 33.53,
          13.41,  0.00,  0.00,  0.00,  0.00,  0.00,
           0.00,  0.00, 13.41, 33.53, 33.53, 33.53,
```

```
           33.53, 33.53, 33.53, 33.53, 33.53, 33.53,
           13.41,  0.00,  0.00,  0.00,  0.00,  0.00,
            0.00,  0.00, 13.41, 33.53, 33.53, 13.41 !
    16 ! WIDTH =  25.51, 15.47, 23.16, 123.17, 115.18, 103.69,
           61.73,  0.00,  0.00,  0.00,  0.00,  0.00,
            0.00,  0.00, 38.05, 120.85, 126.40, 128.11,
          125.92, 127.80, 127.42, 123.17, 115.18, 103.69,
           23.55,  0.00,  0.00,  0.00,  0.00,  0.00,
            0.00,  0.00, 38.05, 120.85, 126.40,  18.16 !

!END!
    17 ! SRCNAM = ST34      !
    17 ! HEIGHT = 13.41, 33.53, 33.53, 33.53, 33.53, 13.41,
           13.41,  0.00, 13.41, 13.41, 13.41, 13.41,
           13.41, 33.53, 33.53, 33.53, 33.53, 33.53,
           33.53, 33.53, 33.53, 33.53, 33.53, 13.41,
           13.41,  0.00, 13.41, 13.41, 13.41, 13.41,
           13.41, 33.53, 33.53, 33.53, 33.53, 33.53 !
    17 ! WIDTH =  19.58, 127.80, 127.42, 123.17, 115.18,  24.57,
           23.55,  0.00, 48.19, 47.65, 48.17, 47.75,
           23.04, 99.02, 111.63, 120.85, 126.40, 128.11,
          125.92, 127.80, 127.42, 123.17, 115.18,  24.57,
           23.55,  0.00, 48.19, 47.65, 48.17, 47.75,
           23.04, 99.02, 111.63, 120.85, 126.40, 128.11 !

!END!
    18 ! SRCNAM = REHEAT    !
    18 ! HEIGHT = 33.53, 33.53, 33.53, 15.24, 15.24, 15.24,
           15.24, 15.24, 15.24, 15.24, 15.24, 15.24,
           15.24, 33.53, 15.24, 15.24, 15.24, 15.24,
           15.24, 15.24, 15.24, 15.24, 15.24, 15.24,
           15.24, 15.24, 15.24, 15.24, 15.24, 15.24,
           15.24, 33.53, 33.53, 33.53, 33.53, 33.53 !
    18 ! WIDTH =  125.97, 127.78, 127.45, 245.47, 301.34, 348.06,
          384.20, 408.66, 420.72, 419.98, 429.51, 431.13,
          419.64, 157.95, 359.16, 312.00, 255.36, 190.96,
          120.76, 121.65, 182.13, 245.47, 301.34,  53.63,
           48.41,  41.72,  33.76,  24.77, 429.51,  28.95,
           33.99,  74.60,  82.21,  87.32,  89.77, 128.11 !

!END!
---------------
Subgroup (13d)
---------------
                              a
       POINT SOURCE: VARIABLE EMISSIONS DATA
       ---------------------------------------

    Use this subgroup to describe temporal variations in the emission
    rates given in 13b.  Factors entered multiply the rates in 13b.
    Skip sources here that have constant emissions.  For more elaborate
    variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

    IVARY determines the type of variation, and is source-specific:
    (IVARY)                     Default: 0
        0 =     Constant
        1 =     Diurnal cycle (24 scaling factors: hours 1-24)
        2 =     Monthly cycle (12 scaling factors: months 1-12)
        3 =     Hour & Season (4 groups of 24 hourly scaling factors,
                       where first group is DEC-JAN-FEB)
        4 =     Speed & Stab. (6 groups of 6 scaling factors, where
                       first group is Stability Class A,
                       and the speed classes have upper
                       bounds (m/s) defined in Group 12
        5 =     Temperature   (12 scaling factors, where temperature
                       classes have upper bounds (C) of:
                       0, 5, 10, 15, 20, 25, 30, 35, 40,
                       45, 50, 50+)


--------
 a
   Data for each species are treated as a separate input subgroup
   and therefore must end with an input group terminator.


-------------------------------------------------------------------------------
```

```
INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters
--------------------------------

---------------
Subgroup (14a)
---------------

    Number of polygon area sources with
    parameters specified below (NAR1)       No default  !  NAR1 =  0   !

    Units used for area source
    emissions below          (IARU)       Default: 1  !  IARU =   1  !
         1 =      g/m**2/s
         2 =     kg/m**2/hr
         3 =     lb/m**2/hr
         4 =    tons/m**2/yr
         5 =    Odour Unit * m/s  (vol. flux/m**2 of odour compound)
         6 =    Odour Unit * m/min
         7 =    metric tons/m**2/yr

    Number of source-species
    combinations with variable
    emissions scaling factors
    provided below in (14d)       (NSAR1) Default: 0  !  NSAR1 =  0  !

    Number of buoyant polygon area sources
    with variable location and emission
    parameters (NAR2)                  No default  !  NAR2 =  0   !
    (If NAR2 > 0, ALL parameter data for
    these sources are read from the file: BAEMARB.DAT)

!END!

---------------
Subgroup (14b)
---------------
                                    a
        AREA SOURCE: CONSTANT DATA
        ----------------------------
                                                     b
Source        Effect.   Base     Initial   Emission
 No.          Height  Elevation  Sigma z    Rates
               (m)      (m)       (m)
-------       ------  ------   --------  ---------


--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.
    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IARU
     (e.g. 1 for g/m**2/s).

---------------
Subgroup (14c)
---------------

        COORDINATES (UTM-km) FOR EACH VERTEX(4) OF EACH POLYGON
        --------------------------------------------------------
Source                                                  a
 No.      Ordered list of X followed by list of Y, grouped by source
------    ------------------------------------------------------------


--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.


---------------
Subgroup (14d)
---------------
                                        a
```

```
        AREA SOURCE: VARIABLE EMISSIONS DATA
        ------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 14b.  Factors entered multiply the rates in 14b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                        Default: 0
        0 =     Constant
        1 =     Diurnal cycle (24 scaling factors: hours 1-24)
        2 =     Monthly cycle (12 scaling factors: months 1-12)
        3 =     Hour & Season (4 groups of 24 hourly scaling factors,
                         where first group is DEC-JAN-FEB)
        4 =     Speed & Stab. (6 groups of 6 scaling factors, where
                         first group is Stability Class A,
                         and the speed classes have upper
                         bounds (m/s) defined in Group 12
        5 =     Temperature   (12 scaling factors, where temperature
                         classes have upper bounds (C) of:
                         0, 5, 10, 15, 20, 25, 30, 35, 40,
                         45, 50, 50+)



--------
  a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


-------------------------------------------------------------------------------

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters
---------------------------


---------------
Subgroup (15a)
---------------

     Number of buoyant line sources
     with variable location and emission
     parameters (NLN2)                   No default  !  NLN2 =  0   !

     (If NLN2 > 0, ALL parameter data for
      these sources are read from the file: LNEMARB.DAT)

     Number of buoyant line sources (NLINES)       No default   ! NLINES =  0  !

     Units used for line source
     emissions below              (ILNU)        Default: 1  !  ILNU =   1  !
        1 =       g/s
        2 =       kg/hr
        3 =       lb/hr
        4 =     tons/yr
        5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
        6 =     Odour Unit * m**3/min
        7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (15c)        (NSLN1) Default: 0  !  NSLN1 =  0  !

     Maximum number of segments used to model
     each line (MXNSEG)                   Default: 7   ! MXNSEG =  7  !

     The following variables are required only if NLINES > 0.  They are
     used in the buoyant line source plume rise calculations.

       Number of distances at which             Default: 6   ! NLRISE =  6  !
       transitional rise is computed

       Average building length (XL)          No default    ! XL = .0 !
                                          (in meters)

       Average building height (HBL)          No default    ! HBL = .0 !
```

```
                              (in meters)

    Average building width (WBL)          No default  ! WBL = .0 !
                              (in meters)

    Average line source width (WML)       No default  ! WML = .0 !
                              (in meters)

    Average separation between buildings (DXL)  No default  ! DXL = .0 !
                              (in meters)

    Average buoyancy parameter (FPRIMEL)    No default  ! FPRIMEL = .0 !
                              (in m**4/s**3)

!END!

---------------
Subgroup (15b)
---------------

     BUOYANT LINE SOURCE: CONSTANT DATA
     ----------------------------------
                                                             a
Source   Beg. X     Beg. Y     End. X     End. Y    Release   Base      Emission
 No.   Coordinate Coordinate Coordinate Coordinate  Height  Elevation    Rates
          (km)       (km)       (km)       (km)       (m)      (m)
------ ---------- ---------- ---------- ---------- ------- ---------  ---------

--------

  a
   Data for each source are treated as a separate input subgroup
   and therefore must end with an input group terminator.

  b
   An emission rate must be entered for every pollutant modeled.
   Enter emission rate of zero for secondary pollutants that are
   modeled, but not emitted.  Units are specified by ILNTU
   (e.g. 1 for g/s).

---------------
Subgroup (15c)
---------------
                                       a
     BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA
     --------------------------------------------

   Use this subgroup to describe temporal variations in the emission
   rates given in 15b.  Factors entered multiply the rates in 15b.
   Skip sources here that have constant emissions.

   IVARY determines the type of variation, and is source-specific:
   (IVARY)                        Default: 0
       0 =      Constant
       1 =      Diurnal cycle (24 scaling factors: hours 1-24)
       2 =      Monthly cycle (12 scaling factors: months 1-12)
       3 =      Hour & Season (4 groups of 24 hourly scaling factors,
                        where first group is DEC-JAN-FEB)
       4 =      Speed & Stab. (6 groups of 6 scaling factors, where
                        first group is Stability Class A,
                        and the speed classes have upper
                        bounds (m/s) defined in Group 12
       5 =      Temperature   (12 scaling factors, where temperature
                        classes have upper bounds (C) of:
                        0, 5, 10, 15, 20, 25, 30, 35, 40,
                        45, 50, 50+)


--------
  a
   Data for each species are treated as a separate input subgroup
   and therefore must end with an input group terminator.


-------------------------------------------------------------------------------
```

```
INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters
---------------------------

---------------
Subgroup (16a)
---------------

     Number of volume sources with
     parameters provided in 16b,c (NVL1)     No default  !  NVL1 =  0   !

     Units used for volume source
     emissions below in 16b        (IVLU)     Default: 1  !  IVLU =   3  !
          1 =        g/s
          2 =        kg/hr
          3 =        lb/hr
          4 =     tons/yr
          5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
          6 =     Odour Unit * m**3/min
          7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (16c)      (NSVL1)    Default: 0  !  NSVL1 =  0  !

     Number of volume sources with
     variable location and emission
     parameters                  (NVL2)     No default  !  NVL2 =   0   !

     (If NVL2 > 0, ALL parameter data for
      these sources are read from the VOLEMARB.DAT file(s) )

!END!

---------------
Subgroup (16b)
---------------
                              a
          VOLUME SOURCE: CONSTANT DATA
          ------------------------------
                                                            b
     X UTM      Y UTM     Effect.   Base    Initial   Initial    Emission
   Coordinate Coordinate  Height  Elevation Sigma y   Sigma z     Rates
     (km)       (km)        (m)      (m)       (m)       (m)
   ---------- ----------  ------   ------   --------  --------  --------
                                                      SO2     SO4    NOX  HNO3  NO3  PM10   CO

--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IVLU
     (e.g. 1 for g/s).

---------------
Subgroup (16c)
---------------
                                   a
        VOLUME SOURCE: VARIABLE EMISSIONS DATA
        ---------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 16b.  Factors entered multiply the rates in 16b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                      Default: 0
          0 =       Constant
          1 =       Diurnal cycle (24 scaling factors: hours 1-24)
          2 =       Monthly cycle (12 scaling factors: months 1-12)
          3 =       Hour & Season (4 groups of 24 hourly scaling factors,
                           where first group is DEC-JAN-FEB)
          4 =       Speed & Stab. (6 groups of 6 scaling factors, where
```

```
                  first group is Stability Class A,
                  and the speed classes have upper
                  bounds (m/s) defined in Group 12
     5 =    Temperature  (12 scaling factors, where temperature
                  classes have upper bounds (C) of:
                  0, 5, 10, 15, 20, 25, 30, 35, 40,
                  45, 50, 50+)



--------
 a
  Data for each species are treated as a separate input subgroup
  and therefore must end with an input group terminator.


-------------------------------------------------------------------------------

INPUT GROUPS: 17a & 17b -- Non-gridded (discrete) receptor information
-----------------------

---------------
Subgroup (17a)
---------------

   Number of non-gridded receptors (NREC)  No default  !  NREC = 180 !

!END!

---------------
Subgroup (17b)
---------------
                              a
       NON-GRIDDED (DISCRETE) RECEPTOR DATA
       ------------------------------------

            X UTM     Y UTM      Ground       Height  b
Receptor   Coordinate  Coordinate  Elevation  Above Ground
 No.         (km)       (km)         (m)          (m)
--------   ----------  ----------  ---------  ------------
RECEPTORS OBTAINED FROM THE NPS/FWS EXTRACTION PROGRAM
ALL RECEPTORS ARE UTM ZONE 17 (KM)


180 OKEFENOKEE NWA RECEPTORS REPRESENTING ALL NPS BOUNDARY RECEPTORS AND
AND INTERIOR RECEPTORS WITH GREATER SPACING

    1  ! X = 386.913,  3381.527,   36.000 !  !END!
    2  ! X = 388.530,  3383.358,   36.000 !  !END!
    3  ! X = 385.314,  3381.544,   36.000 !  !END!
    4  ! X = 386.932,  3383.374,   36.000 !  !END!
    5  ! X = 390.147,  3385.188,   36.000 !  !END!
    6  ! X = 385.334,  3383.391,   36.000 !  !END!
    7  ! X = 388.549,  3385.205,   36.000 !  !END!
    8  ! X = 383.736,  3383.408,   36.000 !  !END!
    9  ! X = 388.568,  3387.052,   36.000 !  !END!
   10  ! X = 382.137,  3383.425,   36.000 !  !END!
   11  ! X = 386.971,  3387.068,   37.000 !  !END!
   12  ! X = 380.539,  3383.443,   36.000 !  !END!
   13  ! X = 388.588,  3388.899,   36.000 !  !END!
   14  ! X = 378.941,  3383.461,   36.000 !  !END!
   15  ! X = 390.204,  3390.730,   36.000 !  !END!
   16  ! X = 377.343,  3383.479,   37.000 !  !END!
   17  ! X = 388.607,  3390.746,   36.000 !  !END!
   18  ! X = 380.580,  3387.137,   36.000 !  !END!
   19  ! X = 375.744,  3383.497,   36.000 !  !END!
   20  ! X = 388.626,  3392.593,   36.000 !  !END!
   21  ! X = 374.146,  3383.516,   36.000 !  !END!
   22  ! X = 390.242,  3394.424,   36.000 !  !END!
   23  ! X = 382.218,  3390.814,   36.000 !  !END!
   24  ! X = 372.548,  3383.534,   36.000 !  !END!
   25  ! X = 388.645,  3394.440,   36.000 !  !END!
   26  ! X = 387.048,  3394.457,   36.000 !  !END!
   27  ! X = 370.949,  3383.553,   30.000 !  !END!
   28  ! X = 374.189,  3387.210,   36.000 !  !END!
   29  ! X = 369.351,  3383.573,   27.000 !  !END!
   30  ! X = 383.855,  3394.491,   36.000 !  !END!
   31  ! X = 387.068,  3396.304,   36.000 !  !END!
```

```
32 ! X = 375.829, 3390.886, 37.000 ! !END!
33 ! X = 367.753, 3383.592, 27.000 ! !END!
34 ! X = 387.087, 3398.151, 36.000 ! !END!
35 ! X = 367.775, 3385.439, 30.000 ! !END!
36 ! X = 385.491, 3398.168, 36.000 ! !END!
37 ! X = 377.469, 3394.562, 36.000 ! !END!
38 ! X = 366.177, 3385.459, 27.000 ! !END!
39 ! X = 367.798, 3387.286, 32.000 ! !END!
40 ! X = 387.107, 3399.998, 36.000 ! !END!
41 ! X = 382.299, 3398.202, 36.000 ! !END!
42 ! X = 390.317, 3401.812, 36.000 ! !END!
43 ! X = 364.579, 3385.479, 27.000 ! !END!
44 ! X = 388.721, 3401.829, 36.000 ! !END!
45 ! X = 369.441, 3390.961, 36.000 ! !END!
46 ! X = 387.126, 3401.845, 36.000 ! !END!
47 ! X = 364.603, 3387.326, 30.000 ! !END!
48 ! X = 390.336, 3403.659, 36.000 ! !END!
49 ! X = 371.082, 3394.636, 36.000 ! !END!
50 ! X = 375.915, 3398.274, 36.000 ! !END!
51 ! X = 363.005, 3387.346, 27.000 ! !END!
52 ! X = 390.355, 3405.506, 36.000 ! !END!
53 ! X = 380.744, 3401.914, 36.000 ! !END!
54 ! X = 363.028, 3389.193, 27.000 ! !END!
55 ! X = 388.760, 3405.523, 36.000 ! !END!
56 ! X = 361.431, 3389.214, 27.000 ! !END!
57 ! X = 363.052, 3391.041, 38.000 ! !END!
58 ! X = 390.374, 3407.354, 37.000 ! !END!
59 ! X = 382.380, 3405.591, 36.000 ! !END!
60 ! X = 369.530, 3398.350, 36.000 ! !END!
61 ! X = 361.455, 3391.061, 33.000 ! !END!
62 ! X = 364.695, 3394.715, 38.000 ! !END!
63 ! X = 374.362, 3401.987, 36.000 ! !END!
64 ! X = 390.393, 3409.201, 36.000 ! !END!
65 ! X = 361.478, 3392.908, 38.000 ! !END!
66 ! X = 363.099, 3394.735, 38.000 ! !END!
67 ! X = 387.204, 3409.234, 36.000 ! !END!
68 ! X = 390.412, 3411.048, 36.000 ! !END!
69 ! X = 361.502, 3394.755, 37.000 ! !END!
70 ! X = 376.000, 3405.663, 36.000 ! !END!
71 ! X = 363.122, 3396.582, 37.000 ! !END!
72 ! X = 380.826, 3409.303, 36.000 ! !END!
73 ! X = 367.980, 3402.064, 36.000 ! !END!
74 ! X = 363.146, 3398.429, 36.000 ! !END!
75 ! X = 390.430, 3412.895, 36.000 ! !END!
76 ! X = 388.837, 3412.912, 36.000 ! !END!
77 ! X = 361.550, 3398.450, 37.000 ! !END!
78 ! X = 368.002, 3403.911, 36.000 ! !END!
79 ! X = 363.169, 3400.277, 36.000 ! !END!
80 ! X = 364.788, 3402.104, 36.000 ! !END!
81 ! X = 369.620, 3405.739, 37.000 ! !END!
82 ! X = 390.449, 3414.742, 36.000 ! !END!
83 ! X = 366.407, 3403.931, 36.000 ! !END!
84 ! X = 374.448, 3409.376, 36.000 ! !END!
85 ! X = 382.461, 3412.980, 36.000 ! !END!
86 ! X = 363.193, 3402.124, 36.000 ! !END!
87 ! X = 368.025, 3405.758, 36.000 ! !END!
88 ! X = 364.812, 3403.951, 36.000 ! !END!
89 ! X = 369.643, 3407.586, 36.000 ! !END!
90 ! X = 390.468, 3416.589, 36.000 ! !END!
91 ! X = 363.216, 3403.971, 36.000 ! !END!
92 ! X = 368.048, 3407.606, 37.000 ! !END!
93 ! X = 387.282, 3416.623, 36.000 ! !END!
94 ! X = 369.665, 3409.433, 36.000 ! !END!
95 ! X = 376.086, 3413.052, 36.000 ! !END!
96 ! X = 390.487, 3418.437, 36.000 ! !END!
97 ! X = 369.688, 3411.280, 36.000 ! !END!
98 ! X = 380.909, 3416.692, 36.000 ! !END!
99 ! X = 390.506, 3420.284, 36.000 ! !END!
100 ! X = 388.914, 3420.300, 36.000 ! !END!
101 ! X = 369.710, 3413.128, 36.000 ! !END!
102 ! X = 368.116, 3413.147, 36.000 ! !END!
103 ! X = 374.535, 3416.765, 36.000 ! !END!
104 ! X = 390.525, 3422.131, 36.000 ! !END!
105 ! X = 361.693, 3409.533, 27.000 ! !END!
106 ! X = 382.543, 3420.369, 36.000 ! !END!
107 ! X = 366.522, 3413.167, 36.000 ! !END!
108 ! X = 360.098, 3409.554, 32.000 ! !END!
109 ! X = 364.928, 3413.187, 30.000 ! !END!
```

```
110 ! X = 390.544, 3423.978, 36.000 ! !END!
111 ! X = 361.717, 3411.381, 30.000 ! !END!
112 ! X = 376.171, 3420.441, 36.000 ! !END!
113 ! X = 360.122, 3411.401, 29.000 ! !END!
114 ! X = 368.162, 3416.842, 36.000 ! !END!
115 ! X = 364.952, 3415.034, 31.000 ! !END!
116 ! X = 361.741, 3413.228, 33.000 ! !END!
117 ! X = 384.176, 3424.045, 36.000 ! !END!
118 ! X = 390.563, 3425.825, 36.000 ! !END!
119 ! X = 358.528, 3411.422, 34.000 ! !END!
120 ! X = 363.358, 3415.055, 31.000 ! !END!
121 ! X = 360.147, 3413.249, 33.000 ! !END!
122 ! X = 356.934, 3411.444, 36.000 ! !END!
123 ! X = 361.764, 3415.075, 33.000 ! !END!
124 ! X = 390.582, 3427.672, 37.000 ! !END!
125 ! X = 369.800, 3420.517, 36.000 ! !END!
126 ! X = 377.807, 3424.117, 36.000 ! !END!
127 ! X = 388.991, 3427.689, 36.000 ! !END!
128 ! X = 355.340, 3411.465, 36.000 ! !END!
129 ! X = 387.399, 3427.706, 36.000 ! !END!
130 ! X = 356.959, 3413.291, 32.000 ! !END!
131 ! X = 361.788, 3416.922, 33.000 ! !END!
132 ! X = 353.746, 3411.487, 36.000 ! !END!
133 ! X = 382.624, 3427.757, 36.000 ! !END!
134 ! X = 352.151, 3411.509, 36.000 ! !END!
135 ! X = 387.419, 3429.553, 36.000 ! !END!
136 ! X = 371.438, 3424.192, 36.000 ! !END!
137 ! X = 353.771, 3413.334, 36.000 ! !END!
138 ! X = 385.827, 3429.570, 36.000 ! !END!
139 ! X = 363.429, 3420.596, 29.000 ! !END!
140 ! X = 384.236, 3429.587, 36.000 ! !END!
141 ! X = 352.177, 3413.356, 36.000 ! !END!
142 ! X = 376.257, 3427.830, 36.000 ! !END!
143 ! X = 353.796, 3415.181, 36.000 ! !END!
144 ! X = 355.415, 3417.007, 32.000 ! !END!
145 ! X = 384.256, 3431.434, 37.000 ! !END!
146 ! X = 357.033, 3418.833, 36.000 ! !END!
147 ! X = 352.202, 3415.203, 36.000 ! !END!
148 ! X = 382.665, 3431.452, 37.000 ! !END!
149 ! X = 365.069, 3424.271, 36.000 ! !END!
150 ! X = 361.860, 3422.464, 30.000 ! !END!
151 ! X = 353.821, 3417.029, 36.000 ! !END!
152 ! X = 368.276, 3426.078, 36.000 ! !END!
153 ! X = 358.651, 3420.659, 36.000 ! !END!
154 ! X = 381.074, 3431.470, 37.000 ! !END!
155 ! X = 355.440, 3418.854, 32.000 ! !END!
156 ! X = 363.476, 3424.291, 36.000 ! !END!
157 ! X = 366.684, 3426.098, 37.000 ! !END!
158 ! X = 360.268, 3422.485, 35.000 ! !END!
159 ! X = 369.891, 3427.906, 36.000 ! !END!
160 ! X = 357.058, 3420.680, 36.000 ! !END!
161 ! X = 361.884, 3424.311, 36.000 ! !END!
162 ! X = 365.092, 3426.118, 41.000 ! !END!
163 ! X = 358.675, 3422.506, 37.000 ! !END!
164 ! X = 368.299, 3427.925, 36.000 ! !END!
165 ! X = 376.300, 3431.524, 37.000 ! !END!
166 ! X = 381.095, 3433.317, 37.000 ! !END!
167 ! X = 379.504, 3433.335, 37.000 ! !END!
168 ! X = 369.913, 3429.753, 36.000 ! !END!
169 ! X = 373.118, 3431.562, 37.000 ! !END!
170 ! X = 368.322, 3429.772, 37.000 ! !END!
171 ! X = 371.527, 3431.581, 37.000 ! !END!
172 ! X = 369.936, 3431.600, 37.000 ! !END!
173 ! X = 379.525, 3435.182, 37.000 ! !END!
174 ! X = 373.140, 3433.409, 37.000 ! !END!
175 ! X = 377.934, 3435.200, 37.000 ! !END!
176 ! X = 376.344, 3435.219, 37.000 ! !END!
177 ! X = 374.753, 3435.237, 37.000 ! !END!
178 ! X = 373.162, 3435.256, 37.000 ! !END!
179 ! X = 377.955, 3437.047, 37.000 ! !END!
180 ! X = 376.365, 3437.066, 37.000 ! !END!
```

----

a
Data for each receptor are treated as a separate input subgroup
and therefore must end with an input group terminator.

b

Receptor height above ground is optional. If no value is entered,

```
SECI UNITS1&2 CUMULATIVE MAX. FUTURE SHORT-TERM EMIS COMPETING SOURCES 2/18/06
RECEPTORS AT OKEFENOKEE NWA                    W/O SECI
1990 NORTH CENTRAL FL - S. GA  WIND DOMAIN
---------------- Run title (3 lines) ------------------------------------------

               CALPUFF MODEL CONTROL FILE
               --------------------------

-------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names

--------------
Default Name  Type          File Name
------------  ----          ---------
CALMET.DAT    input    * METDAT =          *
   or
ISCMET.DAT    input    * ISCDAT =          *
   or
PLMMET.DAT    input    * PLMDAT =          *
   or
PROFILE.DAT   input    * PRFDAT =          *
SURFACE.DAT   input    * SFCDAT =          *
RESTARTB.DAT  input    * RSTARTB=          *
-------------------------------------------------------------------------------
CALPUFF.LST   output   ! PUFLST = PSDSO2FBK.LST !
CONC.DAT      output   ! CONDAT = PSDSO2FBK.CON !
DFLX.DAT      output   * DFDAT  =          *
WFLX.DAT      output   * WFDAT  =          *

VISB.DAT      output   * VISDAT = VISB90.DAT   *
RESTARTE.DAT  output   * RSTARTE=          *
-------------------------------------------------------------------------------
Emission Files
--------------
PTEMARB.DAT   input    * PTDAT  =          *
VOLEMARB.DAT  input    * VOLDAT =          *
BAEMARB.DAT   input    * ARDAT  =          *
LNEMARB.DAT   input    * LNDAT  =          *
-------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input    * OZDAT  =          *
VD.DAT        input    * VDDAT  =          *
CHEM.DAT      input    * CHEMDAT=          *
H2O2.DAT      input    * H2O2DAT=          *
HILL.DAT      input    * HILDAT=           *
HILLRCT.DAT   input    * RCTDAT=           *
COASTLN.DAT   input    * CSTDAT=           *
FLUXBDY.DAT   input    * BDYDAT=           *
BCON.DAT      input    * BCNDAT=           *
DEBUG.DAT     output   * DEBUG =           *
MASSFLX.DAT   output   * FLXDAT=           *
MASSBAL.DAT   output   * BALDAT=           *
FOG.DAT       output   * FOGDAT=           *
-------------------------------------------------------------------------------
All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
        T = lower case      ! LCFILES = T !
        F = UPPER CASE
NOTE: (1) file/path names can be up to 70 characters in length


Provision for multiple input files
----------------------------------

     Number of CALMET.DAT files for run (NMETDAT)
                          Default: 1       ! NMETDAT =  24  !

     Number of PTEMARB.DAT files for run (NPTDAT)
                          Default: 0       ! NPTDAT =  0  !

     Number of BAEMARB.DAT files for run (NARDAT)
                          Default: 0       ! NARDAT =  0  !

     Number of VOLEMARB.DAT files for run (NVOLDAT)
                          Default: 0       ! NVOLDAT =  0  !
```

```
!END!

-------------
Subgroup (0a)
-------------

 The following CALMET.DAT filenames are processed in sequence if NMETDAT>1

Default Name  Type        File Name
------------  ----        ---------
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\JANA.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\JANB.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\FEBA.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\FEBB.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\MARA.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\MARB.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\APRA.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\APRB.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\MAYA.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\MAYB.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\JUNA.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\JUNB.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\JULA.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\JULB.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\AUGA.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\AUGB.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\SEPA.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\SEPB.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\OCTA.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\OCTB.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\NOVA.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\NOVB.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\DECA.DAT ! !END!
CALMET.DAT    input   ! METDAT =c:\CALMET\NCF90\DECB.DAT ! !END!


--------------------------------------------------------------------------------

INPUT GROUP: 1 -- General run control parameters
--------------

   Option to run all periods found
   in the met. file    (METRUN)   Default: 0       ! METRUN =   0  !

       METRUN = 0 - Run period explicitly defined below
       METRUN = 1 - Run all periods in met. file

    Starting date:   Year (IBYR) -- No default       ! IBYR =  1990 !
    (used only if    Month (IBMO) -- No default      ! IBMO =  1   !
     METRUN = 0)       Day (IBDY) -- No default      ! IBDY =  6   !
                     Hour (IBHR) -- No default       ! IBHR =  1   !

    Base time zone         (XBTZ) -- No default      ! XBTZ =  5   !
      PST = 8., MST = 7.
      CST = 6., EST = 5.

    Length of run (hours) (IRLG) -- No default       ! IRLG = 8615 !

    Number of chemical species (NSPEC)
                              Default: 5       ! NSPEC = 7   !

    Number of chemical species
    to be emitted  (NSE)            Default: 3       ! NSE =   5   !

    Flag to stop run after
    SETUP phase (ITEST)             Default: 2       ! ITEST =  2   !
    (Used to allow checking
    of the model inputs, files, etc.)
         ITEST = 1 - STOPS program after SETUP phase
         ITEST = 2 - Continues with execution of program
                    after SETUP

    Restart Configuration:

      Control flag (MRESTART)       Default: 0       ! MRESTART =  0  !

         0 = Do not read or write a restart file
         1 = Read a restart file at the beginning of
```

```
           the run
         2 = Write a restart file during run
         3 = Read a restart file at beginning of run
           and write a restart file during run

      Number of periods in Restart
      output cycle (NRESPD)       Default: 0      ! NRESPD =  0   !

         0 = File written only at last period
        >0 = File updated every NRESPD periods

    Meteorological Data Format (METFM)
                          Default: 1       ! METFM =  1   !

         METFM = 1 - CALMET binary file (CALMET.MET)
         METFM = 2 - ISC ASCII file (ISCMET.MET)
         METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
         METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
                  surface parameters file (SURFACE.DAT)

    PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
    Averaging Time (minutes) (AVET)
                          Default: 60.0    ! AVET = 60.   !
    PG Averaging Time (minutes) (PGTIME)
                          Default: 60.0    ! PGTIME = 60. !


!END!


-------------------------------------------------------------------------------

INPUT GROUP: 2 -- Technical options
--------------


    Vertical distribution used in the
    near field (MGAUSS)              Default: 1     ! MGAUSS =  1   !
      0 = uniform
      1 = Gaussian

    Terrain adjustment method
    (MCTADJ)                     Default: 3     ! MCTADJ =  3   !
      0 = no adjustment
      1 = ISC-type of terrain adjustment
      2 = simple, CALPUFF-type of terrain
          adjustment
      3 = partial plume path adjustment

    Subgrid-scale complex terrain
    flag (MCTSG)                 Default: 0     ! MCTSG =  0   !
      0 = not modeled
      1 = modeled

    Near-field puffs modeled as
    elongated 0 (MSLUG)              Default: 0     ! MSLUG =  0   !
      0 = no
      1 = yes (slug model used)

    Transitional plume rise modeled ?
    (MTRANS)                     Default: 1     ! MTRANS =  1   !
      0 = no  (i.e., final rise only)
      1 = yes (i.e., transitional rise computed)

    Stack tip downwash? (MTIP)         Default: 1     ! MTIP =  1  !
      0 = no  (i.e., no stack tip downwash)
      1 = yes (i.e., use stack tip downwash)

    Method used to simulate building
    downwash? (MBDW)                 Default: 1     ! MBDW =  1   !
      1 = ISC method
      2 = PRIME method

    Vertical wind shear modeled above
    stack top? (MSHEAR)              Default: 0     ! MSHEAR =  0  !
      0 = no  (i.e., vertical wind shear not modeled)
      1 = yes (i.e., vertical wind shear modeled)
```

```
Puff splitting allowed? (MSPLIT)     Default: 0     ! MSPLIT =  0  !
  0 = no (i.e., puffs not split)
  1 = yes (i.e., puffs are split)

Chemical mechanism flag (MCHEM)      Default: 1     ! MCHEM =  1  !
  0 = chemical transformation not
      modeled
  1 = transformation rates computed
      internally (MESOPUFF II scheme)
  2 = user-specified transformation
      rates used
  3 = transformation rates computed
      internally (RIVAD/ARM3 scheme)
  4 = secondary organic aerosol formation
      computed (MESOPUFF II scheme for OH)

Aqueous phase transformation flag (MAQCHEM)
(Used only if MCHEM = 1, or 3)       Default: 0     ! MAQCHEM =  0  !
  0 = aqueous phase transformation
      not modeled
  1 = transformation rates adjusted
      for aqueous phase reactions

Wet removal modeled ? (MWET)         Default: 1     ! MWET =  1  !
  0 = no
  1 = yes

Dry deposition modeled ? (MDRY)      Default: 1     ! MDRY =  1  !
  0 = no
  1 = yes
  (dry deposition method specified
   for each species in Input Group 3)

Method used to compute dispersion
coefficients (MDISP)                 Default: 3     ! MDISP =  3  !

  1 = dispersion coefficients computed from measured values
      of turbulence, sigma v, sigma w
  2 = dispersion coefficients from internally calculated
      sigma v, sigma w using micrometeorological variables
      (u*, w*, L, etc.)
  3 = PG dispersion coefficients for RURAL areas (computed using
      the ISCST multi-segment approximation) and MP coefficients in
      urban areas
  4 = same as 3 except PG coefficients computed using
      the MESOPUFF II eqns.
  5 = CTDM sigmas used for stable and neutral conditions.
      For unstable conditions, sigmas are computed as in
      MDISP = 3, described above.  MDISP = 5 assumes that
      measured values are read

Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
(Used only if MDISP = 1 or 5)        Default: 3     ! MTURBVW =  3  !
  1 = use sigma-v or sigma-theta measurements
      from PROFILE.DAT to compute sigma-y
      (valid for METFM = 1, 2, 3, 4)
  2 = use sigma-w measurements
      from PROFILE.DAT to compute sigma-z
      (valid for METFM = 1, 2, 3, 4)
  3 = use both sigma-(v/theta) and sigma-w
      from PROFILE.DAT to compute sigma-y and sigma-z
      (valid for METFM = 1, 2, 3, 4)
  4 = use sigma-theta measurements
      from PLMMET.DAT to compute sigma-y
      (valid only if METFM = 3)

Back-up method used to compute dispersion
when measured turbulence data are
missing (MDISP2)                     Default: 3     ! MDISP2 =  3  !
(used only if MDISP = 1 or 5)
  2 = dispersion coefficients from internally calculated
      sigma v, sigma w using micrometeorological variables
      (u*, w*, L, etc.)
  3 = PG dispersion coefficients for RURAL areas (computed using
      the ISCST multi-segment approximation) and MP coefficients in
      urban areas
  4 = same as 3 except PG coefficients computed using
      the MESOPUFF II eqns.
```

```
PG sigma-y,z adj. for roughness?     Default: 0     ! MROUGH =  0  !
(MROUGH)
  0 = no
  1 = yes

Partial plume penetration of        Default: 1     ! MPARTL =  1  !
elevated inversion?
(MPARTL)
  0 = no
  1 = yes

Strength of temperature inversion    Default: 0     ! MTINV =  0  !
provided in PROFILE.DAT extended records?
(MTINV)
  0 = no (computed from measured/default gradients)
  1 = yes

PDF used for dispersion under convective conditions?
                                 Default: 0     ! MPDF =  0  !
(MPDF)
  0 = no
  1 = yes

Sub-Grid TIBL module used for shore line?
                                 Default: 0     ! MSGTIBL = 0  !
(MSGTIBL)
  0 = no
  1 = yes

Boundary conditions (concentration) modeled?
                                 Default: 0     ! MBCON = 0  !
(MBCON)
  0 = no
  1 = yes, using formatted BCON.DAT file
  2 = yes, using unformatted CONC.DAT file

Note:  MBCON > 0 requires that the last species modeled
      be 'BCON'.  Mass is placed in species BCON when
      generating boundary condition puffs so that clean
      air entering the modeling domain can be simulated
      in the same way as polluted air.  Specify zero
      emission of species BCON for all regular sources.


Analyses of fogging and icing impacts due to emissions from
arrays of mechanically-forced cooling towers can be performed
using CALPUFF in conjunction with a cooling tower emissions
processor (CTEMISS) and its associated postprocessors.  Hourly
emissions of water vapor and temperature from each cooling tower
cell are computed for the current cell configuration and ambient
conditions by CTEMISS. CALPUFF models the dispersion of these
emissions and provides cloud information in a specialized format
for further analysis. Output to FOG.DAT is provided in either
'plume mode' or 'receptor mode' format.

Configure for FOG Model output?
                                 Default: 0     ! MFOG =  0  !
(MFOG)
  0 = no
  1 = yes  - report results in PLUME Mode format
  2 = yes  - report results in RECEPTOR Mode format


Test options specified to see if
they conform to regulatory
values? (MREG)                   Default: 1     ! MREG =  1  !

  0 = NO checks are made
  1 = Technical options must conform to USEPA
     Long Range Transport (LRT) guidance
            METFM    1 or 2
            AVET     60. (min)
            PGTIME  60. (min)
            MGAUSS   1
            MCTADJ   3
            MTRANS   1
            MTIP     1
```

```
          MCHEM   1 or 3 (if modeling SOx, NOx)
          MWET    1
          MDRY    1
          MDISP   2 or 3
          MPDF    0 if MDISP=3
                  1 if MDISP=2
          MROUGH  0
          MPARTL  1
          SYTDEP  550. (m)
          MHFTSZ  0

!END!


-------------------------------------------------------------------------------

INPUT GROUP: 3a, 3b -- Species list
-------------------

------------
Subgroup (3a)
------------

  The following species are modeled:

! CSPEC =      SO2 !     !END!
! CSPEC =      SO4 !     !END!
! CSPEC =      NOX !     !END!
! CSPEC =     HNO3 !     !END!
! CSPEC =      NO3 !     !END!
! CSPEC =     PM10 !     !END!
! CSPEC =       CO !     !END!

                                         Dry           OUTPUT GROUP
   SPECIES        MODELED       EMITTED      DEPOSITED          NUMBER
    NAME       (0=NO, 1=YES)  (0=NO, 1=YES)  (0=NO,          (0=NONE,
  (Limit: 12                                1=COMPUTED-GAS      1=1st CGRUP,
   Characters                                2=COMPUTED-PARTICLE  2=2nd CGRUP,
   in length)                               3=USER-SPECIFIED)    3= etc.)

!      SO2  =       1,          1,        1,           0  !
!      SO4  =       1,          1,        2,           0  !
!      NOX  =       1,          1,        1,           0  !
!     HNO3  =       1,          0,        1,           0  !
!      NO3  =       1,          0,        2,           0  !
!     PM10  =       1,          1,        2,           0  !
!       CO  =       1,          1,        0,           0  !

!END!

-------------
Subgroup (3b)
-------------
  The following names are used for Species-Groups in which results
  for certain species are combined (added) prior to output.  The
  CGRUP name will be used as the species name in output files.
  Use this feature to model specific particle-size distributions
  by treating each size-range as a separate species.
  Order must be consistent with 3(a) above.


INPUT GROUP: 4 -- Map Projection and Grid control parameters
--------------

    Projection for all (X,Y):
    -------------------------

    Map projection
    (PMAP)              Default: UTM   ! PMAP = UTM  !

       UTM :  Universal Transverse Mercator
       TTM :  Tangential Transverse Mercator
       LCC :  Lambert Conformal Conic
        PS :  Polar Stereographic
        EM :  Equatorial Mercator
      LAZA :  Lambert Azimuthal Equal Area
```

```
False Easting and Northing (km) at the projection origin
(Used only if PMAP= TTM, LCC, or LAZA)
(FEAST)              Default=0.0    ! FEAST  = 0.000  !
(FNORTH)             Default=0.0    ! FNORTH = 0.000  !

UTM zone (1 to 60)
(Used only if PMAP=UTM)
(IUTMZN)             No Default     ! IUTMZN =  17  !

Hemisphere for UTM projection?
(Used only if PMAP=UTM)
(UTMHEM)             Default: N     ! UTMHEM = N  !
   N   :  Northern hemisphere projection
   S   :  Southern hemisphere projection

Latitude and Longitude (decimal degrees) of projection origin
(Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
(RLAT0)              No Default     ! RLAT0 =  48.7N !
(RLON0)              No Default     ! RLON0 = 138.8W !

   TTM :  RLON0 identifies central (true N/S) meridian of projection
          RLAT0 selected for convenience
   LCC :  RLON0 identifies central (true N/S) meridian of projection
          RLAT0 selected for convenience
   PS  :  RLON0 identifies central (grid N/S) meridian of projection
          RLAT0 selected for convenience
   EM  :  RLON0 identifies central meridian of projection
          RLAT0 is REPLACED by 0.0N (Equator)
   LAZA:  RLON0 identifies longitude of tangent-point of mapping plane
          RLAT0 identifies latitude of tangent-point of mapping plane

Matching parallel(s) of latitude (decimal degrees) for projection
(Used only if PMAP= LCC or PS)
(XLAT1)              No Default     ! XLAT1 = 30N  !
(XLAT2)              No Default     ! XLAT2 = 60N  !

   LCC :  Projection cone slices through Earth's surface at XLAT1 and XLAT2
   PS  :  Projection plane slices through Earth at XLAT1
          (XLAT2 is not used)

----------
Note:  Latitudes and longitudes should be positive, and include a
       letter N,S,E, or W indicating north or south latitude, and
       east or west longitude.  For example,
       35.9  N Latitude  =  35.9N
       118.7 E Longitude = 118.7E


Datum-region
------------

The Datum-Region for the coordinates is identified by a character
string.  Many mapping products currently available use the model of the
Earth known as the World Geodetic System 1984 (WGS-G ).  Other local
models may be in use, and their selection in CALMET will make its output
consistent with local mapping products.  The list of Datum-Regions with
official transformation parameters is provided by the National Imagery and
Mapping Agency (NIMA).

NIMA Datum - Regions(Examples)
------------------------------------------------------------------------------
WGS-G    WGS-84 GRS 80 Spheroid, Global coverage (WGS84)
NAS-C    NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS (NAD27)
NWS-27   NWS 6370KM Radius, Sphere
NWS-84   NWS 6370KM Radius, Sphere
ESR-S    ESRI REFERENCE 6371KM Radius, Sphere

Datum-region for output coordinates
(DATUM)              Default: WGS-G    ! DATUM = NAS-C !


METEOROLOGICAL Grid:

       No. X grid cells (NX)      No default    ! NX = 112   !
       No. Y grid cells (NY)      No default    ! NY = 171   !
     No. vertical layers (NZ)     No default    ! NZ =  10   !

       Grid spacing (DGRIDKM)     No default    ! DGRIDKM = 4. !
```

```
                       Units: km

              Cell face heights
                (ZFACE(nz+1))     No defaults
                       Units: m
       ! ZFACE = 0.,20.,40.,80.,160.,300.,600.,1000.,1500.,2200.,3000. !

            Reference Coordinates
           of SOUTHWEST corner of
             grid cell(1, 1):

            X coordinate (XORIGKM)     No default    ! XORIGKM =  77. !
            Y coordinate (YORIGKM)     No default    ! YORIGKM = 2966. !
                      Units: km


  COMPUTATIONAL Grid:

    The computational grid is identical to or a subset of the MET. grid.
    The lower left (LL) corner of the computational grid is at grid point
    (IBCOMP, JBCOMP) of the MET. grid.  The upper right (UR) corner of the
    computational grid is at grid point (IECOMP, JECOMP) of the MET. grid.
    The grid spacing of the computational grid is the same as the MET. grid.

       X index of LL corner (IBCOMP)      No default     ! IBCOMP =  1   !
             (1 <= IBCOMP <= NX)

       Y index of LL corner (JBCOMP)      No default     ! JBCOMP =  1   !
             (1 <= JBCOMP <= NY)


       X index of UR corner (IECOMP)      No default     ! IECOMP =  112 !
             (1 <= IECOMP <= NX)

       Y index of UR corner (JECOMP)      No default     ! JECOMP =  171  !
             (1 <= JECOMP <= NY)


  SAMPLING Grid (GRIDDED RECEPTORS):

    The lower left (LL) corner of the sampling grid is at grid point
    (IBSAMP, JBSAMP) of the MET. grid.  The upper right (UR) corner of the
    sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
    The sampling grid must be identical to or a subset of the computational
    grid.  It may be a nested grid inside the computational grid.
    The grid spacing of the sampling grid is DGRIDKM/MESHDN.

       Logical flag indicating if gridded
       receptors are used (LSAMP)        Default: T     ! LSAMP = F !
       (T=yes, F=no)

       X index of LL corner (IBSAMP)     No default     ! IBSAMP =  1   !
        (IBCOMP <= IBSAMP <= IECOMP)

       Y index of LL corner (JBSAMP)     No default     ! JBSAMP =  1   !
        (JBCOMP <= JBSAMP <= JECOMP)


       X index of UR corner (IESAMP)     No default     ! IESAMP =  112 !
        (IBCOMP <= IESAMP <= IECOMP)

       Y index of UR corner (JESAMP)     No default     ! JESAMP =  171  !
        (JBCOMP <= JESAMP <= JECOMP)


      Nesting factor of the sampling
       grid (MESHDN)                   Default: 1     ! MESHDN =  1  !
       (MESHDN is an integer >= 1)

 !END!


 -------------------------------------------------------------------------------


 INPUT GROUP: 5 -- Output Options
 --------------
```

```
                          *              *
   FILE              DEFAULT VALUE        VALUE THIS RUN
   ----              -------------        --------------

  Concentrations (ICON)          1              ! ICON =  1  !
  Dry Fluxes (IDRY)              1              ! IDRY =  0  !
  Wet Fluxes (IWET)              1              ! IWET =  0  !
  Relative Humidity (IVIS)       1              ! IVIS =  0  !
   (relative humidity file is
    required for visibility
    analysis)
  Use data compression option in output file?
  (LCOMPRS)                      Default: T     ! LCOMPRS = T !

 *
  0 = Do not create file, 1 = create file


  DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

    Mass flux across specified boundaries
    for selected species reported hourly?
    (IMFLX)                   Default: 0      ! IMFLX =  0  !
     0 = no
     1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
           are specified in Input Group 0)

    Mass balance for each species
    reported hourly?
    (IMBAL)                   Default: 0      ! IMBAL =  0  !
     0 = no
     1 = yes (MASSBAL.DAT filename is
          specified in Input Group 0)


  LINE PRINTER OUTPUT OPTIONS:

    Print concentrations (ICPRT)   Default: 0      ! ICPRT =  0  !
    Print dry fluxes (IDPRT)       Default: 0      ! IDPRT =  0  !
    Print wet fluxes (IWPRT)       Default: 0      ! IWPRT =  0  !
    (0 = Do not print, 1 = Print)

    Concentration print interval
    (ICFRQ) in hours             Default: 1      ! ICFRQ =  24  !
    Dry flux print interval
    (IDFRQ) in hours             Default: 1      ! IDFRQ =  1  !
    Wet flux print interval
    (IWFRQ) in hours             Default: 1      ! IWFRQ =  1  !

    Units for Line Printer Output
    (IPRTU)                      Default: 1      ! IPRTU =  3  !
                for          for
            Concentration   Deposition
       1 =     g/m**3       g/m**2/s
       2 =    mg/m**3      mg/m**2/s
       3 =    ug/m**3      ug/m**2/s
       4 =    ng/m**3      ng/m**2/s
       5 =    Odour Units

    Messages tracking progress of run
    written to the screen ?
    (IMESG)                      Default: 1      ! IMESG =  2  !
     0 = no
     1 = yes (advection step, puff ID)
     2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)


   SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

          ---- CONCENTRATIONS ----  ------ DRY FLUXES ------  ------ WET FLUXES ------  -- MASS FLUX --
SPECIES
/GROUP    PRINTED? SAVED ON DISK? PRINTED?  SAVED ON DISK?  PRINTED?  SAVED ON DISK?  SAVED ON DISK?
-------   ------------------------  ------------------------  ------------------------  ---------------
!      SO2 =   0,        1,        0,        0,        0,        0,        0  !
!      SO4 =   0,        1,        0,        0,        0,        0,        0  !
!      NOX =   0,        1,        0,        0,        0,        0,        0  !
!     HNO3 =   0,        1,        0,        0,        0,        0,        0  !
!      NO3 =   0,        1,        0,        0,        0,        0,        0  !
```

```
!      PM10 =    0,         1,         0,          0,          0,          0,          0  !
!        CO =    0,         1,         0,          0,          0,          0,          0  !

 Note:  Species BCON (for MBCON > 0) does not need to be saved on disk.


    OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

      Logical for debug output
      (LDEBUG)                     Default: F     ! LDEBUG = F !

      First puff to track
      (IPFDEB)                     Default: 1     ! IPFDEB =  1  !

      Number of puffs to track
      (NPFDEB)                     Default: 1     ! NPFDEB =  1  !

      Met. period to start output
      (NN1)                        Default: 1     ! NN1 =  1   !

      Met. period to end output
      (NN2)                        Default: 10    ! NN2 =  10  !

!END!


-------------------------------------------------------------------------------

INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
-------------------------

---------------
Subgroup (6a)
---------------
      Number of terrain features (NHILL)       Default: 0     ! NHILL =  0   !

      Number of special complex terrain
      receptors  (NCTREC)                      Default: 0     ! NCTREC =  0   !

      Terrain and CTSG Receptor data for
      CTSG hills input in CTDM format ?
      (MHILL)                         No Default     ! MHILL =  2   !
      1 = Hill and Receptor data created
          by CTDM processors & read from
          HILL.DAT and HILLRCT.DAT files
      2 = Hill data created by OPTHILL &
          input below in Subgroup (6b);
          Receptor data in Subgroup (6c)

      Factor to convert horizontal dimensions  Default: 1.0   ! XHILL2M = 1. !
      to meters (MHILL=1)

      Factor to convert vertical dimensions    Default: 1.0   ! ZHILL2M = 1. !
      to meters (MHILL=1)

      X-origin of CTDM system relative to      No Default     ! XCTDMKM = 0.0E00 !
      CALPUFF coordinate system, in Kilometers (MHILL=1)

      Y-origin of CTDM system relative to      No Default     ! YCTDMKM = 0.0E00 !
      CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

---------------
Subgroup (6b)
---------------

                      1 **
     HILL information


HILL      XC       YC      THETAH  ZGRID  RELIEF    EXPO 1    EXPO 2   SCALE 1    SCALE 2   AMAX1     AMAX2
 NO.     (km)     (km)     (deg.)  (m)     (m)      (m)       (m)       (m)        (m)       (m)
----     ----     ----     ------ -----  ------    ------    ------   -------    -------    -----    -----

--------------
Subgroup (6c)
```

COMPLEX TERRAIN RECEPTOR INFORMATION

```
XRCT    YRCT    ZRCT    XHH
(km)    (km)    (m)
------  -----  ------  ----
```

1

Description of Complex Terrain Variables:
XC, YC = Coordinates of center of hill
THETAH = Orientation of major axis of hill (clockwise from North)
ZGRID = Height of the 0 of the grid above mean sea level
RELIEF = Height of the crest of the hill above the grid elevation
EXPO 1 = Hill-shape exponent for the major axis
EXPO 2 = Hill-shape exponent for the major axis
SCALE 1 = Horizontal length scale along the major axis
SCALE 2 = Horizontal length scale along the minor axis
AMAX = Maximum allowed axis length for the major axis
BMAX = Maximum allowed axis length for the major axis

XRCT, YRCT = Coordinates of the complex terrain receptors
ZRCT = Height of the ground (MSL) at the complex terrain Receptor
XHH = Hill number associated with each complex terrain receptor (NOTE: MUST BE ENTERED AS A REAL NUMBER)

**

NOTE: DATA for each hill and CTSG receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases

----

```
    SPECIES   DIFFUSIVITY   ALPHA STAR   REACTIVITY   MESOPHYLL RESISTANCE   HENRY'S LAW COEFFICIENT
     NAME      (cm**2/s)                                 (s/cm)                 (dimensionless)
    -------  -----------  ----------   ---------- -------------------  ----------------------
 !  SO2 =      0.1509,      1000.,        8.,          0.,                  .04 !
 !  NOX =      0.1656,        1.,         8.,          5.,                  3.5 !
 !  HNO3 =     0.1628,        1.,        18.,          0.,                  8E-8 !
```

!END!

INPUT GROUP: 8 -- Size parameters for dry deposition of particles

----

For SINGLE SPECIES, the mean and standard deviation are used to compute a deposition velocity for NINT (see group 9) size-ranges, and these are then averaged to obtain a mean deposition velocity.

For GROUPED SPECIES, the size distribution should be explicitly specified (by the 'species' in the group), and the standard deviation for each should be entered as 0. The model will then use the deposition velocity for the stated mean diameter.

```
     SPECIES    GEOMETRIC MASS MEAN    GEOMETRIC STANDARD
      NAME          DIAMETER                DEVIATION
                    (microns)               (microns)
     -------   ------------------    ------------------
!      SO4 =         0.48,                  2.  !
!      NO3 =         0.48,                  2.  !
!     PM10 =         0.48,                  2.  !
```

!END!

```
INPUT GROUP: 9 -- Miscellaneous dry deposition parameters
--------------

     Reference cuticle resistance (s/cm)
     (RCUTR)                    Default: 30    ! RCUTR = 30.0 !
     Reference ground resistance  (s/cm)
     (RGR)                      Default: 10    !  RGR = 10.0 !
     Reference pollutant reactivity
     (REACTR)                   Default: 8     ! REACTR = 8.0 !

     Number of particle-size intervals used to
     evaluate effective particle deposition velocity
     (NINT)                     Default: 9     !  NINT =  9  !

     Vegetation state in unirrigated areas
     (IVEG)                     Default: 1     !  IVEG =  1   !
       IVEG=1 for active and unstressed vegetation
       IVEG=2 for active and stressed vegetation
       IVEG=3 for inactive vegetation

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 10 -- Wet Deposition Parameters
---------------


                Scavenging Coefficient -- Units: (sec)**(-1)

      Pollutant     Liquid Precip.     Frozen Precip.
      ---------     --------------     --------------
!       SO2 =         3.0E-05,           0.0E00 !
!       SO4 =         1.0E-04,           3.0E-05 !
!      HNO3 =         6.0E-05,           0.0E00 !
!       NO3 =         1.0E-04,           3.0E-05 !
!      PM10 =         1.0E-04,           3.0E-05 !

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 11 -- Chemistry Parameters
---------------

     Ozone data input option (MOZ)     Default: 1          ! MOZ =  0   !
     (Used only if MCHEM = 1, 3, or 4)
       0 = use a monthly background ozone value
       1 = read hourly ozone concentrations from
           the OZONE.DAT data file

     Monthly ozone concentrations
     (Used only if MCHEM = 1, 3, or 4 and
      MOZ = 0 or MOZ = 1 and all hourly O3 data missing)
     (BCKO3) in ppb               Default: 12*80.
     !  BCKO3 = 12*50. !

     Monthly ammonia concentrations
     (Used only if MCHEM = 1, or 3)
     (BCKNH3) in ppb              Default: 12*10.
     !  BCKNH3 = 12*1. !

     Nighttime SO2 loss rate (RNITE1)
     in percent/hour              Default: 0.2         ! RNITE1 = .2 !

     Nighttime NOx loss rate (RNITE2)
     in percent/hour              Default: 2.0         ! RNITE2 = 2.0 !

     Nighttime HNO3 formation rate (RNITE3)
     in percent/hour              Default: 2.0         ! RNITE3 = 2.0 !

     H2O2 data input option (MH2O2)    Default: 1          ! MH2O2 =  1   !
```

```
     (Used only if MAQCHEM = 1)
       0 = use a monthly background H2O2 value
       1 = read hourly H2O2 concentrations from
           the H2O2.DAT data file

     Monthly H2O2 concentrations
     (Used only if MQACHEM = 1 and
      MH2O2 = 0 or MH2O2 = 1 and all hourly H2O2 data missing)
     (BCKH2O2) in ppb              Default: 12*1.
     ! BCKH2O2 = 12*1 !


--- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
    (used only if MCHEM = 4)

    The SOA module uses monthly values of:
        Fine particulate concentration in ug/m^3 (BCKPMF)
        Organic fraction of fine particulate    (OFRAC)
        VOC / NOX ratio (after reaction)        (VCNX)
    to characterize the air mass when computing
    the formation of SOA from VOC emissions.
    Typical values for several distinct air mass types are:

      Month   1   2   3   4   5   6   7   8   9  10  11  12
             Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

    Clean Continental
      BCKPMF  1.  1.  1.  1.  1.  1.  1.  1.  1.  1.  1.  1.
      OFRAC  .15 .15 .20 .20 .20 .20 .20 .20 .20 .20 .20 .15
      VCNX   50. 50. 50. 50. 50. 50. 50. 50. 50. 50. 50. 50.

    Clean Marine (surface)
      BCKPMF .5  .5  .5  .5  .5  .5  .5  .5  .5  .5  .5  .5
      OFRAC  .25 .25 .30 .30 .30 .30 .30 .30 .30 .30 .30 .25
      VCNX   50. 50. 50. 50. 50. 50. 50. 50. 50. 50. 50. 50.

    Urban - low biogenic (controls present)
      BCKPMF 30. 30. 30. 30. 30. 30. 30. 30. 30. 30. 30. 30.
      OFRAC  .20 .20 .25 .25 .25 .25 .25 .25 .20 .20 .20 .20
      VCNX    4.  4.  4.  4.  4.  4.  4.  4.  4.  4.  4.  4.

    Urban - high biogenic (controls present)
      BCKPMF 60. 60. 60. 60. 60. 60. 60. 60. 60. 60. 60. 60.
      OFRAC  .25 .25 .30 .30 .30 .55 .55 .55 .35 .35 .35 .25
      VCNX   15. 15. 15. 15. 15. 15. 15. 15. 15. 15. 15. 15.

    Regional Plume
      BCKPMF 20. 20. 20. 20. 20. 20. 20. 20. 20. 20. 20. 20.
      OFRAC  .20 .20 .25 .35 .25 .40 .40 .40 .30 .30 .30 .20
      VCNX   15. 15. 15. 15. 15. 15. 15. 15. 15. 15. 15. 15.

    Urban - no controls present
      BCKPMF 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100.
      OFRAC  .30 .30 .35 .35 .35 .55 .55 .55 .35 .35 .35 .30
      VCNX    2.  2.  2.  2.  2.  2.  2.  2.  2.  2.  2.  2.

    Default: Clean Continental
    ! BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !
    ! OFRAC  = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.15 !
    ! VCNX   = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00 !


!END!


-------------------------------------------------------------------------------


INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
---------------

    Horizontal size of puff (m) beyond which
    time-dependent dispersion equations (Heffter)
    are used to determine sigma-y and
    sigma-z (SYTDEP)                 Default: 550.   ! SYTDEP = 5.5E02 !

    Switch for using Heffter equation for sigma z
    as above (0 = Not use Heffter; 1 = use Heffter
```

```
(MHFTSZ)                        Default: 0      ! MHFTSZ =  0  !

Stability class used to determine plume
growth rates for puffs above the boundary
layer (JSUP)                    Default: 5      ! JSUP =  5  !

Vertical dispersion constant for stable
conditions (k1 in Eqn. 2.7-3)  (CONK1)    Default: 0.01    ! CONK1 = .01 !

Vertical dispersion constant for neutral/
unstable conditions (k2 in Eqn. 2.7-4)
(CONK2)                         Default: 0.1    ! CONK2 = .1 !

Factor for determining Transition-point from
Schulman-Scire to Huber-Snyder Building Downwash
scheme (SS used for Hs < Hb + TBD * HL)
(TBD)                           Default: 0.5    ! TBD = .5 !
  TBD < 0   ==> always use Huber-Snyder
  TBD = 1.5 ==> always use Schulman-Scire
  TBD = 0.5 ==> ISC Transition-point

Range of land use categories for which
urban dispersion is assumed
(IURB1, IURB2)                  Default: 10     ! IURB1 =  10  !
                                19     ! IURB2 =  19  !

Site characterization parameters for single-point Met data files ---------
(needed for METFM = 2,3,4)

  Land use category for modeling domain
  (ILANDUIN)                    Default: 20     ! ILANDUIN =  20  !

  Roughness length (m) for modeling domain
  (Z0IN)                        Default: 0.25   ! Z0IN = .25 !

  Leaf area index for modeling domain
  (XLAIIN)                      Default: 3.0    ! XLAIIN = 3.0 !

  Elevation above sea level (m)
  (ELEVIN)                      Default: 0.0    ! ELEVIN = .0 !

  Latitude (degrees) for met location
  (XLATIN)                      Default: -999.  ! XLATIN = -999.0 !

  Longitude (degrees) for met location
  (XLONIN)                      Default: -999.  ! XLONIN = -999.0 !

Specialized information for interpreting single-point Met data files -----

  Anemometer height (m) (Used only if METFM = 2,3)
  (ANEMHT)                      Default: 10.    ! ANEMHT = 10.0 !

  Form of lateral turbulance data in PROFILE.DAT file
  (Used only if METFM = 4 or MTURBVW = 1 or 3)
  (ISIGMAV)                     Default: 1      ! ISIGMAV =  1  !
     0 = read sigma-theta
     1 = read sigma-v

  Choice of mixing heights (Used only if METFM = 4)
  (IMIXCTDM)                    Default: 0      ! IMIXCTDM =  0  !
     0 = read PREDICTED mixing heights
     1 = read OBSERVED mixing heights

Maximum length of a slug (met. grid units)
(XMXLEN)                        Default: 1.0    ! XMXLEN = 1.0 !

Maximum travel distance of a puff/slug (in
grid units) during one sampling step
(XSAMLEN)                       Default: 1.0    ! XSAMLEN = 1.0 !

Maximum Number of slugs/puffs release from
one source during one time step
(MXNEW)                         Default: 99     ! MXNEW =  99  !

Maximum Number of sampling steps for
one puff/slug during one time step
(MXSAM)                         Default: 99     ! MXSAM =  99  !
```

```
Number of iterations used when computing
the transport wind for a sampling step
that includes gradual rise (for CALMET
and PROFILE winds)
(NCOUNT)                      Default: 2     ! NCOUNT = 2  !

Minimum sigma y for a new puff/slug (m)
(SYMIN)                       Default: 1.0   ! SYMIN = 1.0  !

Minimum sigma z for a new puff/slug (m)
(SZMIN)                       Default: 1.0   ! SZMIN = 1.0  !

Default minimum turbulence velocities
sigma-v and sigma-w for each
stability class (m/s)
(SVMIN(6) and SWMIN(6))   Default SVMIN : .50,  .50,  .50,  .50,  .50,  .50
                          Default SWMIN : .20,  .12,  .08,  .06,  .03,  .016

                Stability Class :  A    B    C    D    E    F
                                  ---  ---  ---  ---  ---  ---
                    ! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500!
                    ! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016!

Divergence criterion for dw/dz across puff
used to initiate adjustment for horizontal
convergence (1/s)
Partial adjustment starts at CDIV(1), and
full adjustment is reached at CDIV(2)
(CDIV(2))                     Default: 0.0,0.0  ! CDIV = .0, .0 !

Minimum wind speed (m/s) allowed for
non-calm conditions. Also used as minimum
speed returned when using power-law
extrapolation toward surface
(WSCALM)                      Default: 0.5    ! WSCALM = .5 !

Maximum mixing height (m)
(XMAXZI)                      Default: 3000.  ! XMAXZI = 3000.0 !

Minimum mixing height (m)
(XMINZI)                      Default: 50.    ! XMINZI = 50.0 !

Default wind speed classes --
5 upper bounds (m/s) are entered;
the 6th class has no upper limit
(WSCAT(5))              Default   :
                   ISC RURAL : 1.54, 3.09, 5.14, 8.23, 10.8 (10.8+)

               Wind Speed Class :  1    2    3    4    5
                                  ---  ---  ---  ---  ---
                    ! WSCAT = 1.54, 3.09, 5.14, 8.23, 10.80 !

Default wind speed profile power-law
exponents for stabilities 1-6
(PLX0(6))               Default   : ISC RURAL values
                   ISC RURAL : .07, .07, .10, .15, .35, .55
                   ISC URBAN : .15, .15, .20, .25, .30, .30

                Stability Class :  A    B    C    D    E    F
                                  ---  ---  ---  ---  ---  ---
                    ! PLX0 = 0.07, 0.07, 0.10, 0.15, 0.35, 0.55 !

Default potential temperature gradient
for stable classes E, F (degK/m)
(PTG0(2))               Default: 0.020, 0.035
                    ! PTG0 = 0.020,  0.035 !

Default plume path coefficients for
each stability class (used when option
for partial plume height terrain adjustment
is selected -- MCTADJ=3)
(PPC(6))             Stability Class :  A    B    C    D    E    F
                     Default  PPC : .50,  .50,  .50,  .50,  .35,  .35
                                    ---  ---  ---  ---  ---  ---
                    !  PPC = 0.50, 0.50, 0.50, 0.50, 0.35, 0.35 !

Slug-to-puff transition criterion factor
equal to sigma-y/length of slug
```

(SL2PF) Default: 10. ! SL2PF = 10.0 !

Puff-splitting control variables ------------------------

VERTICAL SPLIT

Number of puffs that result every time a puff
is split - nsplit=2 means that 1 puff splits
into 2
(NSPLIT) Default: 3 ! NSPLIT = 3 !

Time(s) of a day when split puffs are eligible to
be split once again; this is typically set once
per day, around sunset before nocturnal shear develops.
24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
0=do not re-split 1=eligible for re-split
(IRESPLIT(24)) Default: Hour 17 = 1
! IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

Split is allowed only if last hour's mixing
height (m) exceeds a minimum value
(ZISPLIT) Default: 100. ! ZISPLIT = 100.0 !

Split is allowed only if ratio of last hour's
mixing ht to the maximum mixing ht experienced
by the puff is less than a maximum value (this
postpones a split until a nocturnal layer develops)
(ROLDMAX) Default: 0.25 ! ROLDMAX = 0.25 !

HORIZONTAL SPLIT

Number of puffs that result every time a puff
is split - nsplith=5 means that 1 puff splits
into 5
(NSPLITH) Default: 5 ! NSPLITH = 5 !

Minimum sigma-y (Grid Cells Units) of puff
before it may be split
(SYSPLITH) Default: 1.0 ! SYSPLITH = 1.0 !

Minimum puff elongation rate (SYSPLITH/hr) due to
wind shear, before it may be split
(SHSPLITH) Default: 2. ! SHSPLITH = 2.0 !

Minimum concentration (g/m^3) of each
species in puff before it may be split
Enter array of NSPEC values; if a single value is
entered, it will be used for ALL species
(CNSPLITH) Default: 1.0E-07 ! CNSPLITH = 1.0E-07 !

Integration control variables ------------------------

Fractional convergence criterion for numerical SLUG
sampling integration
(EPSSLUG) Default: 1.0e-04 ! EPSSLUG = 1.0E-04 !

Fractional convergence criterion for numerical AREA
source integration
(EPSAREA) Default: 1.0e-06 ! EPSAREA = 1.0E-06 !

Trajectory step-length (m) used for numerical rise
integration
(DSRISE) Default: 1.0 ! DSRISE = 1.0 !

Boundary Condition (BC) Puff control variables ------------------------

Minimum height (m) to which BC puffs are mixed as they are emitted
(MBCON=2 ONLY). Actual height is reset to the current mixing height
at the release point if greater than this minimum.
(HTMINBC) Default: 500. ! HTMINBC = 500. !

Search radius (km) about a receptor for sampling nearest BC puff.
BC puffs are typically emitted with a spacing of one grid cell
length, so the search radius should be greater than DGRIDKM.
(RSAMPBC) Default: 10. ! RSAMPBC = 10. !

```
     Near-Surface depletion adjustment to concentration profile used when
     sampling BC puffs?
     (MDEPBC)                    Default:  1      ! MDEPBC = 1. !
        0 = Concentration is NOT adjusted for depletion
        1 = Adjust Concentration for depletion

!END!


-------------------------------------------------------------------------------


INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters
--------------------------------

---------------
Subgroup (13a)
---------------

     Number of point sources with
     parameters provided below      (NPT1)  No default  !  NPT1 =  51 !

     Units used for point source
     emissions below              (IPTU)  Default: 1  !  IPTU =   1  !
          1 =        g/s
          2 =        kg/hr
          3 =        lb/hr
          4 =      tons/yr
          5 =      Odour Unit * m**3/s  (vol. flux of odour compound)
          6 =      Odour Unit * m**3/min
          7 =      metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (13d)       (NSPT1) Default: 0  !  NSPT1 = 0  !

     Number of point sources with
     variable emission parameters
     provided in external file      (NPT2)  No default  !  NPT2 =  0  !

     (If NPT2 > 0, these point
     source emissions are read from
     the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------
                                     a
          POINT SOURCE: CONSTANT DATA
          -----------------------------
                                                          b        c
 Source     X UTM     Y UTM     Stack  Base     Stack   Exit  Exit    Bldg.  Emission
  No.    Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.   Dwash   Rates
           (km)       (km)       (m)      (m)       (m)  (m/s) (deg. K)
 ------  ---------- ---------- ------  ------   -------- ----- -------- ----- --------
Subgroup (13b)


GP PALATKA FUTURE SOURCES,
     1  ! SRCNAM = SDT4       !
     1  ! X =   433.9347,  3283.4775,   62.80,    4.00,    1.52,   10.35,  355.0, 1.0,    0.970 !  !END!
     2  ! SRCNAM = PB524      !
     2  ! X =   433.9773,  3283.4470,   72.20,    4.00,    2.44,   26.19,  485.0, 1.0,  184.2 !  !END!
     3  ! SRCNAM = CB4        !
     3  ! X =   433.9825,  3283.4504,   72.20,    4.00,    2.44,   28.14,  514.0, 1.0,  121.1 !  !END!
     4  ! SRCNAM = PB7        !
     4  ! X =   433.9862,  3283.4661,   18.30,    4.00,    2.13,   13.25,  672.0, 1.0,    0.189E-01 !  !END!
     5  ! SRCNAM = LK4        !
     5  ! X =   434.1067,  3283.2471,   39.90,    5.00,    1.35,   21.51,  346.5, 0.0,    4.35 !  !END!
     6  ! SRCNAM = TM5P       !
     6  ! X =   434.2864,  3283.4399,   28.65,    4.00,    1.29,   23.50,  505.4, 1.0,    0.378E-02 !  !END!
     8  ! SRCNAM = RB4_24HR  !
     8  ! X =   433.8823,  3283.4380,   70.10,    4.00,    3.66,   20.08,  491.0, 1.0,   13.84 !  !END!
     8  ! SRCNAM = TOX  !
```

```
   8 ! X =  433.9816, 3283.3801,  76.20,   4.00,   1.10,   5.49, 344.0, 1.0,   3.94 !  !END!

COMPETING SOURCES - AMERISTEEL
   9 ! SRCNAM = EAFBH1    !
   9 ! X =  405.7080, 3350.0061,  33.53,  26.20,   3.66,  16.84, 383.2, 1.0,   2.020 !  !END!
  10 ! SRCNAM = EAFBH2    !
  10 ! X =  405.7150, 3349.9919,  33.53,  26.20,   3.66,  16.84, 383.2, 1.0,   2.020 !  !END!
  11 ! SRCNAM = REHEATN   !
  11 ! X =  405.8110, 3350.3240,  20.12,  26.20,   1.77,  13.72, 522.0, 1.0,   0.200E-01 !  !END!

OTHER COMPETING SOURCES
OTHER FUTURE SOURCES FROM DEP 1/11/02 FILE (7_3_12_99.DAT)
UPDATED G-P 2004/2005
UPDATED THROUGH GERDAU-AMERISTEEL

BRANDY BRANCH
  12 ! SRCNAM = S123NG    !
  12 ! X =  408.8350, 3354.4910,  57.91,  25.00,   5.49,  21.28, 403.0, 0.0,  12.36 !  !END!
  15 ! SRCNAM = SFP       !
  15 ! X =  408.8930, 3354.5359,   7.32,  25.00,   0.15,  60.02, 616.0, 0.0,   0.400E-02 !  !END!

MILENNIUM SPECIALTY CHEMICAL
  16 ! SRCNAM = BOILER4   !
  16 ! X =  436.7900, 3360.7400,  12.20,   5.00,   1.10,  14.02, 405.0, 0.0,  25.200 !  !END!
  17 ! SRCNAM = BOILER5   !
  17 ! X =  436.7900, 3360.7400,  38.10,   5.00,   1.16,  23.29, 450.0, 0.0,  24.320 !  !END!
  18 ! SRCNAM = BOILER6   !
  18 ! X =  436.7900, 3360.7400,  38.10,   5.00,   1.55,  22.71, 450.0, 0.0,  30.520 !  !END!
  19 ! SRCNAM = BOILER7   !
  19 ! X =  436.7900, 3360.7400,  38.10,   5.00,   1.55,  22.71, 450.0, 0.0,  10.330 !  !END!

JEFFERSON SMURFIT CORP JACKSONVILLE
  20 ! SRCNAM = CMILL1    !
  20 ! X =  439.9000, 3359.3000,  53.40,   2.00,   3.20,  22.90, 410.0, 0.0,  36.780 !  !END!
  21 ! SRCNAM = CMILL2    !
  21 ! X =  439.9000, 3359.3000,  61.00,   2.00,   3.00,  10.70, 335.0, 0.0,  25.650 !  !END!
  22 ! SRCNAM = CMILL3    !
  22 ! X =  439.9000, 3359.3000,  64.00,   2.00,   1.40,  11.00, 346.0, 0.0,   1.310 !  !END!

ANHEISER BUSCH
  23 ! SRCNAM = BLR1234   !
  23 ! X =  440.5800, 3359.3000,  30.48,   1.00,   1.10,  16.15, 488.7, 0.0,  23.200 !  !END!
  27 ! SRCNAM = SOLAR     !
  27 ! X =  440.5800, 3359.3000,  30.48,   1.00,   1.77,  19.51, 413.0, 0.0,   4.730 !  !END!

CEDAR BAY
  28 ! SRCNAM = CCBAY123  !
  28 ! X =  441.6100, 3365.5400, 122.90,   1.00,   4.10,  36.60, 327.0, 0.0,  96.51  !  !END!
  31 ! SRCNAM = CCBAY45   !
  31 ! X =  441.6100, 3365.5400,  19.20,   1.00,   1.30,  28.40, 301.0, 0.0,   0.600E-01 !  !END!

JEA NORTHSIDE
  33 ! SRCNAM = CJEAN12   !
  33 ! X =  446.6700, 3365.0701, 151.00,   2.00,   4.57,  19.20, 330.9, 0.0, 139.100 !  !END!

RAYONIER, INC
  35 ! SRCNAM = CRAY1     !
  35 ! X =  454.7000, 3392.2000,  54.90,   2.00,   3.00,   9.80, 336.0, 0.0,  53.210 !  !END!
  36 ! SRCNAM = CRAY2     !
  36 ! X =  454.7000, 3392.2000,  54.90,   2.00,   3.00,   9.80, 336.0, 0.0,  50.560 !  !END!
  37 ! SRCNAM = CRAY3     !
  37 ! X =  454.7000, 3392.2000,  54.90,   2.00,   3.00,   9.80, 329.0, 0.0,  55.510 !  !END!

GILMAN PAPER
  38 ! SRCNAM = CPAPER1   !
  38 ! X =  448.2000, 3401.3000,  83.80,   3.00,   4.30,   2.80, 450.0, 0.0,  87.360 !  !END!
  39 ! SRCNAM = CPAPER2   !
  39 ! X =  448.2000, 3401.3000,  45.70,   3.00,   3.10,   7.80, 326.0, 0.0,  88.820 !  !END!
  40 ! SRCNAM = CPAPER3   !
  40 ! X =  448.2000, 3401.3000,  54.90,   3.00,   2.10,  16.80, 425.0, 0.0,  15.200 !  !END!
  41 ! SRCNAM = CPAPER4   !
  41 ! X =  448.2000, 3401.3000,  76.20,   3.00,   2.60,  12.20, 411.0, 0.0,  15.810 !  !END!
  42 ! SRCNAM = CPAPER5   !
  42 ! X =  448.2000, 3401.3000,  30.50,   3.00,   1.50,  11.60, 350.0, 0.0,   2.130 !  !END!

JEFFERSON SMURFIT CORP FERNANDINA BEACH
  43 ! SRCNAM = CBMILL1   !
```

```
    43 ! X =  456.2000, 3394.2000,  78.40,   6.00,   3.40,  15.20, 454.0, 0.0, 190.570 !  !END!
    44 ! SRCNAM = CBMILL2  !
    44 ! X =  456.2000, 3394.2000,  80.80,   6.00,   3.50,  18.60, 493.0, 0.0,  40.460 !  !END!
    45 ! SRCNAM = CBMILL3  !
    45 ! X =  456.2000, 3394.2000,  88.10,   6.00,   3.90,  18.90, 484.0, 0.0,  45.120 !  !END!
    46 ! SRCNAM = CBMILL4  !
    46 ! X =  456.2000, 3394.2000, 103.70,   6.00,   4.50,  12.80, 441.0, 0.0, 154.510 !  !END!
    47 ! SRCNAM = CBMILL5  !
    47 ! X =  456.2000, 3394.2000,  22.90,   6.00,   1.70,  16.80, 436.0, 0.0,   3.370 !  !END!

GRU DEERHAVEN
    49 ! SRCNAM = GRUDH2   !
    49 ! X =  365.7000, 3292.6001, 106.68,  57.00,   5.64,  15.24, 408.1, 0.0, 367.160 !  !END!
    50 ! SRCNAM = GRUDHCC   !
    50 ! X =  365.5000, 3292.6001,  15.85,  57.00,   4.30,  51.21, 866.5, 0.0,   6.680 !  !END!

PCS- CLEVE HOLLADAY FDEP 4/2/04
    59 ! SRCNAM = SULACC&D  !
    59 ! X =  328.3000, 3368.8000,  45.70,  24.00,   1.59,  28.70, 356.0, 0.0,  96.600 !  !END!
    60 ! SRCNAM = SULACE&F  !
    60 ! X =  328.3000, 3368.8000,  61.00,  24.00,   2.90,   9.30, 356.0, 0.0, 105.000 !  !END!
    61 ! SRCNAM = AUXBLRE   !
    61 ! X =  328.3000, 3368.8000,  15.30,  24.00,   1.60,  15.90, 428.0, 0.0,  21.500 !  !END!
    62 ! SRCNAM = AUXBLRB   !
    62 ! X =  328.3000, 3368.8000,  10.70,  24.00,   1.46,   9.50, 468.0, 0.0,  22.000 !  !END!
    63 ! SRCNAM = AUXBLRC&D  !
    63 ! X =  328.3000, 3368.8000,  31.70,  24.00,   1.98,  15.20, 468.0, 0.0,  41.880 !  !END!
    64 ! SRCNAM = DAP2ZTR   !
    64 ! X =  328.3000, 3368.8000,  42.70,  24.00,   2.44,  13.10, 325.0, 0.0,   0.690 !  !END!

FPL PUTNAM  ACTUAL EMISSIONS (CT AT 0.5%S, DB ON GAS) (AT MAX.= 175.85 G/S; NEED TO RE-PERMIT FOR HIGHER LIMIT)
2 OF FPL PUTNAM'S 4 CTS CONSUME PSD INCREMENT
   110 ! SRCNAM = CFPLPUTM  !
   110 ! X =  443.3000, 3277.6001,  22.30,   0.00,   3.15,  58.60, 437.4, 0.0, 116.600 !  !END!

STONE CONTAINER CORP
    66 ! SRCNAM = CS123     !
    66 ! X =  443.0000, 3365.3999,  61.00,   3.00,   2.40,   5.20, 439.0, 0.0,   2.100 !  !END!

AMERICAN SUWANNEE CEMENT- CLEVE HOLLADAY FDEP 4/2/04
   210 ! SRCNAM = AMSUWCEM  !
   210 ! X =  321.4000, 3315.9000,  96.00,   0.00,   2.90,  14.10, 369.3, 0.0,   3.58  !  !END!

FLORIDA ROCK CEMENT- CLEVE HOLLADAY FDEP 4/2/04
   211 ! SRCNAM = FLROCCEM  !
   211 ! X =  348.3500, 3287.0400,  76.20,   0.00,   2.90,  14.60, 453.2, 0.0,   2.23  !  !END!

SJRPP
BASED ON 0.76 LB/MMBTU X 6144 MMBTU/HR = 4669.4 LB/HR (589 G/S)
     8 ! SRCNAM = CRIVER12  !
     8 ! X =  447.0800, 3366.6599, 195.10,   0.00,   6.79,  27.40, 342.0, 0.0, 1178.000 !  !END!
```

a
Data for each source are treated as a separate input subgroup
and therefore must end with an input group terminator.

SRCNAM is a 12-character name for a source
(No default)
X is an array holding the source data listed by the column headings
(No default)
SIGYZI is an array holding the initial sigma-y and sigma-z (m)
(Default: 0.,0.)
FMFAC is a vertical momentum flux factor (0. or 1.0) used to represent
the effect of rain-caps or other physical configurations that
reduce momentum rise associated with the actual exit velocity.
(Default: 1.0 -- full momentum used)

b
0. = No building downwash modeled, 1. = downwash modeled
NOTE: must be entered as a REAL number (i.e., with decimal point)

c
An emission rate must be entered for every pollutant modeled.
Enter emission rate of zero for secondary pollutants that are
modeled, but not emitted. Units are specified by IPTU
(e.g. 1 for g/s).

```
Subgroup (13c)
---------------

        BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH
        -------------------------------------------------------
Source                                               a
 No.    Effective building width and height (in meters) every 10 degrees
------  ----------------------------------------------------------------
    1 ! SRCNAM = SDT4      !
    1 !  HEIGHT =  59.00,  59.00,  59.00,  59.00,  59.00,  59.00,
             59.00,  59.00,  59.00,  59.00,  59.00,  59.00,
             59.00,  59.00,  59.00,  59.00,  59.00,  59.00,
             59.00,  59.00,  59.00,  59.00,  59.00,  59.00,
             59.00,  59.00,  59.00,  59.00,  59.00,  59.00,
             59.00,  59.00,  59.00,  59.00,  59.00,  59.00 !
    1 !  WIDTH =  41.78,  40.62,  38.23,  34.68,  30.07,  30.13,
             34.74,  38.30,  40.69,  41.85,  41.73,  40.35,
             37.74,  33.98,  33.94,  37.69,  40.29,  41.67,
             41.78,  40.62,  38.23,  34.68,  30.07,  30.13,
             34.74,  38.30,  40.69,  41.85,  41.73,  40.35,
             37.74,  33.98,  33.94,  37.69,  40.29,  41.67 !

!END!

    2 ! SRCNAM = PB524     !
    2 !  HEIGHT =  32.80,  32.80,  32.80,  32.80,   0.00,   0.00,
             25.90,  59.00,  59.00,  59.00,  59.00,  59.00,
             59.00,  59.00,  59.00,  32.80,  32.80,  32.80,
             32.80,  32.80,  32.80,  32.80,  21.70,  21.70,
             25.90,  59.00,  59.00,  59.00,  59.00,  59.00,
             59.00,  59.00,  59.00,  32.80,  32.80,  32.80 !
    2 !  WIDTH =  41.59,  40.61,  38.40,  35.01,   0.00,   0.00,
             40.77,  38.30,  40.69,  41.85,  41.73,  40.35,
             37.74,  33.98,  33.94,  37.03,  39.77,  41.31,
             41.59,  40.61,  38.40,  35.01, 129.71, 129.67,
             46.68,  38.30,  40.69,  41.85,  41.73,  40.35,
             37.74,  33.98,  33.94,  37.03,  39.77,  41.31 !

!END!
    3 ! SRCNAM = CB4       !
    3 !  HEIGHT =  32.80,  32.80,  32.80,  32.80,   0.00,   0.00,
             25.90,  59.00,  59.00,  59.00,  59.00,  59.00,
             59.00,  59.00,  32.80,  32.80,  32.80,  32.80,
             32.80,  32.80,  32.80,  32.80,  21.70,  21.70,
             25.90,  59.00,  59.00,  59.00,  59.00,  59.00,
             59.00,  59.00,  32.80,  32.80,  32.80,  32.80 !
    3 !  WIDTH =  41.59,  40.61,  38.40,  35.01,   0.00,   0.00,
             40.77,  38.30,  40.69,  41.85,  41.73,  40.35,
             37.74,  33.98,  33.16,  37.03,  39.77,  41.31,
             41.59,  40.61,  38.40,  35.01, 129.71, 129.67,
             46.68,  38.30,  40.69,  41.85,  41.73,  40.35,
             37.74,  33.98,  33.16,  37.03,  39.77,  41.31 !

!END!
    4 ! SRCNAM = PB7       !
    4 !  HEIGHT =  32.80,  32.80,  32.80,  32.80,  32.80,  32.80,
             59.00,  59.00,  59.00,  59.00,  59.00,  59.00,
             59.00,  32.80,  32.80,  32.80,  32.80,  32.80,
             32.80,  32.80,  32.80,  32.80,  32.80,  32.80,
             59.00,  59.00,  59.00,  59.00,  59.00,  59.00,
             59.00,  32.80,  32.80,  32.80,  32.80,  32.80 !
    4 !  WIDTH =  41.59,  40.61,  38.40,  35.01,  45.43,  37.98,
             34.74,  38.30,  40.69,  41.85,  41.73,  40.35,
             37.74,  33.14,  33.16,  37.03,  39.77,  41.31,
             41.59,  40.61,  38.40,  35.01,  45.43,  37.98,
             34.74,  38.30,  40.69,  41.85,  41.73,  40.35,
             37.74,  33.14,  33.16,  37.03,  39.77,  41.31 !

!END!
    6 ! SRCNAM = TM5P      !
    6 !  HEIGHT =  25.60,  25.80,  25.80,  25.80,  25.80,  25.80,
             25.80,  25.80,  25.80,  25.80,  25.80,  25.80,
             25.80,  21.50,  25.60,  25.60,  25.60,  25.60,
             25.60,  25.80,  25.80,  25.80,  25.80,  25.80,
             25.80,  25.80,  25.80,  25.80,  25.80,  25.80,
             25.80,  21.50,  25.60,  25.60,  25.60,  25.60 !
    6 !  WIDTH = 109.53,  99.16,  99.34,  96.50,  90.73,  93.59,
             98.74, 100.89,  99.98,  96.03,  89.16,  79.58,
```

```
          67.58,  35.09,  72.38,  85.89,  96.79, 104.75,
         109.53,  99.16,  99.34,  96.50,  90.73,  93.59,
          98.74, 100.89,  99.98,  96.03,  89.16,  79.58,
          67.58,  35.09,  72.38,  85.89,  96.79, 104.75 !

!END!
   8 ! SRCNAM = RB4_24HR  !
   8 ! HEIGHT = 59.00, 59.00, 59.00, 59.00, 59.00, 59.00,
          59.00, 59.00, 59.00, 59.00, 25.90, 25.90,
          25.90,  0.00,  0.00, 25.90, 25.90, 25.90,
          59.00, 59.00, 59.00, 59.00, 59.00, 59.00,
          59.00, 59.00, 59.00, 59.00, 25.90, 25.90,
          25.90,  0.00,  0.00, 25.90, 25.90, 25.90 !
   8 ! WIDTH =  36.42, 36.42, 36.42, 34.68, 30.07, 30.13,
          34.74, 36.42, 36.42, 36.42, 35.93, 31.81,
          26.72,  0.00,  0.00, 26.73, 31.82, 35.95,
          36.42, 36.42, 36.42, 34.68, 30.07, 30.13,
          34.74, 36.42, 36.42, 36.42, 35.93, 31.81,
          26.72,  0.00,  0.00, 26.73, 31.82, 35.95 !

!END!

     ! SRCNAM = TOX      !
     ! HEIGHT = 32.80,  0.00,  0.00,  0.00,  0.00,  0.00,
           0.00,  0.00,  0.00,  0.00,  0.00, 25.90,
          59.00, 59.00, 59.00, 59.00, 59.00, 32.80,
          32.80,  0.00,  0.00,  0.00,  0.00,  0.00,
           0.00,  0.00,  0.00,  0.00,  0.00, 25.90,
          32.80,  0.00,  0.00,  0.00, 59.00,  0.00 !
     ! WIDTH =  79.87,  0.00,  0.00,  0.00,  0.00,  0.00,
           0.00,  0.00,  0.00,  0.00,  0.00, 98.04,
          37.54, 33.95, 33.95, 37.54, 37.54, 82.94,
          79.87,  0.00,  0.00,  0.00,  0.00,  0.00,
           0.00,  0.00,  0.00,  0.00,  0.00, 98.04,
          75.60,  0.00,  0.00,  0.00, 37.54,  0.00 !

!END!



   9 ! SRCNAM = EAFBH1   !
   9 ! HEIGHT = 30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
          30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
          30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
          30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
          30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
          30.48, 30.48, 30.48, 30.48, 30.48, 30.48 !
   9 ! WIDTH =  56.66, 51.34, 44.46, 36.24, 26.91, 16.76,
          18.11, 28.16, 37.35, 45.41, 52.09, 57.18,
          60.54, 62.06, 61.69, 61.89, 62.01, 60.25,
          56.66, 51.34, 44.46, 36.24, 26.91, 16.76,
          18.11, 28.16, 37.35, 45.41, 52.09, 57.18,
          60.54, 62.06, 61.69, 61.89, 62.01, 60.25 !

!END!
   10 ! SRCNAM = EAFBH2   !
   10 ! HEIGHT = 30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
          30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
          30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
          30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
          30.48, 30.48, 30.48, 30.48, 30.48, 30.48,
          30.48, 30.48, 30.48, 30.48, 30.48, 30.48 !
   10 ! WIDTH =  56.66, 51.34, 44.46, 36.24, 26.91, 16.76,
          18.11, 28.16, 37.35, 45.41, 52.09, 57.18,
          60.54, 62.06, 61.69, 61.89, 62.01, 60.25,
          56.66, 51.34, 44.46, 36.24, 26.91, 16.76,
          18.11, 28.16, 37.35, 45.41, 52.09, 57.18,
          60.54, 62.06, 61.69, 61.89, 62.01, 60.25 !

!END!
   11 ! SRCNAM = REHEATN  !
   11 ! HEIGHT = 33.53, 33.53, 33.53, 33.53, 33.53, 33.53,
          15.24, 15.24, 15.24, 15.24, 15.24, 15.24,
          15.24, 15.24, 33.53, 33.53, 33.53, 15.24,
          15.24, 15.24, 15.24, 33.53, 33.53, 33.53,
          15.24, 15.24, 15.24, 15.24, 15.24, 15.24,
          15.24, 15.24, 33.53, 33.53, 33.53, 33.53 !
   11 ! WIDTH = 125.97, 127.78, 127.45, 123.24, 115.29, 103.84,
```

```
          35.17,  30.40,  24.70,  18.25,  23.04,  28.95,
          33.99,  38.00, 182.31, 201.13, 213.84,  41.80,
          39.55,  41.30,  42.63, 205.08, 187.92, 103.84,
          35.17,  30.40,  24.70,  18.25,  23.04,  28.95,
          33.99,  38.00,  55.32,  56.46,  55.88,  89.50 !

!END!


---------------
Subgroup (13d)
---------------
                                  a
     POINT SOURCE: VARIABLE EMISSIONS DATA
     ---------------------------------------

   Use this subgroup to describe temporal variations in the emission
   rates given in 13b.  Factors entered multiply the rates in 13b.
   Skip sources here that have constant emissions.  For more elaborate
   variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

   IVARY determines the type of variation, and is source-specific:
   (IVARY)                        Default: 0
       0 =     Constant
       1 =     Diurnal cycle (24 scaling factors: hours 1-24)
       2 =     Monthly cycle (12 scaling factors: months 1-12)
       3 =     Hour & Season (4 groups of 24 hourly scaling factors,
                      where first group is DEC-JAN-FEB)
       4 =     Speed & Stab. (6 groups of 6 scaling factors, where
                      first group is Stability Class A,
                      and the speed classes have upper
                      bounds (m/s) defined in Group 12
       5 =     Temperature   (12 scaling factors, where temperature
                      classes have upper bounds (C) of:
                      0, 5, 10, 15, 20, 25, 30, 35, 40,
                      45, 50, 50+)


--------
  a
  Data for each species are treated as a separate input subgroup
  and therefore must end with an input group terminator.


-------------------------------------------------------------------------------


INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters
--------------------------------

---------------
Subgroup (14a)
---------------

   Number of polygon area sources with
   parameters specified below (NAR1)       No default  !  NAR1 =  0   !

   Units used for area source
   emissions below          (IARU)      Default: 1  !  IARU =   1  !
       1 =      g/m**2/s
       2 =      kg/m**2/hr
       3 =      lb/m**2/hr
       4 =      tons/m**2/yr
       5 =      Odour Unit * m/s  (vol. flux/m**2 of odour compound)
       6 =      Odour Unit * m/min
       7 =      metric tons/m**2/yr

   Number of source-species
   combinations with variable
   emissions scaling factors
   provided below in (14d)        (NSAR1) Default: 0  !  NSAR1 =  0  !

   Number of buoyant polygon area sources
   with variable location and emission
   parameters (NAR2)                   No default  !  NAR2 =  0   !
   (If NAR2 > 0, ALL parameter data for
   these sources are read from the file: BAEMARB.DAT)
```

```
!END!

---------------
Subgroup (14b)
---------------
                                     a
     AREA SOURCE: CONSTANT DATA
     ----------------------------
                                                b
Source       Effect.   Base      Initial   Emission
 No.         Height  Elevation   Sigma z    Rates
              (m)      (m)        (m)
-------      ------   ------    --------  ---------


--------
  a
   Data for each source are treated as a separate input subgroup
   and therefore must end with an input group terminator.
  b
   An emission rate must be entered for every pollutant modeled.
   Enter emission rate of zero for secondary pollutants that are
   modeled, but not emitted.  Units are specified by IARU
   (e.g. 1 for g/m**2/s).

---------------
Subgroup (14c)
---------------

     COORDINATES (UTM-km) FOR EACH VERTEX(4) OF EACH POLYGON
     --------------------------------------------------------
Source                                                  a
 No.      Ordered list of X followed by list of Y, grouped by source
------   ------------------------------------------------------------


--------
  a
   Data for each source are treated as a separate input subgroup
   and therefore must end with an input group terminator.


---------------
Subgroup (14d)
---------------
                                          a
     AREA SOURCE: VARIABLE EMISSIONS DATA
     --------------------------------------

   Use this subgroup to describe temporal variations in the emission
   rates given in 14b.  Factors entered multiply the rates in 14b.
   Skip sources here that have constant emissions.  For more elaborate
   variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

   IVARY determines the type of variation, and is source-specific:
   (IVARY)                        Default: 0
        0 =     Constant
        1 =     Diurnal cycle (24 scaling factors: hours 1-24)
        2 =     Monthly cycle (12 scaling factors: months 1-12)
        3 =     Hour & Season (4 groups of 24 hourly scaling factors,
                          where first group is DEC-JAN-FEB)
        4 =     Speed & Stab. (6 groups of 6 scaling factors, where
                          first group is Stability Class A,
                          and the speed classes have upper
                          bounds (m/s) defined in Group 12
        5 =     Temperature  (12 scaling factors, where temperature
                          classes have upper bounds (C) of:
                          0, 5, 10, 15, 20, 25, 30, 35, 40,
                          45, 50, 50+)



--------
  a
   Data for each species are treated as a separate input subgroup
   and therefore must end with an input group terminator.
```

```
--------------------------------------------------------------------------------

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters
---------------------------

---------------
Subgroup (15a)
---------------

    Number of buoyant line sources
    with variable location and emission
    parameters (NLN2)                   No default  !  NLN2 =  0   !

    (If NLN2 > 0, ALL parameter data for
     these sources are read from the file: LNEMARB.DAT)

    Number of buoyant line sources (NLINES)      No default   ! NLINES =  0  !

    Units used for line source
    emissions below              (ILNU)        Default: 1  !  ILNU =   1  !
         1 =      g/s
         2 =     kg/hr
         3 =     lb/hr
         4 =    tons/yr
         5 =    Odour Unit * m**3/s  (vol. flux of odour compound)
         6 =    Odour Unit * m**3/min
         7 =    metric tons/yr

    Number of source-species
    combinations with variable
    emissions scaling factors
    provided below in (15c)       (NSLN1) Default: 0  !  NSLN1 =  0  !

    Maximum number of segments used to model
    each line (MXNSEG)                    Default: 7   ! MXNSEG =  7  !

    The following variables are required only if NLINES > 0.  They are
    used in the buoyant line source plume rise calculations.

      Number of distances at which             Default: 6   ! NLRISE =  6  !
      transitional rise is computed

      Average building length (XL)            No default    ! XL = .0 !
                                        (in meters)

      Average building height (HBL)           No default    ! HBL = .0 !
                                        (in meters)

      Average building width (WBL)            No default    ! WBL = .0 !
                                        (in meters)

      Average line source width (WML)         No default    ! WML = .0 !
                                        (in meters)

      Average separation between buildings (DXL)  No default   ! DXL = .0 !
                                        (in meters)

      Average buoyancy parameter (FPRIMEL)       No default   ! FPRIMEL = .0 !
                                        (in m**4/s**3)

!END!

---------------
Subgroup (15b)
---------------

        BUOYANT LINE SOURCE: CONSTANT DATA
        ----------------------------------
                                                            a
Source   Beg. X     Beg. Y     End. X   End. Y    Release   Base       Emission
 No.   Coordinate Coordinate Coordinate Coordinate Height  Elevation    Rates
         (km)       (km)       (km)      (km)      (m)       (m)
------  ---------- ---------- --------- ---------- -------  ---------   ---------

--------

  a
  Data for each source are treated as a separate input subgroup
```

```
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by ILNTU
     (e.g. 1 for g/s).

---------------
Subgroup (15c)
---------------
                              a
        BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA
        --------------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 15b.  Factors entered multiply the rates in 15b.
     Skip sources here that have constant emissions.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                     Default: 0
           0 =     Constant
           1 =     Diurnal cycle (24 scaling factors: hours 1-24)
           2 =     Monthly cycle (12 scaling factors: months 1-12)
           3 =     Hour & Season (4 groups of 24 hourly scaling factors,
                            where first group is DEC-JAN-FEB)
           4 =     Speed & Stab. (6 groups of 6 scaling factors, where
                            first group is Stability Class A,
                            and the speed classes have upper
                            bounds (m/s) defined in Group 12
           5 =     Temperature  (12 scaling factors, where temperature
                            classes have upper bounds (C) of:
                            0, 5, 10, 15, 20, 25, 30, 35, 40,
                            45, 50, 50+)



--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


-------------------------------------------------------------------------------


INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters
---------------------------

---------------
Subgroup (16a)
---------------

     Number of volume sources with
     parameters provided in 16b,c (NVL1)     No default  !  NVL1 =  0   !

     Units used for volume source
     emissions below in 16b       (IVLU)     Default: 1  !  IVLU =   3  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (16c)      (NSVL1)    Default: 0  !  NSVL1 =  0  !

     Number of volume sources with
     variable location and emission
     parameters                   (NVL2)     No default  !  NVL2 =   0  !

     (If NVL2 > 0, ALL parameter data for
      these sources are read from the VOLEMARB.DAT file(s) )
```

```
!END!

---------------
Subgroup (16b)
---------------
                            a
          VOLUME SOURCE: CONSTANT DATA
          ------------------------------
                                                                   b
     X UTM      Y UTM     Effect.   Base    Initial   Initial   Emission
   Coordinate Coordinate  Height  Elevation Sigma y   Sigma z     Rates
     (km)       (km)       (m)      (m)      (m)       (m)
   ---------- ----------  ------   ------   --------  --------  --------
                                                  SO2     SO4    NOX  HNO3  NO3  PM10   CO

--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IVLU
     (e.g. 1 for g/s).

---------------
Subgroup (16c)
---------------
                                 a
          VOLUME SOURCE: VARIABLE EMISSIONS DATA
          ---------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 16b.  Factors entered multiply the rates in 16b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                          Default: 0
          0 =      Constant
          1 =      Diurnal cycle (24 scaling factors: hours 1-24)
          2 =      Monthly cycle (12 scaling factors: months 1-12)
          3 =      Hour & Season (4 groups of 24 hourly scaling factors,
                            where first group is DEC-JAN-FEB)
          4 =      Speed & Stab. (6 groups of 6 scaling factors, where
                            first group is Stability Class A,
                            and the speed classes have upper
                            bounds (m/s) defined in Group 12
          5 =      Temperature   (12 scaling factors, where temperature
                            classes have upper bounds (C) of:
                            0, 5, 10, 15, 20, 25, 30, 35, 40,
                            45, 50, 50+)



--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


-------------------------------------------------------------------------------

INPUT GROUPS: 17a & 17b -- Non-gridded (discrete) receptor information
----------------------

---------------
Subgroup (17a)
---------------

     Number of non-gridded receptors (NREC)  No default  !  NREC = 180 !

!END!

---------------
Subgroup (17b)
---------------
```

a
NON-GRIDDED (DISCRETE) RECEPTOR DATA

```
              X UTM      Y UTM      Ground      Height  b
Receptor    Coordinate  Coordinate  Elevation  Above Ground
  No.         (km)        (km)        (m)         (m)
--------   ----------  ----------  ---------  ------------
```

RECEPTORS OBTAINED FROM THE NPS/FWS EXTRACTION PROGRAM
ALL RECEPTORS ARE UTM ZONE 17 (KM)

180 OKEFENOKEE NWA RECEPTORS REPRESENTING ALL NPS BOUNDARY RECEPTORS AND
AND INTERIOR RECEPTORS WITH GREATER SPACING

```
 1 ! X = 386.913, 3381.527, 36.000 ! !END!
 2 ! X = 388.530, 3383.358, 36.000 ! !END!
 3 ! X = 385.314, 3381.544, 36.000 ! !END!
 4 ! X = 386.932, 3383.374, 36.000 ! !END!
 5 ! X = 390.147, 3385.188, 36.000 ! !END!
 6 ! X = 385.334, 3383.391, 36.000 ! !END!
 7 ! X = 388.549, 3385.205, 36.000 ! !END!
 8 ! X = 383.736, 3383.408, 36.000 ! !END!
 9 ! X = 388.568, 3387.052, 36.000 ! !END!
10 ! X = 382.137, 3383.425, 36.000 ! !END!
11 ! X = 386.971, 3387.068, 37.000 ! !END!
12 ! X = 380.539, 3383.443, 36.000 ! !END!
13 ! X = 388.588, 3388.899, 36.000 ! !END!
14 ! X = 378.941, 3383.461, 36.000 ! !END!
15 ! X = 390.204, 3390.730, 36.000 ! !END!
16 ! X = 377.343, 3383.479, 37.000 ! !END!
17 ! X = 388.607, 3390.746, 36.000 ! !END!
18 ! X = 380.580, 3387.137, 36.000 ! !END!
19 ! X = 375.744, 3383.497, 36.000 ! !END!
20 ! X = 388.626, 3392.593, 36.000 ! !END!
21 ! X = 374.146, 3383.516, 36.000 ! !END!
22 ! X = 390.242, 3394.424, 36.000 ! !END!
23 ! X = 382.218, 3390.814, 36.000 ! !END!
24 ! X = 372.548, 3383.534, 36.000 ! !END!
25 ! X = 388.645, 3394.440, 36.000 ! !END!
26 ! X = 387.048, 3394.457, 36.000 ! !END!
27 ! X = 370.949, 3383.553, 30.000 ! !END!
28 ! X = 374.189, 3387.210, 36.000 ! !END!
29 ! X = 369.351, 3383.573, 27.000 ! !END!
30 ! X = 383.855, 3394.491, 36.000 ! !END!
31 ! X = 387.068, 3396.304, 36.000 ! !END!
32 ! X = 375.829, 3390.886, 37.000 ! !END!
33 ! X = 367.753, 3383.592, 27.000 ! !END!
34 ! X = 387.087, 3398.151, 36.000 ! !END!
35 ! X = 367.775, 3385.439, 30.000 ! !END!
36 ! X = 385.491, 3398.168, 36.000 ! !END!
37 ! X = 377.469, 3394.562, 36.000 ! !END!
38 ! X = 366.177, 3385.459, 27.000 ! !END!
39 ! X = 367.798, 3387.286, 32.000 ! !END!
40 ! X = 387.107, 3399.998, 36.000 ! !END!
41 ! X = 382.299, 3398.202, 36.000 ! !END!
42 ! X = 390.317, 3401.812, 36.000 ! !END!
43 ! X = 364.579, 3385.479, 27.000 ! !END!
44 ! X = 388.721, 3401.829, 36.000 ! !END!
45 ! X = 369.441, 3390.961, 36.000 ! !END!
46 ! X = 387.126, 3401.845, 36.000 ! !END!
47 ! X = 364.603, 3387.326, 30.000 ! !END!
48 ! X = 390.336, 3403.659, 36.000 ! !END!
49 ! X = 371.082, 3394.636, 36.000 ! !END!
50 ! X = 375.915, 3398.274, 36.000 ! !END!
51 ! X = 363.005, 3387.346, 27.000 ! !END!
52 ! X = 390.355, 3405.506, 36.000 ! !END!
53 ! X = 380.744, 3401.914, 36.000 ! !END!
54 ! X = 363.028, 3389.193, 27.000 ! !END!
55 ! X = 388.760, 3405.523, 36.000 ! !END!
56 ! X = 361.431, 3389.214, 27.000 ! !END!
57 ! X = 363.052, 3391.041, 38.000 ! !END!
58 ! X = 390.374, 3407.354, 37.000 ! !END!
59 ! X = 382.380, 3405.591, 36.000 ! !END!
60 ! X = 369.530, 3398.350, 36.000 ! !END!
61 ! X = 361.455, 3391.061, 33.000 ! !END!
62 ! X = 364.695, 3394.715, 38.000 ! !END!
63 ! X = 374.362, 3401.987, 36.000 ! !END!
```

```
64 ! X = 390.393, 3409.201, 36.000 ! !END!
65 ! X = 361.478, 3392.908, 38.000 ! !END!
66 ! X = 363.099, 3394.735, 38.000 ! !END!
67 ! X = 387.204, 3409.234, 36.000 ! !END!
68 ! X = 390.412, 3411.048, 36.000 ! !END!
69 ! X = 361.502, 3394.755, 37.000 ! !END!
70 ! X = 376.000, 3405.663, 36.000 ! !END!
71 ! X = 363.122, 3396.582, 37.000 ! !END!
72 ! X = 380.826, 3409.303, 36.000 ! !END!
73 ! X = 367.980, 3402.064, 36.000 ! !END!
74 ! X = 363.146, 3398.429, 36.000 ! !END!
75 ! X = 390.430, 3412.895, 36.000 ! !END!
76 ! X = 388.837, 3412.912, 36.000 ! !END!
77 ! X = 361.550, 3398.450, 37.000 ! !END!
78 ! X = 368.002, 3403.911, 36.000 ! !END!
79 ! X = 363.169, 3400.277, 36.000 ! !END!
80 ! X = 364.788, 3402.104, 36.000 ! !END!
81 ! X = 369.620, 3405.739, 37.000 ! !END!
82 ! X = 390.449, 3414.742, 36.000 ! !END!
83 ! X = 366.407, 3403.931, 36.000 ! !END!
84 ! X = 374.448, 3409.376, 36.000 ! !END!
85 ! X = 382.461, 3412.980, 36.000 ! !END!
86 ! X = 363.193, 3402.124, 36.000 ! !END!
87 ! X = 368.025, 3405.758, 36.000 ! !END!
88 ! X = 364.812, 3403.951, 36.000 ! !END!
89 ! X = 369.643, 3407.586, 36.000 ! !END!
90 ! X = 390.468, 3416.589, 36.000 ! !END!
91 ! X = 363.216, 3403.971, 36.000 ! !END!
92 ! X = 368.048, 3407.606, 37.000 ! !END!
93 ! X = 387.282, 3416.623, 36.000 ! !END!
94 ! X = 369.665, 3409.433, 36.000 ! !END!
95 ! X = 376.086, 3413.052, 36.000 ! !END!
96 ! X = 390.487, 3418.437, 36.000 ! !END!
97 ! X = 369.688, 3411.280, 36.000 ! !END!
98 ! X = 380.909, 3416.692, 36.000 ! !END!
99 ! X = 390.506, 3420.284, 36.000 ! !END!
100 ! X = 388.914, 3420.300, 36.000 ! !END!
101 ! X = 369.710, 3413.128, 36.000 ! !END!
102 ! X = 368.116, 3413.147, 36.000 ! !END!
103 ! X = 374.535, 3416.765, 36.000 ! !END!
104 ! X = 390.525, 3422.131, 36.000 ! !END!
105 ! X = 361.693, 3409.533, 27.000 ! !END!
106 ! X = 382.543, 3420.369, 36.000 ! !END!
107 ! X = 366.522, 3413.167, 36.000 ! !END!
108 ! X = 360.098, 3409.554, 32.000 ! !END!
109 ! X = 364.928, 3413.187, 30.000 ! !END!
110 ! X = 390.544, 3423.978, 36.000 ! !END!
111 ! X = 361.717, 3411.381, 30.000 ! !END!
112 ! X = 376.171, 3420.441, 36.000 ! !END!
113 ! X = 360.122, 3411.401, 29.000 ! !END!
114 ! X = 368.162, 3416.842, 36.000 ! !END!
115 ! X = 364.952, 3415.034, 31.000 ! !END!
116 ! X = 361.741, 3413.228, 33.000 ! !END!
117 ! X = 384.176, 3424.045, 36.000 ! !END!
118 ! X = 390.563, 3425.825, 36.000 ! !END!
119 ! X = 358.528, 3411.422, 34.000 ! !END!
120 ! X = 363.358, 3415.055, 31.000 ! !END!
121 ! X = 360.147, 3413.249, 33.000 ! !END!
122 ! X = 356.934, 3411.444, 36.000 ! !END!
123 ! X = 361.764, 3415.075, 33.000 ! !END!
124 ! X = 390.582, 3427.672, 37.000 ! !END!
125 ! X = 369.800, 3420.517, 36.000 ! !END!
126 ! X = 377.807, 3424.117, 36.000 ! !END!
127 ! X = 388.991, 3427.689, 36.000 ! !END!
128 ! X = 355.340, 3411.465, 36.000 ! !END!
129 ! X = 387.399, 3427.706, 36.000 ! !END!
130 ! X = 356.959, 3413.291, 32.000 ! !END!
131 ! X = 361.788, 3416.922, 33.000 ! !END!
132 ! X = 353.746, 3411.487, 36.000 ! !END!
133 ! X = 382.624, 3427.757, 36.000 ! !END!
134 ! X = 352.151, 3411.509, 36.000 ! !END!
135 ! X = 387.419, 3429.553, 36.000 ! !END!
136 ! X = 371.438, 3424.192, 36.000 ! !END!
137 ! X = 353.771, 3413.334, 36.000 ! !END!
138 ! X = 385.827, 3429.570, 36.000 ! !END!
139 ! X = 363.429, 3420.596, 29.000 ! !END!
140 ! X = 384.236, 3429.587, 36.000 ! !END!
141 ! X = 352.177, 3413.356, 36.000 ! !END!
```

```
142 ! X = 376.257, 3427.830, 36.000 ! !END!
143 ! X = 353.796, 3415.181, 36.000 ! !END!
144 ! X = 355.415, 3417.007, 32.000 ! !END!
145 ! X = 384.256, 3431.434, 37.000 ! !END!
146 ! X = 357.033, 3418.833, 36.000 ! !END!
147 ! X = 352.202, 3415.203, 36.000 ! !END!
148 ! X = 382.665, 3431.452, 37.000 ! !END!
149 ! X = 365.069, 3424.271, 36.000 ! !END!
150 ! X = 361.860, 3422.464, 30.000 ! !END!
151 ! X = 353.821, 3417.029, 36.000 ! !END!
152 ! X = 368.276, 3426.078, 36.000 ! !END!
153 ! X = 358.651, 3420.659, 36.000 ! !END!
154 ! X = 381.074, 3431.470, 37.000 ! !END!
155 ! X = 355.440, 3418.854, 32.000 ! !END!
156 ! X = 363.476, 3424.291, 36.000 ! !END!
157 ! X = 366.684, 3426.098, 37.000 ! !END!
158 ! X = 360.268, 3422.485, 35.000 ! !END!
159 ! X = 369.891, 3427.906, 36.000 ! !END!
160 ! X = 357.058, 3420.680, 36.000 ! !END!
161 ! X = 361.884, 3424.311, 36.000 ! !END!
162 ! X = 365.092, 3426.118, 41.000 ! !END!
163 ! X = 358.675, 3422.506, 37.000 ! !END!
164 ! X = 368.299, 3427.925, 36.000 ! !END!
165 ! X = 376.300, 3431.524, 37.000 ! !END!
166 ! X = 381.095, 3433.317, 37.000 ! !END!
167 ! X = 379.504, 3433.335, 37.000 ! !END!
168 ! X = 369.913, 3429.753, 36.000 ! !END!
169 ! X = 373.118, 3431.562, 37.000 ! !END!
170 ! X = 368.322, 3429.772, 37.000 ! !END!
171 ! X = 371.527, 3431.581, 37.000 ! !END!
172 ! X = 369.936, 3431.600, 37.000 ! !END!
173 ! X = 379.525, 3435.182, 37.000 ! !END!
174 ! X = 373.140, 3433.409, 37.000 ! !END!
175 ! X = 377.934, 3435.200, 37.000 ! !END!
176 ! X = 376.344, 3435.219, 37.000 ! !END!
177 ! X = 374.753, 3435.237, 37.000 ! !END!
178 ! X = 373.162, 3435.256, 37.000 ! !END!
179 ! X = 377.955, 3437.047, 37.000 ! !END!
180 ! X = 376.365, 3437.066, 37.000 ! !END!
```

----

a

Data for each receptor are treated as a separate input subgroup
and therefore must end with an input group terminator.

b

Receptor height above ground is optional. If no value is entered,

10.2 Zoning Descriptions

The following section contains the zoning descriptions for Putnam County applicable to the SGS Unit 3 project.

2.01.06 – Relationship of Zoning Districts To Future Land Use Categories In The Comprehensive Plan

Table 2.01A below shows which zoning districts are consistent with and implement the future land use categories described in the Putnam County Comprehensive Plan and depicted on the Future Land Use Map in the Future Land Use Element of the County's Comprehensive Plan.

TABLE 2.01A: ZONING DISTRICTS THAT MAY BE ALLOWED IN THE FUTURE LAND USE CATEGORIES (Nov. 4, 2002)

	ZONING DISTRICTS																	
FUTURE LAND USE CATEGORIES	RE	R-1,R-1A, R-1HA	R-2, R-2HA	R-3	R-4	RMH	AE	AG	CON	CPO C-1	C-2	C-3	C-4	IL	IH	P1	P2	M	PUD
Urban Service (US)	X	X	X	X	X	X	1	1		X	X	X	X	X	X	X	X		X
Urban Reserve (UR)	X	X	X	X	X	X	1	1		X	X	X	X	X	X	X	X		X
Rural Center (RC)	X	X	X	X	X	X	1	1		X	X	X	X	X	X	X	X		X
Rural Residential (RR)	X	X	X			2	X	1		X						X			X
Commercial (CR)							1	1		X	X	X	X			X	X		X
Industrial (IN)							1	1						X	X	X	X		X
Mining (MI)							X	X								X	X	X	X
Public Facilities (PF)																X	X		X
Agricultural I (A1)	2	2	2				X	X								X	X		X
Agricultural II (A2)	2	2	2				X	X								X	X		X
Conservation (CN)									X							X			X

Generally: The table is for illustrative purposes only. Each specific land use in the County, including the over-all development scheme for each use, should be analyzed for ~~consistency with the entire Comprehensive Plan~~, regardless of the zoning district. Compliance with the requirements of the zoning district is only one step in that consistency analysis. Density and intensity of uses within zoning categories are subject to development standards in Article 7, supplemental regulations in Article 3, additional restrictions for overlay zones in Article 4, and resource protection standards in Article 6.

1- Property located in this future land use category may continue to be used as allowed by indicated zoning district, but property located in this future land use category may not be changed or rezoned to the indicated zoning district.

2- Lots in vested subdivisions or existing lots of record may be assigned a zoning in which the use of lots, the lot dimensions, and lot area generally comply with the standards of the assigned zoning district, notwithstanding the density requirements of the future land use category.

TABLE 7.02B -- FLOOR AREA RATIO AND IMPERVIOUS SURFACE COVERAGE				
FUTURE LAND USE CATEGORIES	*Floor Area Ratio Non-Residential*	*Impervious Surface Coverage Non-Residential*	*Floor Area Ratio Residential*	*Impervious Surface Coverage Residential*
Urban Service (US)	1:1	85%	0.7:1	50%
Urban Reserve (UR)	0.85:1	80%	0.5:1	50%
Rural Center (RC)	0.7:1	75%	0.5:1	50%
Rural Residential (RR)	0.4:1	70%	0.4:1	40%
Commercial (CR)	1:1	85%	NA	NA
Industrial (IN)	1:1	85%	NA	NA
Mining (MI)	NA	NA	NA	NA
Public Facilities (PF)	0.5:1	70%	NA	NA
Agricultural I (A1)	See Zoning District	85%	0.4:1	50%
Agricultural II (A2)	See Zoning District	85%	0.4:1	50%
Conservation (CN)	NA	10%	NA	10%

7.02.03 -- Supplemental Provisions

a. <u>Lot Area.</u> Lot Area or lot size is the minimum square footage required for an individual lot or parcel in the applicable zoning district. The Lot Area shall not include roadways, rights-of-way lands or property located waterward of the mean <u>or ordinary</u> high water line (i.e. submerged lands). For purposes of zoning districts or uses that require a Lot Area of 1 acre (43,560 square feet), a lot or parcel that is 0.95 acres in size or better shall be sufficient to meet the required Lot Area.

b. <u>Lot Width.</u>

1. <u>Lot Width:</u> Lot width is measured as the horizontal distance between side lot lines along the depth of the lot or parcel commencing at the boundary of the required front yard setback. For example, where the required front yard setback is 25 feet, the lot width will be measured starting 25 feet from the front property line.

10.2.1 Putnam County Zoning Approval

The following section contains the 1979 Putnam County Zoning Ordinance 75-6.

PERMIT:	Land Use or Zoning Approval
STATUTORY MANDATE:	Putnam County Zoning Ordinance 75-6 Chapter 163 F. S. Chapter 125 F. S.
ADMINISTERING AGENCY:	Putnam County Commission
APPROVAL DATE:	May 23, 1979
COMMENTS:	Part of Site Certification

BOARD OF COUNTY COMMISSIONERS

MANSIN PEACOCK, CRESCENT CITY, DISTRICT 1
EDWARD B. FULGHAM, PALATKA, DISTRICT 2
ROBERT L. REYELS, EAST PALATKA, DISTRICT 3
JERRY R. KELLEY, FLORAHOME, DISTRICT 4
KELLEY SMITH, JR., PALATKA, DISTRICT 5

PUTNAM COUNTY

P. O. DRAWER 1486
PALATKA, FLORIDA 32077

RONALD E. CLARK, ATTORNEY, PALATKA
CHARLES H. HOOD, CLERK OF CIRCUIT COURT, PALATKA
JOHN A. SAMPSON, ENGINEER
BRIAN E. MICHAELS, CODES ADMINISTRATOR AND CHIEF BUILDING OFFICIAL

June 5, 1978

RECEIVED JUN 7 1978

Mr. Harry W. Wright
Executive Vice-President/General Manager
Seminole Electric Cooperative, Incorporated
2410 East Busch Boulevard, Suite 108
Tampa, Florida 33612

Dear Mr. Wright:

This is to certify that the Board of County Commissioners of Putnam County, Florida, at its regular meeting of May 23, 1978, and upon the unanimous recommendation of the Putnam County Planning Commission, approved Planned Unit Development zoning for your preferred site north of Palatka off U.S. Highway 17 and State Road 209.

This zoning approval confers the right to build the electric power plant as described in the application documentation and at the public hearings, including tall structures of 800 feet (mean sea level).

If you or any agency or organization require additional information we will be pleased to supply it.

Sincerely,

Brian E. Michaels

Brian E. Michaels
Codes Administrator

BEM:jb

cc: Each County Commissioner
Planning Commission
Clerk of Circuit Court
County Engineer
File PUD-78-002

Seminole Electric Cooperative, Incorporated

Suite 108 2410 East Busch Boulevard (813) 933-7406

Tampa, Florida 33612

May 30, 1978

Board of County Commissioners
Attn: Brian Michaels
Codes Administrator
P. O. Drawer 1486
Palatka, Fla. 32077

Re: Rezoning of Proposed
Seminole Electric Cooperative,
Inc. Power Plant Site,
Putnam County

Dear Mr. Michaels:

Seminole Electric Cooperative, Inc., is required to file a Tall Structure Application with the Florida Department of Transportation. Section 8 of this Application requires written evidence that the proposed site meets County zoning codes.

Please submit a letter to Mr. Harry W. Wright, Executive Vice President-General Manager, indicating that the Putnam Site has been properly rezoned for the construction of an electric power plant.

Thank you for your attention to this matter.

Very truly yours,

David L. Lester
Environmental Engineer

DLL:js
cc: R. W. Claussen

Mr. Harry W. Wright, Executive Vice President
Seminole Electric Cooperative, Inc.
2410 East Busch Boulevard, Suite 108
Tampa, Florida 33612

Dear Mr. Wright:

It is our understanding that Seminole Electric Cooperative, Inc. proposes to construct an electrical generating plant on property presently owned by River Farms, Inc. in Putnam County, Florida. A part of the permitting process required of Seminole is to make a tall structure permit application to the State of Florida Department of Transportation, Division of Mass Transportation. As a part of that application, Seminole must provide evidence that the proposed tall structure meets the applicable City or County zoning requirements and the statement is required from the appropriate zoning agency showing compliance. The purpose of this letter is to inform all parties concerned that your proposed flue gas stack, which is to have a maximum height of 800 feet above ground level, is in compliance with Putnam County zoning and Putnam County is the appropriate agency.

10.2.2 Putnam County PUD Amendment

The following section contains a copy of the PUD amendment adopted January 10, 2006.

DEVELOPMENT AGREEMENT

SEMINOLE ELECTRIC COOPERATIVE, INC.

AMENDMENT OF
SEMINOLE GENERATING STATION PUD

This agreement is entered this 10th day of January, 2006, by and between SEMINOLE ELECTRIC COOPERATIVE, INC., a Florida corporation, hereinafter referred to as "SECI" and the BOARD OF COUNTY COMMISSIONERS in and for PUTNAM COUNTY, a political subdivision of the State of Florida, hereinafter referred to as "COUNTY."

PREAMBLE

WHEREAS, on May 23, 1978, the Putnam County Board of County Commissioners adopted Ordinance PUD-78-002 approving the rezoning of certain parcels within Putnam County to Planned Unit Development (PUD) in anticipation of SECI seeking certification, under the Florida Electrical Power Plant Siting Act (PPSA), Chapter 403, Part II, Florida Statutes, for its now existing coal-fired electrical power generating station (Units 1 and 2); and,

WHEREAS, on September 18, 1979, the Governor and Cabinet, sitting as the Siting Certification Board, entered an order approving the construction of the existing coal-fired Units 1 and 2 pursuant to the PPSA; and,

WHEREAS, SECI commenced operation of Unit 1 in 1984 and Unit 2 in 1985, and those units continue to be in operation; and,

WHEREAS, in anticipation of SECI applying for certification of a third coal-fired unit (Unit 3) at its Putnam County generating facility, in early 2006, SECI has submitted an application to the COUNTY to amend its existing PUD zoning approval to accommodate plant modifications and additions necessary to construct, operate, and otherwise integrate Unit 3 into the existing site and to assure, as required under the

PPSA, that the proposed site is "consistent and in compliance with existing land use plans and zoning ordinances;" and,

WHEREAS, the site and existing Units 1 and 2 are located exclusively in the unincorporated area of Putnam County, and,

WHEREAS, the existing Units 1 and 2 are located in an Industrial future land use designation under the Putnam County Comprehensive Plan which allows electrical power plants on lands with such a designation; and,

WHEREAS, any modifications to the existing generating station, necessary to accommodate Unit 3, shall be fully evaluated under the PPSA during which the COUNTY may participate as a party; and,

WHEREAS, the COUNTY and SECI wish to set forth, in this Development Agreement, any and all information required by the COUNTY under Section 12.11.3.b.6.(a) – (c), of the Putnam County Land Development Code (LDC) and further wish to articulate a mutual understanding as to how the PUD amendment process and the statutory siting process may work together, to assure that the site is consistent with existing county land use plans and zoning ordinances, and fully address the environmental impact resulting from construction and operation of the facility, including air and water quality, fish and wildlife, and the water resources and other natural resources of the State and COUNTY.

NOW, THEREFORE, the parties hereto do agree as follows:

ARTICLE 1: PROPERTY OWNERSHIP AND DESCRIPTION

1.1 PURPOSE:

The purpose of this article is to set forth the location and ownership interests in the property subject to the PUD amendment and to provide a general description of the existing Seminole Generating Station PUD and the nature of the PUD zoning amendment requested.

1.2 LEGAL DESCRIPTION

The legal description of the property is attached hereto and incorporated herein as Exhibit A to this Development Agreement.

1.3 PROPERTY OWNERSHIP

The property is owned by Seminole Electric Cooperative, Inc., a Florida Corporation.

1.4. GENERAL DESCRIPTION

The existing PUD is comprised of two separate parcels both of which were part of the originally approved rezoning and site certification. The plant itself is located on a parcel[1] consisting of approximately 1,917 acres (Parcel 1) situated east of U. S. Highway 17 and north of County Road 209 and lying in Section 31, Township 8 South, Range 27 East and Sections 5, 6, 7, 8, 17 and 18, Township 9 South, Range 27 East, and Sections 1 and 12, Township 9 South, Range 26 East, Putnam County, Florida. The property is accessed from US 17 and CR 209. A smaller waterfront parcel (Parcel 2) lies south of CR 209 within Section 18, Township 9 South, and Range 27 East. Parcel 2 consists of approximately 4.5 acres.

1.4.1. Main Power Plant Operations (Parcel 1)

Existing structures at the plant are typical of coal-fired steam generating power facilities throughout Florida the most prominent of which are the two 450 feet tall hyperbolic cooling towers and the existing stack which is 675 feet tall. The existing generating units are located in the central portion of the site. The site is undeveloped

[1] In 1980 a 40 acre out-parcel was purchased by SECI and added to the PUD by Ordinance PUD-80-001. In 1990 SECI acquired the remainder of Section 7, T 9 S, R 27 E which added approximately sixty (60) acres (Miller Parcel) bringing the total contiguous acreage north of CR 209 to approximately 2,066 acres. The sale of the Lafarge Parcel reduced the total contiguous holdings north of CR 209 to 1,977 acres of which 1,917 (omitting the Miller Parcel) are subject to the requested PUD amendment.

except for the existing units and ancillary facilities. Adjacent lands are largely undeveloped but for the Lafarge Gypsum plant located north of the existing generating facilities. The undeveloped portions of the site are primarily forested wetlands and uplands. The existing plant is a 1300 megawatt facility comprised of two 650 megawatt generating units. Output from the plant is distributed across associated transmission lines through various distribution systems (owned by ten electric cooperative members) that in turn deliver electricity to individuals and businesses in 46 of Florida's 67 counties. Over 1.6 million people are served by the Seminole Generating Station from the Florida panhandle to the southwest portion of the state.

1.4.2. Underground Cooling System Pipes and Pump House (Parcel 2)

A small second parcel (Parcel 2) lies south of CR 209 and accommodates a pump house and underground pipes necessary to operate the power plant cooling system. Parcel 2 is approximately 4.5 acres and includes approximately 212 feet of frontage on the St. Johns River which also serves as the northernmost boundary of a sovereign submerged land lease, from the State of Florida to SECI, which accommodates the power plant cooling water intake pipe. The underground pipes needed for the power plant cooling system run from Parcel 2, through a 100 foot wide privately granted easement, to the main power plant facility on Parcel 1. Parcel 2 and the easement are otherwise undeveloped. A boundary survey depicting Parcel 1, Parcel 2 and the pipeline easement is attached as Exhibit B.

1.5 LAND USE, PRINCIPAL USES AND STRUCTURES

On May 23, 1978, Parcels 1 and 2 were rezoned from Agricultural to PUD by Ordinance PUD-78-002 in anticipation of the construction of the existing power plant[2].

[2] As noted, on July 22, 1980, the PUD was amended (Ordinance PUD-80-001) to add an additional forty (40) acre out-parcel, at the north end of the SECI property, to Parcel 1. On December 14, 1999, Ordinance 99-29 amended the PUD to allow construction of a gypsum plant on a subparcel north of the existing plant.

At the time of the initial rezoning, the County Comprehensive Plan was still in a draft stage. Since 1978, and completion of the existing power plant, the County has adopted its Comprehensive Plan as well as a detailed Land Development Code.

Parcels 1 and 2 remain zoned PUD. The majority of Parcel 1, and the entirety of the existing and proposed power plant facilities, fall within the Industrial future land use category under the existing County Comprehensive Plan. Small portions of Parcel 1, not encumbered by plant facilities, fall within the Agricultural II future land use category. Approximately two-thirds of Parcel 2 falls within the Agricultural II future land use category with the southerly one-third waterfront portion falling within the Rural Residential future land use category. The existing pipeline easement, which is not a part of the PUD, runs across property zoned for agricultural uses and falling within the Agricultural II future land use category. Neither the County Comprehensive Plan nor the Land Development Code precludes the repair, replacement or addition of underground water pipes necessary to plant operations. The underground pipes, and the pipeline easement, were part of the original certification and any modifications required to accommodate Unit 3 will be reviewed as part of the site certification process.

Subject to site certification under the PPSA, Unit 3 will be constructed primarily east of, but integrated with, existing Units 1 and 2 such that any new development activity will fall within that portion of Parcel 1 designated under the Industrial future land use category. But for the existing pump house, Parcel 2, which is part of the PUD, will remain undeveloped. Pumps within the existing pump house will be replaced or upgraded and existing underground water pipes may be replaced or upgraded, and new underground pipes may be added, but no new uses or structures are intended for Parcel 2. The pipeline easement—which is not part of the PUD—will remain undeveloped

---

By deed dated February 18, 2000, SECI conveyed the subparcel to Lafarge Corporation. The Lafarge parcel is shown in Exhibit B.

although pipes may be repaired, replaced (or additional pipes installed) underground between Parcels 1 and 2.

Although no new uses or above-ground structures are anticipated on Parcel 2 or the pipeline easement, both are considered to be part of the electrical power plant to be certified under the PPSA and will be reviewed along with Parcel 1 throughout the State site certification process to which the COUNTY shall be a party.

ARTICLE 2: PROJECT DEVELOPMENT AND CONDITIONS

2.1 PURPOSE

The purpose of this section is to describe the project plan of development, the proposed land uses and structures included in the project, any applicable standards and conditions of use of the Seminole Generating Station PUD, and the integration of those standards and conditions with the Florida Electrical Power Plant Siting Act review process. Subject to the PPSA review process, and ultimate approval by the Governor and Cabinet sitting as the siting board, the project will be completed substantially in accord with the PUD Master Plan , entitled "Conceptual Site Plan" attached as Exhibit C hereto, any applicable conditions of certification arising from the PPSA review process, and the following provisions of this Development Agreement. The final site plan for purposes of constructing and operating Unit 3 shall be the final site plan as certified under the PPSA[3], based upon the detailed review process under the PPSA, and as approved by order of the Governor and Cabinet sitting as the power plant siting board.

2.2 GENERAL

Adoption of an ordinance by the Board of County Commissioners, approving the proposed amendment to the Seminole Generating Station PUD, shall serve as

[3] Exhibit C contains two alternative plans that vary only slightly as to orientation of Unit structures and accessory uses in relation to one another. The differences between the Figures 1 and 2 do not substantively alter the location and configuration of Unit 3 as to be integrated with Units 1 and 2. The final orientation of structures and accessory uses will be determined by the site certification process.

confirmation by the COUNTY that the proposed site, for the purpose of adding Unit 3 and its accessory and associated facilities, is consistent and in compliance with existing land use plans and zoning ordinances of Putnam County as required under the PPSA. Upon filing a notice of intent to be a party, pursuant to Section 403.508(4) of the PPSA, the COUNTY shall subsequently participate as a party to the site certification proceedings which include additional opportunities for the COUNTY to review and comment upon issues related to the site as summarized in Exhibit D.

2.3 Relationship of Site Certification—County Development Plan Review

Because the addition of Unit 3 is subject to the State Electrical Power Plant Siting Act certification process, upon approval of the requested PUD amendment, and this Development Agreement, by the Board of County Commissioners, the Class III Preliminary and Final Development Plan Review process will be addressed by the COUNTY'S participation in the site certification proceedings, and in any agency report the COUNTY may submit under Section 403.507(2) of the PPSA, such that the issuance of an order granting final site certification, signed by the Governor, shall constitute approval for SECI to construct and operate Unit 3 consistent with this Development Agreement, the site certification, and any applicable conditions of certification.

2.4 PROJECT PLAN AND USE

Subject to certification under the PPSA, the PUD Amendment shall allow construction of Unit 3 substantially as set forth in the Conceptual Site Plan, attached as Exhibit C. Unit 3 shall lie primarily east of, and shall be integrated with, existing Units 1 and 2 on Parcel 1 of the PUD. Unit 3 is designed for a capacity of 750 megawatts (nominal). Subject to PPSA certification, Unit 3 and associated facilities may include the construction or installation of a turbine building, boiler, electrostatic precipitators, stack, wet FGD (flue gas desulfurization for SO2 removal), wastewater treatment facilities, wet

ESP (electrostatic precipitators for SO3 removal), FGD effluent processing area, a coal handling area, limestone preparation area, ammonia storage, wastewater surge pond, temporary construction warehouse, a zero liquid discharge system, a fuel oil tank and cooling tower. The new mechanical draft cooling tower, as proposed, will be approximately 1,300 feet in length but less than sixty (60) feet in height and, unlike the existing 450 foot hyperbolic cooling towers for Units 1 and 2, should not be visible from offsite. Temporary staging areas (laydown) will vary in location, within or in close proximity to the existing plant, as needed to facilitate construction.

During the construction of Unit 3, all construction traffic shall access the plant from US 17. No construction traffic, for either construction employees or construction deliveries, shall enter from CR 209 (a.k.a. "West River Road") but for an emergency situation in the event the US 17 entrance is not open. As part of its application for site certification under the PPSA, SECI shall seek approval from the Florida Department of Transportation (FDOT) for the installation of a traffic light, or lights, in addition to extended turn lanes and deceleration lanes at the SECI plant entrance, on US 17, to offset potential-traffic related impacts associated with Unit 3. SECI or economic development entities shall provide any needed funds for the installation and operation of the traffic improvements. Traffic improvements or controls shall be implemented at locations as may be required or approved by FDOT during the site certification process.

Where feasible, the existing Unit 1 and 2 common plant facilities and infrastructure will be utilized, including: the administration building, rail system, access roads and entrances, coal handling systems, lined storage area, sanitary wastewater treatment system, industrial and domestic wastewater treatment systems, water supply wells, intake and discharge facilities on the St. Johns River, and previously certified FGD landfill facilities.

A natural vegetative buffer will be maintained on Parcel 1 the width of which shall be that required under Section 7.03.03 of the Land Development Code. Along the south boundary of Parcel 1, the buffer shall be twice the maximum required under the Land Development Code or sixty (60) feet. Existing vegetation within the buffer shall be maintained but for wildfire management or selected tree thinning in accordance with established silviculture practice. Clear cutting of the natural vegetative buffer will not be allowed.

2.5 DEVELOPMENT STANDARDS

The project shall be constructed consistent and in compliance with the Putnam County Comprehensive Plan and Land Development Code, this PUD agreement, as may be approved by the Putnam County Board of County Commissioners, the order granting final site certification and any applicable conditions of certification. The certification shall authorize SECI to construct and operate the proposed electrical power plant, subject ~~only~~ to the conditions of certification set forth in such certification and the issuance of department (FDEP) licenses or permits required under any federally delegated or approved permit program.

ARTICLE 3. SUPPLEMENTAL REQUIREMENTS

3.1 PURPOSE

The purpose of this section is to articulate a mutual understanding as to the manner by which certain aspects of the proposed power plant modifications and additions, for the construction and operation of Unit 3, will be addressed by SECI and the COUNTY and integrated into the site certification process in which the COUNTY shall participate as a party.

3.2 RESOURCE PROTECTION STANDARDS

The Florida Department of Environmental Protection (DEP) acts as the coordinating agency throughout the site certification process. DEP's Siting Coordination Office (SCO) is responsible for collecting, reviewing and distributing all information necessary for state and local agencies to fully participate as parties and ultimately for the Governor and Cabinet, sitting as the siting board, to make an informed decision as to the appropriateness of the site for construction of an electrical power plant. To assure that the application process is orderly and thorough, the DEP SCO has published its "Instruction Guide: Power Plants," available online, which sets forth a detailed and comprehensive list of issues that each applicant must address when seeking site certification. Major categories of topics include: Need for Power and the Proposed Facilities; Site and Vicinity Characterization; The Plant and Directly Associated Facilities; Effects of Site Preparation and Plant and Associated Facilities Construction; Effects of Plant Operation; Transmission Lines and Other Linear Facilities; Economic and Social Effects of Plant Construction and Operation; Site and Design Alternatives; Coordination (a list of individuals within federal, state, regional, and local government agencies who were contacted to provide input to this project); and Appendices with federal permit applications and approvals, zoning descriptions, land use plan descriptions, existing state permits, and monitoring programs.

Based upon the breadth of the application process, and the scope of the information that must be distributed to each party, including the COUNTY, and because the COUNTY intends to participate in the site certification process, any provisions of Article 6 of the Putnam County Land Development Code, entitled "Resource Protection Standards," not already addressed in this Development Agreement and incorporated documents, may be addressed by the COUNTY through its participation in the statutory site certification process.

3.3 DEVELOPMENT DESIGN AND IMPROVEMENT STANDARDS

Consistent with Section 3.2 hereinabove, any provisions of Article 7 of the Putnam County Land Development Code, entitled "Development Design and Improvement Standards" not already addressed in this Development Agreement and incorporated documents, may be addressed by the COUNTY through its participation in the site certification process.

3.4 TIME LIMIT FOR PROJECT COMPLETION

SECI and the COUNTY recognize that construction of a power generating unit is a multi-year process and so long as SECI is acting pursuant to the authority of the site certification, any approved modification thereof, and any applicable conditions of certification, there shall be no pre-determined time limit as to the completion of the project. The parties acknowledge that it is the intent of SECI to complete Unit 3 and place the unit into commercial operation by 2012.

3.5 MODIFICATION OF CERTIFICATION

To the extent SECI may seek to modify its certification as allowed under the PPSA, no further amendment of the Seminole Generating Station PUD shall be required if the PPSA would not otherwise require a determination that the modification is in compliance and consistent with existing land use plans and zoning ordinances. Additionally, SECI asserts, and the COUNTY acknowledges, that coal-fired generating units are engineered and constructed in such a manner that adjustments in building dimensions, the location of buildings in relation to one another, and the location of supporting uses in relation to the required buildings and structures, may have to be adjusted, e.g., to maximize efficiency or to accommodate design improvements deemed necessary during construction. To the extent that any such modifications do not change the intensity or nature of the use, modify setbacks, or render the construction substantively inconsistent with the Conceptual Site Plan attached hereto, the COUNTY will not require that SECI seek further amendment of the Seminole Generating Station PUD.

3.6 HEIRS, SUCCESSORS AND ASSIGNS

This agreement shall be binding upon the parties hereto, their successors in interest, heirs, assigns and personal representatives.

ARTICLE 4. AGREEMENT

4.1 ENTIRE AGREEMENT

This document and any exhibits attached hereto and incorporated herein shall constitute the entire agreement between SECI and the COUNTY for purposes of satisfying Section 12.11.03.b.6., of the Putnam County Land Development Code.

4.2 AMENDMENTS

No modification, amendment or alteration in the terms or conditions herein shall be effective unless contained in a written document executed with the same formality.

4.3 JURISDICTION

Jurisdiction as to any dispute arising from this agreement lies in Putnam County, Florida.

4.4 NOTICES

All notices given pursuant to the terms of this agreement, or which either party may desire to provide hereunder, shall be in writing and delivered personally, by overnight carrier, or by U.S. Mail, return receipt requested, to:

Seminole Electric Cooperative, Inc.
C/o James R. Frauen
Post Office Box 272000
Tampa, Florida 33688-2000

Russell D. Castleberry, County Attorney
Post Office Box 758
Palatka, Florida 32178-0758

4.5 EFFECTIVE DATE

This Development Agreement shall become effective upon approval by the Putnam County Board of County Commissioners.

APPROVED BY ACTION OF THE PUTNAM COUNTY BOARD OF COUNTY COMMISSIONERS, this 10th day of January, 2006.

PUTNAM COUNTY, BOARD OF COUNTY COMMISSIONERS

BY: [signature]
LINDA MYERS, CHAIR

STATE OF FLORIDA
COUNTY OF PUTNAM

The foregoing instrument was acknowledged before me, this 10th day of January, 2006, by Linda Myers who ✓ is personally known to me or who __ produced ______________ as identification.

[signature]
Notary, Signature

Notary Commission No.:

____
Notary, Print/Type

My Commission Expires:

TABITHA B. LASSITER
Notary Public - State of Florida
My Commission Expires Feb 28, 2010
Commission # DD 486698
Bonded By National Notary Assn

SEMINOLE ELECTRIC COOPERATIVE, INC.

BY: [signature]

ITS: Manager of Environmental Affairs

STATE OF FLORIDA
COUNTY OF HILLSBOROUGH

The foregoing instrument was acknowledged before me, this 24th day of January, 2006, by James R. Frauen who ✓ is personally known to me or who __ produced ______________ as identification.

[signature]
Notary, Signature

Notary Commission No.:

Vickie J Richard
My Commission DD382777
Expires September 28, 2008

____
Notary, Print/Type

My Commission Expires: