PG&E Generating™
Cedar Bay Generating Plant
Owner: Cedar Bay Generating Company Limited Partnership

P.O. Box 26324
Jacksonville, FL 32226

904.751.4000
Fax: 904.751.7320
Internet: www.gen.pge.com

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BUREAU OF AIR REGULATION

November 8, 1999

Mr. Michael Halpin, P.E.
Florida Department of Environmental Protection, Title V Section
Division of Air Resource Management
Mail Station #5505
2600 Blair Stone Road
Tallahassee, Fl. 32399-2400

PA 88-24 PSD-FL-139

Dear Mr. Halpin:

Pursuant to your letter dated September 3, 1999 and in order to continue processing Cedar Bay's PSD Permit modification, we wish to submit the requested information on emission characteristics during start-up modes, provide modeling data that demonstrates Air Quality Impact Analysis of a requested 3-hour rolling average of Sox, clarify the plant's hourly heat input number, and re-affirm our understanding of the other PSD Modification requests.

History

- Cedar Bay submitted a PSD Modification request to the Department of Environmental Protection on March 22, 1999. The modifications to PSD permit conditions included the following:
  1. Startup/Shutdown definitions for Cedar Bay's Circulating Fluidized Bed Boilers to permit excess CO emission during these periods {Condition II.A.11.c.(2) and II.A.9.a}
  2. A request to replace the Sox 3-hour rolling average with a 24 hour block average {Condition II.A.3}
  3. A request to add Method 29 as a method for metals determination while conducting air compliance testing {Condition II. A.8.e.(5),(11),(15),(16)}
  4. A request to delete the reference in the PSD permit concerning Mercury Testing {Condition11.A.2.c.}
  5. A request to change the language concerning a test burn of short fiber rejects { Condition II.A.1.h.}
  6. A request to differentiate handling/usage rates of coal and aragonite undergoing unloading operations from other handling operations {Condition II.B.2}

- On May 20, 1999, Cedar Bay submitted a letter requesting changes and an addition to the original PSD Modification. They were as follows:
  1. Specify the correct reference in the PSD permit concerning the mercury testing requirement as the initial modification package referenced an incorrect Condition
  2. A submittal of new language relating to Cedar Bay's test burn of the short fiber rejects

3. A request to allow all (3) boilers collectively to comply with the 3189 MMBtu/hr heat input limit and have the appropriate method for compliance with the 3189 MMBtu/hr permit limit be calculated on a 24-hour block average {Condition II.A.1.c.}

- On September 3, 1999 you generated a letter requesting additional information concerning two items of the PSD modification. The requests included identifying specific emission characteristics related to start-up modes of Cedar Bay's boilers and for air modeling to estimate the short-term air quality impacts related to a 3-hour SO2 limit.

- Additional conversations with you via telephone have confirmed that the Department will not allow the heat input to be determined on a 24-hour block average, however, there did not appear to be a problem applying a total heat input limit of 3189 for all 3 boilers collectively.

SO_2 Limit

Pursuant to your request, Cedar Bay contracted with Golder Associates to perform the requisite air modeling (attached). The results of the modeling indicate that Cedar Bay may operate with a 3-hour SO2 limit of 0.40 lb/MMBtu(1,276.75lb/hr) and still demonstrate compliance with the applicable 3-hour average Ambient Air Quality Standards (AAQS) and PSD Class 1 and II increments. A statistical analysis of Cedar Bay's historical SO2 exceedance data indicates maximum values below the air model's emission limit of 0.40 lb/MMBtu. As such, Cedar Bay proposes a 3-hour rolling average of 0.36 lb/MMBtu and 382 lb/hr. for each boiler.

The PSD modification submitted in March requested the 3-hour rolling average be changed to a 24-hour block average of .22 MMBtu/233.8 lbs/hr. In light of the air modeling, Cedar Bay proposes a change to the 3-hour rolling average instead of a modification to a 24-hour block average. All other SO2 emission limitations would remain the same.

Proposed Language

Cedar Bay proposes to modify Condition No. II.A.3. for SO2 (other pollutants unchanged) as follows:

Pollutant	Lbs/MMBtu	Lbs/Hr	TPY	TPY for 3 CFB's
SO_2	~~0.24~~ 0.36[3]	~~255.1~~ 382.5[3]	------	--------
	0.20[4]	--	866	2598

(1) No change
(2) No change
(3) No change
(4) No change

Please note: Golder Associates has advised Cedar Bay that they have submitted an electronic copy of the modeling report to Mr. Cleve Holliday of the Air Monitoring Section of DEP.

Heat Input

As discussed in earlier correspondence, Cedar Bay desires some operational flexibility with each individual boiler due to our co-generation scenario of power supply and concurrent steam demands. Additionally, each boiler, although built to the same specifications, has it's own idiosyncrasies. Cedar Bay requests that the hourly limit of heat input apply collectively for all three boilers.

Finally, Cedar Bay is requesting that the same permit note that is present in the Title V permit is added to the PSD permit , for consistency.

Proposed Language

Cedar Bay proposes to modify Condition No. II.A.1.c. as follows:

The maximum combined total heat input into the CFB's shall not exceed 3189 MMBtu/hr. *permitting note*: The heat input limitations have been placed in the permit to identify the capacity of each emissions unit for purposes of confirming that emissions testing is conducted within 90 - 100 percent of the emissions unit rated capacity(or to limit future operation to 100 percent of the test load), to establish appropriate limits and to aid in determining future rule applicability.

Start-up and Shutdown Definitions

Cedar Bay desires to obtain a modification regarding provisions for CO excess emissions during the various startup conditions for the circulating bed (CFB) boilers. Below is the data requested that explains the magnitude, frequency, and duration of each mode of a CFB startup.

There are generally two startup scenarios: 1) cold startup, and 2) warm startup. A third startup scenario is refractory replacement during a boiler outage. Each of these and the potential excess emissions are described below.

Cold Startup

A cold startup occurs when the boiler has been shutdown long enough for the boiler internal components to cool down. With three CFB boilers, approximately 15 to 20 cold startups may occur per year. The cold startup involves firing distillate fuel oil up to 10 hours, and excess emissions may occur during this period. This length of time may be required in order to raise the bed temperature to the minimum temperature necessary to support coal combustion. During the cold startup period, the hourly emission rates of carbon monoxide (CO) in lb/MMBtu can range from 10 to 20 times the permitted 8-hour rolling average limit of 0.175 lb/MMBtu. Because the heat input during these conditions is relatively low, the CO emissions in lb/hr are approximately 1 to 3 times the 8-hour rolling average permit limit of 186 lb/hr. During these cold startups, emissions of sulfur dioxide (SO2) and nitrogen oxides (NOx) are well within permit limits.

Warm Startup

A warm startup occurs when the boiler has been shutdown, but not long enough for the boiler internal components to completely cool down. With three CFB boilers, approximately 20 to 30 warm startups may occur per year. The warm startup involves firing distillate fuel oil. The length of time required in order to raise the bed temperature to the minimum temperature necessary to support coal combustion is dependent upon the duration of boiler shutdown prior to startup. During the warm startup period, the hourly emission rates of CO in lb/MMBtu can range from 5 to 10 times the permitted 8-hour rolling average limit of 0.175 lb/MMBtu, and up to 3 occurrences of excess emissions above the 8-hour rolling average CO limit are possible. Because the heat input during these conditions is relatively low, the CO emissions in lb/hr are normally within the permit limit of 186 lb/hr. During these warm startup periods, emissions of SO2 and NOx are well within permit limits.

Refractory Replacement

Refractory curing occurs when portions of the refractory on a boiler are replaced during a boiler outage. The new refractory must be cured at controlled temperatures by firing distillate oil for up to 24 hours. There may be up to a total of 4 to 6 refractory cures per year for the three CFB boilers. During this period, there is low heat input to the boiler and only No. 2 fuel oil is fired. As a result, the curing contributes to periods of excess CO emissions as high as 10-20 times the permit limit in lbs/MMBtu and 2-3 times the lb/hr rate limit. It is normal operating procedure to transition from refractory cure to warm start-up to bring the boiler online. During the refractory cure, as in other startup modes, emissions of SO2 and NOx are well within permit limits.

Specific Request

Cedar Bay requests that specific language is written into the PSD permit to allow CO excess emissions during these periods of startup/shutdown and refractory curing. Suggested language was provided in the PSD Modification submitted in March 1999.

Please advise if there is any other information needed or if you have any questions concerning Cedar Bay's PSD Modification request.

Sincerely,

Jeffrey a Walker

Jeffrey Walker
Environmental Manager

cc: Hamilton S. Oven, P.E., Administrator, Siting Coordination Office, FDEP
Michelle Golden, PG&E Generating, Bethesda

CC: NED
Duval

C. Holladay, BAR
File

Rec'd in BAR
11/9/99 KA

REPORT ON

AIR QUALITY IMPACT ANALYSIS
CEDAR BAY GENERATING PLANT

Prepared For:

Cedar Bay Generating Company, L.P.
9640 East Port Road
Jacksonville, FL 32218

Prepared By:

Golder Associates Inc.
6241 NW 23rd Street, Suite 500
Gainesville, Florida 32653-1500

November 1999
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1.0 AIR QUALITY IMPACT ANALYSIS

1.1 INTRODUCTION

Cedar Bay Generating Plant (Cedar Bay) is requesting to increase the 3-hour average SO_2 emission limit for its three circulating fluidized-bed boilers (CFBs) from 0.24 to 0.36 lb/MMBtu (1,146 lb/hr). The following dispersion modeling analysis, demonstrating compliance with applicable 3-hour average Ambient Air Quality Standards (AAQS) and PSD Class I and II and increments, is presented in support of this request.

1.2 AIR MODELING ANALYSIS APPROACH

An air quality impact analysis of the Cedar Bay facility was conducted for SO_2. The air quality modeling analysis was performed using the Industrial Source Complex Short-Term (ISCST3) model, Version 99155, currently recommended for regulatory applications, to assess maximum ground-level impacts due to the Cedar Bay facility and other sources in the area. The analysis followed EPA and FDEP modeling guidelines for assessing compliance with the AAQS and PSD increments.

The impact analysis used screening and refinement phases to determine the maximum pollutant impacts associated with the Cedar Bay facility. The difference between the two modeling phases is the density of the receptor grid spacing used when predicting concentrations. Concentrations are predicted for the screening phase using a coarse (i.e., large spacing) receptor grid and a 5-year meteorological data record. In the screening analysis, the receptor grid consisted of a polar receptor grid with a 10-degree angular spacing between receptors.

Refinements of the maximum predicted concentrations from the screening phase are typically performed in the vicinity of the receptors of the screening receptor grid at which the highest predicted concentrations occurred over the 5-year period. Generally, if maximum concentrations predicted in another year are within 10 percent of the overall maximum concentration predicted for the 5-year period, then the other concentrations are refined as well. Modeling refinements are performed to determine maximum concentrations with a receptor grid spacing of 100 meters (m) or less.

The domain of a refined receptor grid will generally extend to all adjacent screening receptors surrounding a particular screening grid receptor. The air dispersion model is then executed with the refined grid for the entire year of meteorology during which the maximum concentration in the screening phase occurred. This approach is used to ensure that a valid maximum concentration is obtained.

Because the Cedar Bay facility is located approximately 54 km from the Okefenokee National Wildlife Refuge (ONWR) and 98 km from the Wolf Island National Wildlife Refuge (WINWR), both PSD Class I areas, a Class I increment analysis was performed.

A more detailed description of the model, along with the emission inventory, meteorological data, and screening receptor grids, is presented in the following sections.

1.3 AAQS AND PSD CLASS II INCREMENT ANALYSES

In general, when 5 years of meteorological data are used, the highest annual and the highest, second-highest (H2H) short-term concentrations are to be compared to the applicable AAQS and allowable PSD Class II increments. The H2H is calculated 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.

This approach is consistent with most air quality standards and all allowable PSD increments, which permit a short-term average concentration to be exceeded once per year at each receptor.

For the AAQS analysis, the Cedar Bay facility (at the requested SO_2 emission limit for the CFBs) was modeled together with background emission facilities. Additionally, a non-modeled background concentration is added to the maximum predicted air quality to determine a total air quality concentration. The maximum annual and H2H short-term total concentrations are compared to the AAQS.

For the PSD Class II increment analysis, the PSD increment consuming sources at the Cedar Bay facility were modeled with background PSD consuming or expanding sources. The maximum annual and H2H short-term PSD increment concentrations are compared to the allowable PSD Class II increments.

1.4 PSD CLASS I INCREMENT ANALYSIS

A detailed SO_2 PSD increment analysis was performed at the PSD Class I area. For the PSD Class I increment analysis, the PSD increment consuming sources at the Cedar Bay facility were modeled along with other background PSD consuming or expanding sources described in Section 1.7. The maximum annual and H2H short-term concentrations are compared to the allowable PSD Class I increments.

1.5 MODEL SELECTION

The ISCST3 dispersion model (Version 99155) was used to evaluate all pollutant impacts. This model is currently available on the EPA's Internet web site, Support Center for Regulatory Air Models (SCRAM), within the Technical Transfer Network (TTN). A listing of ISCST3 model features is presented in Table 1-1. The ISCST3 model is designed to calculate hourly concentrations based on hourly meteorological data (i.e., wind direction, wind speed, atmospheric stability, ambient temperature, and mixing heights). The ISCST3 model is applicable to sources located in either flat or rolling terrain where terrain heights do not exceed stack heights. These areas are referred to as simple terrain. The model can also be applied in areas where the terrain exceeds the stack heights. These areas are referred to as complex terrain.

Since the terrain surrounding the Cedar Bay facility is flat, the modeling analysis assumed that all receptors were at the base elevation of the facility (i.e., flat terrain assumption in ISCST3).

In this analysis, the EPA regulatory default options were used to predict all maximum impacts. The ISCST3 model can run in the rural or urban land use mode, which affects stability dispersion coefficients, wind speed profiles, and mixing heights. Land use can be characterized based on a scheme recommended by EPA (Auer, 1978). If more than

50 percent of the land use within a 3-km radius circle around a project is classified as industrial or commercial, or high-density residential, then the urban option should be selected. Otherwise, the rural option is appropriate. Based on reviews of aerial and U.S. Geological Survey (USGS) topographical maps, the land use within a 3-km (1.9-mile) radius of the Cedar Bay facility is considered to be mostly rural (i.e., very little heavy industrial, light-moderate industrial, commercial, or compact residential land use categories). Therefore, the rural mode was used in the air dispersion model to predict impacts from the Cedar Bay facility and other emission sources considered in the modeling analysis.

The ISCST3 model was used to predict maximum pollutant concentrations for the 3-hour averaging period. The predicted concentrations were then compared to allowable PSD increments and the AAQS.

1.6 METEOROLOGICAL DATA

Meteorological data used in the ISCST3 model to determine air quality impacts consisted of a concurrent 5-year period of hourly surface weather observations and twice-daily upper air soundings from the National Weather Service (NWS) offices located at the Jacksonville International Airport (JAX) and Waycross, GA, respectively. Concentrations were predicted using 5 years of hourly meteorological data from 1984 through 1988. The NWS office at JAX is the closest primary NWS to the study area. The JAX station meteorological data have been used for previous air modeling studies for sources in Duval County.

The surface observations included wind direction, wind speed, temperature, cloud cover, and cloud ceiling height. The wind speed, cloud cover, and cloud ceiling values were used in the ISCST3 meteorological preprocessor program to determine atmospheric stability using the Turner stability scheme. Based on the temperature measurements at morning and afternoon, mixing heights were calculated from the radiosonde data at Waycross, GA using the Holzworth approach (Holzworth, 1972). Hourly mixing heights were derived from the morning and afternoon mixing heights using the interpolation method developed by EPA (Holzworth, 1972). The hourly surface data and mixing heights were used to develop a sequential, hourly meteorological data set (i.e., wind direction, wind speed, temperature, stability, and mixing heights). Because the observed hourly wind directions at the NWS stations are classified into one of thirty-six 10-degree sectors, the wind directions were randomized within each sector to account for the expected variability in air flow. These calculations were performed using the EPA RAMMET meteorological preprocessor program.

1.7 EMISSION INVENTORY

1.7.1 CEDAR BAY FACILITY

An emissions inventory of sources at the Cedar Bay facility is presented in Table 1-2. This emissions inventory reflects a 3-hour average SO_2 emission rate of 425.58 lb/hr per CFB based on the requested emission limit of 0.4 lb/MMBtu. Note that Cedar is requesting an SO_2 emission limit of only 0.36 lb/MMBtu.

1.7.2 OTHER EMISSION SOURCES

The emission inventories for other non-Cedar Bay facilities were developed mainly from databases used in recent air modeling studies of the Jacksonville area including Jacksonville Electric Authority's Northside Repowering Project, and the cluster rule compliance demonstration projects for Jefferson Smurfit Corporation (located in Fernadina Beach) and Georgia-Pacific Corporation (located in Palatka). For the AAQS and PSD Class II increment analysis, all major SO_2 sources located in Nassau and Duval Counties were included, as well as Gilman Paper in St. Mary's, Georgia. A summary of these facilities, their locations with respect to the Cedar Bay facility, and their SO_2 emission rates is presented in Table 1-3. The individual source emissions, stack, and operating parameters for the AAQS and PSD Class II modeling analyses are summarized in Table 1-4.

A PSD Class I increment modeling analysis was performed for SO_2. All sources that were considered in the Class I analysis are presented in Table 1-5. All PSD increment consuming or expanding sources within these facilities are included in the analysis, including Putnam County sources.

1.8 BUILDING DOWNWASH EFFECTS

Based on the building dimensions associated with buildings and structures at the plant, all stacks at the Cedar Bay facility comply with the good engineering practice (GEP) stack height regulations. However, these stacks are less than GEP height. Therefore, the potential for building downwash to occur was considered in the air modeling analysis for these stacks.

Generally, a stack is considered to be within the influence of a building if it is within the lesser of 5 times L, where L is the lesser dimension of the building height or projected width. The ISCST3 model uses two procedures to address the effects of building downwash. For both methods, the direction-specific building dimensions are input for H_b and l_b for 36 radial directions, with each direction representing a 10-degree sector. The H_b is the building height and l_b is the lesser of the building height or projected width. For short stacks (i.e., physical stack height is less than $H_b + 0.5\,l_b$), the Schulman and Scire (1980) method is used. The features of the Schulman and Scire method are as follows:

1. Reduced plume rise as a result of initial plume dilution,
2. Enhanced plume spread as a linear function of the effective plume height, and
3. Specification of building dimensions as a function of wind direction.

For cases where the physical stack height is greater than $H_b + 0.5\,l_b$, but less than GEP, the Huber-Snyder (1976) method is used. Both downwash algorithms affect stacks that are within the influence of a building, without regard for the actual distance the stack or stack's plume is from the building during any given moment.

The building dimensions considered in the air modeling analysis for the Cedar Bay facility and adjacent Stone Container facility are presented in Table 1-6. The location of the buildings and stacks can be found on the site plot plan (Figure 1-1). Due to the proximity of the Stone Container facility to the Cedar Bay facility, structures from both facilities were considered in the building wake analysis. For the modeling analysis, direction-specific building dimensions are input for H_b and l_b for 36 radial directions, with each direction representing a 10-degree sector. All direction-specific building parameters were calculated with the Building Profile Input Program (BPIP), Version 95086. The BPIP program was used to generate building data for the ISCST3 model input.

1.9 RECEPTOR LOCATIONS

For predicting maximum concentrations in the vicinity of the Cedar Bay facility, an array of discrete polar receptors were used. The number of discrete receptors was 1,174, which included 36 receptors located along the property line of Cedar Bay facility and 1,138 additional offsite receptors located at distances of 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.25, 1.5, 1.75, 2.0, 2.5, 3.0, 3.5, 4.0 km and every kilometer to 20 km from the CFB stack location, the origin (i.e., 0,0) location for the air modeling analysis. A summary of the plant boundary receptors used in the modeling analysis is presented in Table 1-7.

Modeling refinements were performed, as required, by using a polar receptor grid with a maximum receptor spacing of 100 m in the radial direction and an angular spacing between radials of 1 or 2 degrees. Because the receptor distance is less than 100 m for receptors within a radial distance of less then 575 m, angular refinements within that distance are generally not required. However, resolution in the radial direction would be refined to 100 m.

SO_2 concentrations were also predicted at 10 discrete Cartesian receptors located along the southern and eastern boundaries of the ONWR PSD Class I Area, plus one additional receptor located at the WINWR. A listing of the 11 Class I receptors is presented in Table 1-8. Due to the distance from the Cedar Bay facility to the ONWR and WINWR, additional receptor refinements were not performed for these areas.

1.10 BACKGROUND CONCENTRATIONS

Total air quality impacts were predicted for the AAQS analysis by adding the maximum annual and highest, second-highest short-term concentrations due to all modeled sources to estimated background concentrations. Background concentrations are concentrations due to sources not explicitly included in the modeling analysis. These concentrations consist of two components:

- Impacts due to other non-modeled emission sources (i.e., point sources not explicitly included in the modeling inventory), and
- Natural and fugitive emission sources.

The non-modeled background concentrations were obtained from air quality monitoring data for Duval County (1998 ALLSUM) provided by FDEP. The maximum 3-hour average SO_2 concentration of 272 $\mu g/m^3$ was selected for use as the background concentration, based on the following 1998 ALLSUM report information for SO_2 monitors located in Duval county.

Summary of 1998 3-Hour Average SO_2 ALLSUM Report Data for Monitors Located in Duval County

Site ID No.	Address	Highest 3-Hour Average SO_2 Concentration ($\mu g/m^3$)
12-031-0032	2900 Bennet Street	259
12-031-0080	LaSalle Street	131
12-031-0081	840 Cedar Bay Road	272
12-031-0097	6241 Fort Caroline Road	220

The use of a 3-hour average SO_2 background concentration of 272 $\mu g/m^3$ is conservative (results in higher concentrations) because the SO_2 monitor on Cedar Bay Road is likely impacted by sources considered in the modeling analysis.

Table 1-1. Major Features of the ISCST3 Model

ISCST3 Model Features
• Polar or Cartesian coordinate systems for receptor locations
• Rural or one of three urban options which affect wind speed profile exponent, dispersion rates, and mixing height calculations
• Plume rise due to momentum and buoyancy as a function of downwind distance for stack emissions (Briggs, 1969, 1971, 1972, and 1975; Bowers, et al., 1979).
• Procedures suggested by Huber and Snyder (1976); Huber (1977); and Schulman and Scire (1980) for evaluating building wake effects
• Procedures suggested by Briggs (1974) for evaluating stack-tip downwash
• Separation of multiple emission sources
• Consideration of the effects of gravitational settling and dry deposition on ambient particulate concentrations
• Capability of simulating point, line, volume, area, and open pit sources
• Capability to calculate dry and wet deposition, including both gaseous and particulate precipitation scavenging for wet deposition
• Variation of wind speed with height (wind speed-profile exponent law)
• Concentration estimates for 1-hour to annual average times
• Terrain-adjustment procedures for elevated terrain including a terrain truncation algorithm for ISCST3; a built-in algorithm for predicting concentrations in complex terrain
• Consideration of time-dependent exponential decay of pollutants
• The method of Pasquill (1976) to account for buoyancy-induced dispersion
• A regulatory default option to set various model options and parameters to EPA recommended values (see text for regulatory options used)
• Procedure for calm-wind processing including setting wind speeds less than 1 m/s to 1 m/s.

Note: ISCST3 = Industrial Source Complex Short-Term.
Source: EPA, 1998.

Table 1-2. Inventory of SO_2 Sources at the Cedar Bay Facility

Source Description	ISCST3 ID Name	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 Source? (EXP/CON)
Three Circulating Fluidized Bed Boilers	CFB123	403	122.8	13.3	4.05	131	328	120.4	36.70	1276.7	160.87	CON
Two Limestone Dryers	CBDRYER	63	19.2	4.3	1.30	82	301	93.2	28.40	0.48	0.06	CON

Table 1-3. Summary of SO_2 Emitting Facilities Considered in the Air Modeling Analysis

Facility	UTM Coordinates		Location[a]				SO_2 Emission Rate	Q Emissions Threshold	Included in AAQS Modeling Analysis?	Included in PSD Class II Modeling Analysis?	Included in PSD Class I Modeling Analysis?
	East (km)	North (km)	X (km)	Y (km)	Distance (km)	Direction (deg)	(TPY)	[(D-SIA)x20]			
Stone Container Corp.	441.8	3365.6	0.2	0.1	0.2	72	111	SIA	Yes	Yes	Yes
Anheiser Busch, Inc	440.6	3366.8	-1.0	1.3	1.6	321	2,636	SIA	Yes	Yes	Yes
Georgia Pacific	440.1	3368.3	-1.5	2.8	3.1	331	207	SIA	Yes	No[d]	No[d]
JEA - Northside Power Plant	446.9	3364.8	5.3	-0.7	5.3	98	113,776	SIA	Yes	Yes	Yes
JEA - St. Johns River Power Park	447.1	3366.7	5.5	1.2	5.6	78	64,592	SIA	Yes	Yes	Yes
JEA - Kennedy Power Plant	440.0	3359.2	-1.6	-6.3	6.5	194	9,039	SIA	Yes	Yes	Yes
Millenium Specialty Products	435.6	3360.7	-6.0	-4.8	7.7	231	139	SIA	Yes	Yes	Yes
J. W. Swisher	437.9	3357.9	-3.7	-7.6	8.5	206	292	SIA	Yes	No[d]	No[d]
ES Metals	431.8	3358.3	-9.8	-7.2	12.2	234	-838	SIA	Yes	Yes	Yes
JEA - Southside Power Plant	437.7	3353.9	-3.9	-11.6	12.3	199	11,063	SIA	Yes	No[d]	No[d]
Gulf Life Insurance	436.2	3354.1	-5.4	-11.4	12.7	205	103	SIA	Yes	No[d]	No[d]
Anchor Glass Container Co.	431.3	3357.5	-10.3	-8.0	13.1	232	448	SIA	Yes	No[d]	No[d]
Duval Asphalt Products	428.7	3361.4	-12.9	-4.1	13.6	252	1,270	SIA	Yes	No[d]	No[d]
Maxwell House	439.7	3350.0	-1.9	-15.5	15.7	187	399	SIA	Yes	Yes	Yes
Bush Boake Allen, Inc.	427.6	3357.3	-14.0	-8.2	16.3	240	504	SIA	Yes	No[d]	No[d]
U.S. Naval Station- Mayport	460.4	3362.8	18.8	-2.7	19.0	98	924	SIA	Yes	No[d]	No[d]
Duval Asphalt Products	443.2	3344.0	1.6	-21.5	21.6	176	384	52	Yes	No[d]	No[d]
Rayonier, Inc.	454.7	3392.2	13.1	26.7	29.7	26	7,451	214	Yes	Yes	Yes
Jefferson Smurfit Corp.	456.2	3394.2	14.6	28.7	32.2	27	18,651	263	Yes	Yes	Yes
Gilman Paper Co. St. Mary's GA	448.2	3401.3	6.6	35.8	36.4	10	7,271	347	Yes	Yes	Yes
Seminole Power Plant	438.8	3289.2	-2.8	-76.3	76.4	182	75,392	1,148	No[c]	No[c]	Yes
Georgia-Pacific Palatka	434.0	3283.4	-7.6	-82.1	82.5	185	14,315	1,270	No[c]	No[c]	Yes
FPL Palatka Power Plant	442.8	3277.6	1.2	-87.9	87.9	179	-12,890	1,379	No[c]	No[c]	Yes
FPL Putnam Power Plant	443.3	3277.6	1.7	-87.9	88.0	179	13,550	1,379	No[c]	No[c]	Yes

Footnotes:

[a] Relative to the location of Cedar Bay Cogeneration, Inc. which is located at the following *UTM Coordinates:*

East (km) 441.6
North (km) 3365.5

[b] The significant impact area (SIA) equals 19.0 km

[c] Beyond 50 km from the SIA and therefore not included in the AAQS and PSD Class II modeling analysis.

[d] These facilities do no have increment consuming or increment expanding sources and were therefore not included in the modeling analysis for PSD increments.

Table 1-4. Inventory of SO_2 Sources Included in the AAQS and PSD Class II Air Modeling Analyses

Facility	Units	ISCST3 ID Name	Stack Parameters Height (m)	Diameter (m)	Temperature (K)	Velocity (m/s)	Emission Rate (g/s)	PSD Source? (EXP/CON)	Modeled in AAQS	Class II
Stone Container Corp										
	Package Boilers 1-3 Future	SKCPAC13	61.0	2.44	447	16.18	3.20	CON	Yes	Yes
	PBs 1-3 1974 Baseline	SCCPB13	32.3	1.83	433	20.12	-200.00	EXP	No	Yes
	BB1-2 1974 Baseline	SCCB12	41.5	2.44	329	13.72	-114.00	EXP	No	Yes
Anheiser Busch, Inc										
	Duct Burner, Heat Rec. Boiler, Biogas Flare	ABUSCHC	6.1	0.60	811	1.80	2.14	CON	Yes	Yes
	Boiler Nos. 1 through 4	ABUSCHB	30.5	1.10	483	17.40	73.76		Yes	No
Georgia-Pacific Co.										
	Boiler No. 1	GPBLR1	11.6	0.61	477	9.14	2.58		Yes	No
	Boiler No. 2	GPBLR2	4.9	0.61	505	6.40	3.36		Yes	No
JEA - Northside Power Plant										
	Repowered Units 1&2	JEANS12	151.0	4.57	331	19.20	139.42	CON	Yes	Yes
	Unit 1 1974 Baseline	JEANS1B	76.2	4.87	403	23.10	-690.92	EXP	No	Yes
	Unit 2 1974 Baseline	JEANS2B	88.4	5.00	394	13.10	-584.55	EXP	No	Yes
	Unit 3	JEANS3	106.7	4.72	425	40.38	1257.00		Yes	No
	CT 3, 4, 5 and 6	JEANSCTS	9.8	5.84	700	8.80	19.56		Yes	No
JEA - St. Johns River Power Park										
	Unit Nos. 1 & 2	SJRPP12	195.1	6.79	342	27.40	1859.60	CON	Yes	Yes
JEA - Kennedy Power Plant										
	Unit 9	JEAKEN9	45.7	3.20	398	10.10	75.05		Yes	No
	Unit 10	JEAKEN10	41.5	2.70	411	27.40	185.19		Yes	No
	Unit 8 1974 Baseline	JEAKEN8B	45.7	3.20	394	10.40	-75.05	EXP	No	Yes
Millenium Specialty Products										
	Future	MILLENMF	13.7	1.22	450	5.50	4.01	CON	Yes	Yes
	1974 Baseline	MILLENMB	12.2	1.10	658	10.10	-8.49	EXP	No	Yes
J. W. Swisher										
	Boilers Nos. 1 through 3	JWS1	18.3	1.22	505	0.61	4.26			
	Boiler Nos. 4 through 6	JWS2	9.1	0.30	477	7.01	4.21			
ES Metals										
	Unit ID No. 02	ESM2	25.6	0.91	325	15.24	-18.77	EXP	No	Yes
	Unit ID No. 03	ESM3	24.4	1.22	355	3.96	-5.38	EXP	No	Yes
JEA - Southside Power Plant										
	No. 4 Steam Generator	JEASS4	43.9	3.40	425	11.90	110.42		Yes	No
	No. 5 Steam Generator	JEASS5	44.2	3.00	418	26.80	208.08		Yes	No
Anchor Glass Container										
	No. 1 Glass Melting Furnace	AGCGMF1	17.4	0.90	511	19.50	1.37		Yes	No
	No. 2 Glass Melting Furnace	AGCGMF2	17.4	0.80	522	14.00	2.74		Yes	No
	No. 3 Glass Melting Furnace	AGCGMF3	33.2	1.70	430	11.60	5.05		Yes	No
	No. 4 Glass Melting Furnace	AGCGMF4	35.7	1.60	511	11.90	3.75		Yes	No

Table 1-4. Inventory of SO_2 Sources Included in the AAQS and PSD Class II Air Modeling Analyses

Facility	Units	ISCST3 ID Name	Stack Parameters Height (m)	Diameter (m)	Temperature (K)	Velocity (m/s)	Emission Rate (g/s)	PSD Source? (EXP/CON)	Modeled in AAQS	Class II
Duval Asphalt Products										
	Asphalt Batch Plant	DAP	11.6	0.98	376	31.09	36.54		Yes	No
Maxwell House										
	Boiler No. 1	MH1	45.7	0.98	607	0.61	3.96		Yes	No
	Boiler No. 2	MH2	45.7	0.43	397	67.97	7.52		Yes	No
	Boiler No. 2 (Retired)	MH2RET	15.2	0.91	402	20.73	-2.44	EXP	No	Yes
Bush Boake Allen, Inc.										
	Boiler No. 2	BBABLR2	15.5	1.20	586	0.90	7.20		Yes	No
	Myrcene Unit D	BBAMYCD	7.9	0.20	700	14.00	0.03		Yes	No
	Boiler No. 3	BBABLR3	20.1	1.20	586	11.60	7.17		Yes	No
	Myrcene Unit A	BBAMYCA	18.3	0.90	539	1.20	0.13		Yes	No
U.S. Naval Station- Mayport										
	Building 1241 Boilers 1, 2, 3	USNM1241	12.2	0.90	544	14.30	15.81		Yes	No
	Building 250 Boilers 1, 2	USNM250	14.0	1.20	561	7.90	10.11		Yes	No
	Building 338 Boilers 87 & 88	USNM338	7.6	0.30	472	4.30	0.26		Yes	No
	Building 1488 Boiler	USNM1488	18.3	0.30	450	13.70	0.43		Yes	No
Duval Asphalt Products										
	Asphalt Batch Plant	DAP1	11.6	0.98	376	31.09	11.06		Yes	No
Rayonier, Inc.										
	PB 1-3	RAYPB13	54.9	3.00	336	9.80	165.90	CON	Yes	Yes
	RB	RAYRB	76.2	2.29	325	17.37	40.60		Yes	No
	Vent Scrubber	RAYVENT	37.5	0.91	328	20.12	8.00		Yes	No
	PB 1-3 PSD Baseline	RAYPB13b	37.2	3.00	336	9.80	-165.90	EXP	No	Yes
Jefferson Smurfit										
	Recovery Boiler No. 5	JSRB5	87.8	2.74	484	18.96	31.20	CON	Yes	Yes
	Recovery Boiler No. 4	JSRB4	75.9	3.75	511	17.96	35.10	CON	Yes	Yes
	Power Boiler No. 5	JSPB5	78.3	3.35	498	18.17	311.03	CON	Yes	Yes
	Power Boiler No. 7	JSPB7	103.6	4.51	470	13.44	154.38	CON	Yes	Yes
	Lime Kiln No. 4	JSLK4	30.8	0.94	450	48.59	3.38	CON	Yes	Yes
	Smelt Dissolving Tank No. 4	JSSDT4	75.9	1.83	340	18.17	0.87	CON	Yes	Yes
	Smelt Dissolving Tank No. 5	JSSDT5	87.8	1.22	345	13.44	0.99	CON	Yes	Yes
	Recovery Boiler No. 4	JSRB4B	75.9	2.74	493	18.78	-35.10	EXP	No	Yes
	Power Boiler No. 5	JSPB5B	69.2	3.35	480	16.25	-170.00	EXP	No	Yes
	Smelt Dissolving Tank No. 4	JSSDT4B	69.5	1.83	350	5.21	-0.71	EXP	No	Yes
	Power Boiler Nos. 3 and 4	JSPB34B	69.2	2.44	483	16.86	-144.70	EXP	No	Yes
	Lime Kiln No. 2	JSLK2B	13.4	1.07	361	12.25	-1.25	EXP	No	Yes
	Lime Kiln No. 3	JSLK3B	13.4	1.37	360	17.59	-1.25	EXP	No	Yes
	Recovery Boiler No. 3	JSRB3B	40.8	2.74	390	13.26	-10.50	EXP	No	Yes
	Smelt Dissolving Tank No. 3	JSSDT3B	33.2	0.61	360	5.82	-0.21	EXP	No	Yes
Gilman Paper Co. St. Mary's, GA										
	PB3 Future	GILPB3	83.8	4.30	450	2.82	87.29	CON	Yes	Yes
	Combination Boiler Future	GILCOBLR	45.7	3.05	326	7.76	88.75	CON	Yes	Yes

Table 1-4. Inventory of SO_2 Sources Included in the AAQS and PSD Class II Air Modeling Analyses

Facility	Units	ISCST3 ID Name	Stack Parameters Height (m)	Diameter (m)	Temperature (K)	Velocity (m/s)	Emission Rate (g/s)	PSD Source? (EXP/CON)	Modeled in AAQS	Class II
	RBs 2 & 3 Future	GILRB23	54.9	2.13	425	16.76	15.20	CON	Yes	Yes
	RB4 Future	GILRB4	76.2	2.59	411	12.19	15.80	CON	Yes	Yes
	Lime Kiln Future	GILLK	30.5	1.52	350	11.64	2.13	CON	Yes	Yes
	PB1 1974 Baseline	GILPB13b	83.8	4.30	450	7.30	-281.00	EXP	No	Yes
	PB4 1974 Baseline	GILPB4b	36.6	1.80	700	20.00	-59.90	EXP	No	Yes
	RB2 1974 Baseline	GILRB2b	47.2	2.30	426	13.10	-7.60	EXP	No	Yes
	RB3 1974 Baseline	GILRB3b	53.3	1.60	394	25.20	-7.60	EXP	No	Yes
	RB4 1974 Baseline	GILRB4b	76.2	2.60	427	22.10	-15.80	EXP	No	Yes

Table 1-5. Inventory of SO_2 Sources Included in the PSD Class I Air Modeling Analyses

Facility	Units	ISCST3 ID Name	Stack Parameters Height (m)	Diameter (m)	Temperature (K)	Velocity (m/s)	Emission Rate (g/s)	PSD Source? (EXP/CON)
Stone Container Corp								
	Package Boilers 1-3 Future	SKCPAC13	61.0	2.44	447	16.18	3.20	CON
	PBs 1-3 1974 Baseline	SCCPB13	32.3	1.83	433	20.12	-200.00	EXP
	BB1-2 1974 Baseline	SCCBB12	41.5	2.44	329	13.72	-114.00	EXP
Anheiser Busch, Inc								
	Duct Burner, Heat Rec. Boiler, Biogas Flare	ABUSCHC	6.1	0.60	811	1.80	2.14	CON
JEA - Northside Power Plant								
	Repowered Units 1&2	JEANS12	151.0	4.57	331	19.20	139.42	CON
	Unit 1 1974 Baseline	JEANS1B	76.2	4.87	403	23.10	-690.92	EXP
	Unit 2 1974 Baseline	JEANS2B	88.4	5.00	394	13.10	-584.55	EXP
JEA - St. Johns River Power Park								
	Unit Nos. 1 & 2	SJRPP12	195.1	6.79	342	27.40	1859.60	CON
JEA - Kennedy Power Plant								
	Unit 8 1974 Baseline	JEAKEN8B	45.7	3.20	394	10.40	-75.05	EXP
Millenium Specialty Products								
	Future	MILLENMF	13.7	1.22	450	5.50	4.01	CON
	1974 Baseline	MILLENMB	12.2	1.10	658	10.10	-8.49	EXP
ES Metals								
	Unit ID No. 02	ESM2	25.6	0.91	325	15.24	-18.77	EXP
	Unit ID No. 03	ESM3	24.4	1.22	355	3.96	-5.38	EXP
Maxwell House								
	Boiler No. 2 (Retired)	MH2RET	15.2	0.91	402	20.73	-2.44	EXP
Rayonier, Inc.								
	PB 1-3	RAYPB13	54.9	3.00	336	9.80	165.90	CON
	PB 1-3 PSD Baseline	RAYPB13	37.2	3.00	336	9.80	-165.90	EXP
Jefferson Smurfit								
	Recovery Boiler No. 5	JSRB5	87.8	2.74	484	18.96	31.20	CON
	Recovery Boiler No. 4	JSRB4	75.9	3.75	511	17.96	35.10	CON
	Power Boiler No. 5	JSPB5	78.3	3.35	498	18.17	311.03	CON
	Power Boiler No. 7	JSPB7	103.6	4.51	470	13.44	154.38	CON
	Lime Kiln No. 4	JSLK4	30.8	0.94	450	48.59	3.38	CON
	Smelt Dissolving Tank No. 4	JSSDT4	75.9	1.83	340	18.17	0.87	CON
	Smelt Dissolving Tank No. 5	JSSDT5	87.8	1.22	345	13.44	0.99	CON
	Recovery Boiler No. 4	JSRB4B	75.9	2.74	493	18.78	-35.10	EXP

Table 1-5. Inventory of SO_2 Sources Included in the PSD Class I Air Modeling Analyses

Facility	Units	ISCST3 ID Name	Stack Parameters Height (m)	Diameter (m)	Temperature (K)	Velocity (m/s)	Emission Rate (g/s)	PSD Source? (EXP/CON)
	Power Boiler No. 5	JSPB5B	69.2	3.35	480	16.25	-170.00	EXP
	Smelt Dissolving Tank No. 4	JSSDT4B	69.5	1.83	350	5.21	-0.71	EXP
	Power Boiler Nos. 3 and 4	JSPB34B	69.2	2.44	483	16.86	-144.70	EXP
	Lime Kiln No. 2	JSLK2B	13.4	1.07	361	12.25	-1.25	EXP
	Lime Kiln No. 3	JSLK3B	13.4	1.37	360	17.59	-1.25	EXP
	Recovery Boiler No. 3	JSRB3B	40.8	2.74	390	13.26	-10.50	EXP
	Smelt Dissolving Tank No. 3	JSSDT3B	33.2	0.61	360	5.82	-0.21	EXP
Gilman Paper Co. St. Mary's, GA								
	PB3 Future	GILPB3	83.8	4.30	450	2.82	87.29	CON
	Combination Boiler Future	GILCOBLR	45.7	3.05	326	7.76	88.75	CON
	RBs 2 & 3 Future	GILRB23	54.9	2.13	425	16.76	15.20	CON
	RB4 Future	GILRB4	76.2	2.59	411	12.19	15.80	CON
	Lime Kiln Future	GILLK	30.5	1.52	350	11.64	2.13	CON
	PB1 1974 Baseline	GILPB13b	83.8	4.30	450	7.30	-281.00	EXP
	PB4 1974 Baseline	GILPB4b	36.6	1.80	700	20.00	-59.90	EXP
	RB2 1974 Baseline	GILRB2b	47.2	2.30	426	13.10	-7.60	EXP
	RB3 1974 Baseline	GILRB3b	53.3	1.60	394	25.20	-7.60	EXP
	RB4 1974 Baseline	GILRB4b	76.2	2.60	427	22.10	-15.80	EXP
Seminole Power Plant								
	Units 1 and 2	SEMELECT	205.7	10.97	327	7.99	2168.80	CON
Florida Power & Light - Putnam								
	2x70Mw CT/HRSG + DB	FPLPUTNM	22.3	3.15	437	58.60	194.90	CON
Florida Power & Light - Palatka								
	Unit 2	FPLPALAT	45.7	3.96	408	9.50	-257.03	EXP
Georgia-Pacific Corporation - Palatka								
	Recovery Boiler No 4	GPPLRB4	70.1	3.66	478	19.42	13.85	CON
	Smelt Dissolving Tank No. 4	GPPLSDT4	62.8	1.52	344	6.46	1.00	CON
	Lime Kiln No. 4	GPPLLK4	39.9	1.35	339	18.53	1.37	CON
	Power Boiler No. 4	GPPLPB4	61.0	1.22	475	21.82	45.23	CON
	Power Boiler No. 5	GPPLPB5	70.7	2.74	503	18.47	197.13	CON
	Combination Boiler No. 4	GPPLCB4	72.2	2.44	500	21.88	281.10	CON
	Power Boiler No. 6	GPPLPB6	18.3	1.83	622	17.43	1.40	CON
	Recovery Boiler No 1 Baseline	GPPLRB1B	76.2	3.66	360	8.80	-6.21	EXP
	Recovery Boiler No 2 Baseline	GPPLRB2B	76.2	3.66	372	8.80	-8.88	EXP
	Recovery Boiler No 3 Baseline	GPPLRB3B	40.5	3.41	372	7.28	-8.58	EXP
	Recovery Boiler No 4 Baseline	GPPLRB4B	70.1	3.66	474	16.86	-34.97	EXP
	SDT No. 1 Baseline	GPPSDT1B	30.5	0.76	366	7.53	-0.13	EXP
	SDT No. 2 Baseline	GPPSDT2B	30.5	0.91	375	9.51	-0.18	EXP
	SDT No. 3 Baseline	GPPSDT3B	33.2	0.76	369	3.57	-0.18	EXP

Table 1-5. Inventory of SO_2 Sources Included in the PSD Class I Air Modeling Analyses

Facility	Units	ISCST3 ID Name	Stack Parameters Height (m)	Diameter (m)	Temperature (K)	Velocity (m/s)	Emission Rate (g/s)	PSD Source? (EXP/CON)
	SDT No. 4 Baseline	GPPSDT4B	62.8	1.52	346	8.26	-0.71	EXP
	Lime Kiln No. 1 Baseline	GPPLLK1B	15.2	1.28	401	5.24	-0.24	EXP
	Lime Kiln No. 2 Baseline	GPPLLK2B	15.9	1.71	341	10.67	-0.24	EXP
	Lime Kiln No. 3 Baseline	GPPLLK3B	15.9	1.71	342	8.47	-0.48	EXP
	Lime Kiln No. 4 Baseline	GPPLLK4B	45.4	1.31	351	16.46	-1.40	EXP
	Power Boiler No. 4 Baseline	GPPLPB4B	37.2	1.22	477	14.54	-45.22	EXP
	Power Boiler No. 5 Baseline	GPPLPB5B	72.9	2.74	520	15.97	-161.15	EXP
	CB No. 4 Baseline	GPPLCB4B	72.9	3.05	477	10.52	-121.28	EXP

Footnotes:

[a] There are four combustion turbines at Florida Power & Lights facitility located in Putnam. Two of these combustion turbines are increment consuming.

Table 1-6. Structure Dimensions Used in the Air Modeling Analysis

	Actual Building Dimensions					
	Height		Length		Width	
Structure	ft	m	ft	m	ft	m
Cedar Bay						
CFB Boiler Building	161	49.1	248	75.7	110	33.5
Stone Container						
Recovery Boiler Building	90	27.4	157	47.8	80	24.3
Pump Mill	72	21.9	172	52.4	113	34.3
Power Boiler Building	60	18.3	201	61.3	115	35.1
Bark Boiler Building	60	18.3	75	22.9	68	20.6

Table 1-7. Cedar Bay Facility Property Boundary Receptors

Direction[a] (Degrees)	Distance (meters)	Direction[a] (Degrees)	Distance (meters)
10	357	190	101
20	315	200	96
30	273	210	88
40	155	220	83
50	152	230	91
60	156	240	104
70	142	250	112
80	127	260	118
90	143	270	129
100	147	280	139
110	131	290	155
120	135	300	182
130	170	310	218
140	166	320	235
150	156	330	258
160	144	340	265
170	124	350	349
180	110	360	372

[a] With respect to the location of the CFBs.

Table 1-8. Summary of Receptors Used for the PSD Class I Modeling Analyses

Receptor Number	UTM Coordinate (km)	
	Easting	Northing
Wolf Island NWR		
1	470.5	3459.0
Okefenokee NWR		
2	391.0	3417.0
3	390.0	3410.0
4	392.0	3400.0
5	390.0	3395.0
6	391.0	3390.0
7	390.0	3384.0
8	383.0	3382.0
9	378.0	3382.0
10	374.0	3383.0
11	370.0	3383.0

All receptors are located in UTM Zone 17.

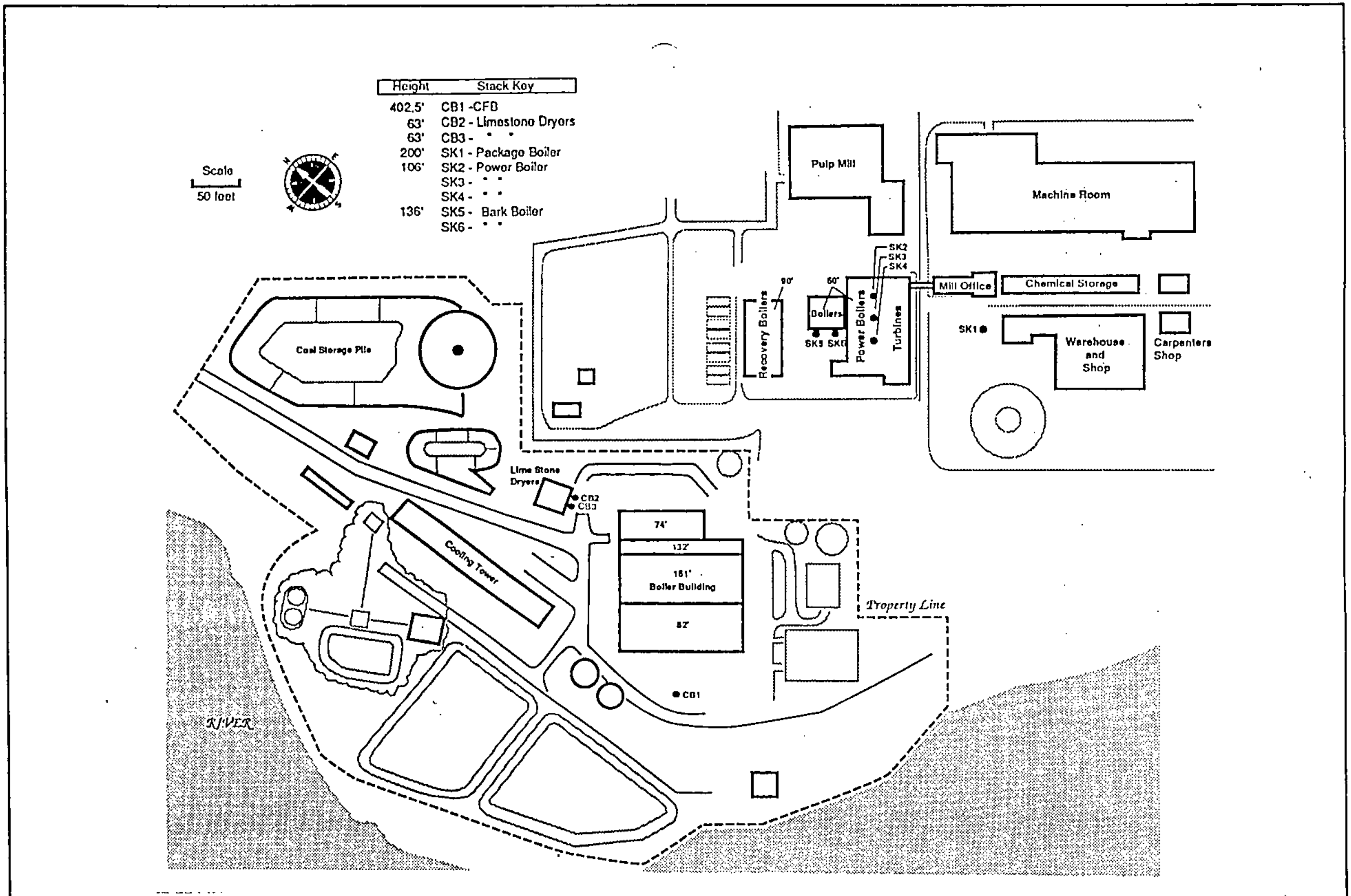

Figure 1-1. Stack and Building Configuration
Cedar Bay Generating Plant, Jacksonville, Florida

Golder Associates

2.0 AIR MODELING ANALYSIS RESULTS

2.1 AAQS ANALYSES

The maximum predicted 3-hour average SO_2 concentrations from the screening analysis due to all future modeled sources are presented in Table 2-1. Based on the results of the screening analyses, additional refined modeling analyses were performed. The refined modeling results were added to a measured, non-modeled background concentration of 10 $\mu g/m^3$, to produce a cumulative total air quality concentration that can be compared with the AAQS. The AAQS refined analysis results are presented in Table 2-2.

The maximum predicted total (including a background concentration of 272 $\mu g/m^3$) 3-hour average SO_2 concentration is 897 $\mu g/m^3$. This predicted concentration is well below the 3-hour average SO_2 AAQS of 1,300 $\mu g/m^3$, and, as such, compliance with the 3-hour average AAQS for SO_2 is demonstrated.

2.2 PSD CLASS II ANALYSIS

The maximum predicted 3-hour average SO_2 PSD increment consumption from the screening analysis due to all PSD-affecting sources is presented in Table 2-3. Based on the results of the screening analyses, refined modeling analyses were performed for receptors located at 320 degrees, 1,500 m and 90 degrees, 5,000 m from the CFB Stack Location. The refined modeling results are presented in Table 2-4.

The maximum H2H 3-hour average SO_2 PSD increment consumption was determined to be 599 $\mu g/m^3$, which is above the allowable increment of 512 $\mu g/m^3$. Several other exceedances of the 3-hour PSD Class II increment for SO_2 were predicted for other time periods and receptor combinations.

To determine all the time period and receptor combinations for which the predicted 3-hour average concentration was above 512 $\mu g/m^3$, the threshold function of the ISCST3 model was used to create the appropriate event input file. This event file was used to determine the contributions of the Cedar Bay facility to any predicted exceedances of the allowable 3-hour

PSD increment. The time period and receptor combinations evaluated in this analysis, and Cedar Bay's contributions to these predicted impacts are summarized in Table 2-5. As shown in Table 2-5, Cedar Bay's maximum contribution to any of the predicted exceedances was 0.014 $\mu g/m^3$, well less than the 3-hour significance level for SO_2 of 25 $\mu g/m^3$. Increment consuming sources at the Anheuser Busch facility were responsible for the majority of the predicted exceedances. Although, compliance with the 3-hour average PSD Class II increment for SO_2 is not demonstrated by this modeling analysis, Cedar Bay does not contribute significantly to any modeled exceedance of the 3-hour average PSD Class II increment for SO_2.

2.3 PSD CLASS I ANALYSIS

The maximum predicted SO_2 PSD increment consumption at the ONWR and WINWR PSD Class I areas due to all nearby PSD-affecting sources is compared to the allowable 3-hour average PSD Class I increment for SO_2 in Table 2-6.

The maximum predicted 3-hour average SO_2 PSD increment consumption at the ONWR PSD Class I areas is 29.4 $\mu g/m^3$, which is above the allowable 3-hour average PSD Class I increment of 25 $\mu g/m^3$. Using an approach similar to that described in Section 2.2, the ISCST3 model was used to determine Cedar Bay's contribution to the predicted exceedances of the Class I increment. The time period and receptor combinations evaluated in this analysis, and Cedar Bay's contributions to these predicted impacts are summarized in Table 2-7. As shown in Table 2-7, Cedar Bay's maximum contribution to any of the predicted exceedances was 0.79 $\mu g/m^3$, again, less than USEPA's recommended 3-hour average significance level for SO_2 of 1 $\mu g/m^3$. Although compliance with the 3-hour average PSD Class I increment for SO_2 is not demonstrated by this modeling analysis, Cedar Bay does not contribute significantly to any predicted exceedances.

Further analysis of these maximum impacts reveals that the Seminole Power Plant in Palatka, by itself, causes impacts greater than the 25 $\mu g/m^3$ allowable increments for the 3-hour averaging time. It is noted that the modeling analysis does not take into account any

SO_2 half-life, which in this case may be appropriate for modeling long-range transport of SO_2, due to the great distance to the Class I area.

Table 2-1. Maximum Predicted 3-Hour Average SO_2 Impacts Due to All Modeled Sources, AAQS Screening Analysis

Concentration[a] ($\mu g/m^3$)	Receptor Location[b] Direction (degree)	Distance (m)	Time Period (YYMMDDHH)
Highest 3-Hour Average			
695	320	1750	84102718
622	320	1750	85082315
558	320	1500	86110121
688	320	1750	87090515
518	320	1500	88112309
Highest, Second-Highest, 3-Hour Average			
540	320	1500	84011306
552	320	1750	85042018
528	320	1500	86122915
533	320	1750	87060718
450	320	1500	88020518

Note:
YYMMDDHH = the two digit designation for the year, month, day, and hour.

Footnotes:
[a] Based on 5-year meteorological record, Jacksonville/Waycross, 1984 through 1988.
[b] Relative to the location of the CFB stack.

Table 2-2. Maximum Predicted 3-Hour Average SO_2 Impacts Due to All Modeled Sources AAQS Refined Analysis

Concentration[a] (μg/m³)			Receptor Location[b]			Florida
			Direction	Distance	Time Period	AAQS[c]
Modeled	Background	Total	(degree)	(m)	(YYMMDDHH)	(μg/m³)
Highest 3-Hour Average						
695	272	967	320	1750	84102718	--
622	272	904	320	1750	85082315	--
666	272	948	322	1750	86030918	--
688	272	960	320	1750	87090515	--
656	272	928	326	1650	88060918	--
Highest, Second-Highest, 3-Hour Average						
625	272	897	322	1750	84052018	1300
599	272	871	326	1550	85032412	1300
600	272	872	322	1750	86100815	1300
584	272	856	318	1650	87050906	1300
599	272	871	318	1650	88112124	1300

Note:
YYMMDDHH = the two digit designation for the year, month, day, and hour.

Footnotes:
[a] Based on 5-year meteorological record, Jacksonville/Waycross, 1984 through 1988.
[b] Relative to the location of the CFB stack.
[c] Applicable to highest, second-highest concentration for each year only.

Table 2-3. Maximum Predicted 3-Hour Average SO_2 Impacts Due to All Modeled Sources, PSD Class II Increment Screening Analysis

Concentration[a] (μg/m³)	Receptor Location[b] Direction (degree)	Distance (m)	Time Period (YYMMDDHH)
Highest 3-Hour Average			
528	320	1500	84011303
538	90	5000	85051112
504	320	1500	86122915
529	320	1500	87010512
487	320	1500	88112309
Highest, Second-Highest, 3-Hour Average			
518	320	1500	84090809
353	320	1500	85092612
492	320	1500	86110121
468	320	1500	87010509
416	320	1500	88020518

Note:
YYMMDDHH = the two digit designation for the year, month, day, and hour.

Footnotes:
[a] Based on 5-year meteorological record, Jacksonville/Waycross, 1984 through 1988.
[b] Relative to the location of the CFB stack.

Table 2-4. Maximum Predicted 3-Hour Average SO_2 Impacts Due to All Modeled Sources, PSD Class II Increment Refined Analysis

Concentration[a] ($\mu g/m^3$)	Receptor Location[b] Direction (degree)	Receptor Location[b] Distance (m)	Time Period (YYMMDDHH)	Allowable PSD Class II Increment[c] ($\mu g/m^3$)
Highest 3-Hour Average				
655	322	1550	84053012	--
581	90	4900	85051112	--
623	318	1650	86090112	--
598	320	1550	87031312	--
650	326	1650	88060918	--
Highest, Second-Highest, 3-Hour Average				
567	326	1550	84040618	512
365	91	5100	85091112	512
573	324	1750	86031309	512
584	318	1650	87050906	512
599	318	1650	88112124	512

Note:
YYMMDDHH = the two digit designation for the year, month, day, and hour.

Footnotes:
[a] Based on 5-year meteorological record, Jacksonville/Waycross, 1984 through 1988.
[b] Relative to the location of the CFB stack.
[c] Applicable to highest, second-highest concentration for each year only.

Table 2-5. Summary of Predicted 3-Hour Average PSD Class II Increment Exceedances and Cedar Bay's Contribution

Maximum Predicted 3-Hour Concentration ($\mu g/m^3$)	Period (YYMMDDHH)	Receptor Location[a]		Cedar Bay's Contribution ($\mu g/m^3$)
		Direction (degrees)	Distance (meters)	
527.9	84011303	320	1,500	0
549.3	84012106	320	1,450	0
610.1	84012115	320	1,550	0
551.2	84020418	324	1,500	0
571.8	84020609	324	1,500	0
634.4	84022315	326	1,550	0
528.0	84040421	328	1,650	0
564.5	84040521	324	1,500	0
616.6	84040612	324	1,550	0
562.3	84040615	324	1,550	0
566.9	84040618	326	1,550	0
602.3	84050409	328	1,650	0
655.0	84053012	322	1,550	0
518.3	84090809	320	1,500	0
546.1	84090812	318	1,550	0
515.6	84091512	324	1,550	0
524.4	84101012	316	1,650	0
560.7	84101012	318	1,650	0
548.5	84112206	320	1,550	0
581.2	85051112	90	4,900	0
534.8	85051112	88	4,800	0
559.2	85051112	88	4,900	0
530.8	85051112	88	5,000	0
516.0	85051112	89	4,700	0
568.1	85051112	89	4,800	0
580.7	85051112	89	4,900	0
547.1	85051112	89	5,000	0
538.8	85051112	90	4,700	0
579.5	85051112	90	4,800	0
581.2	85051112	90	4,900	0
538.0	85051112	90	5,000	0
546.3	85051112	91	4,700	0
573.5	85051112	91	4,800	0
563.7	85051112	91	4,900	0
514.2	85051112	91	5,000	0
542.7	85051112	92	4,700	0
556.3	85051112	92	4,800	0
535.6	85051112	92	4,900	0

Table 2-5. Summary of Predicted 3-Hour Average PSD Class II Increment Exceedances and Cedar Bay's Contribution

Maximum Predicted 3-Hour Concentration ($\mu g/m^3$)	Period (YYMMDDHH)	Receptor Location[a] Direction (degrees)	Receptor Location[a] Distance (meters)	Cedar Bay's Contribution ($\mu g/m^3$)
531.8	85051112	93	4,700	0
533.1	85051112	93	4,800	0
516.2	85051112	94	4,700	0
365.0	85091112	91	5,100	0
570.1	86010512	324	1,500	0
586.0	86011109	318	1,500	0
542.9	86012615	324	1,550	0
516.1	86030818	318	1,650	0
572.7	86031309	324	1,750	0
562.8	86032615	318	1,650	0
551.8	86041418	318	1,750	0
622.8	86090112	318	1,650	0
515.6	86091218	326	1,550	0
608.5	86101612	320	1,550	0
574.7	86102524	324	1,750	0
532.2	86110203	320	1,450	0
555.3	86121424	318	1,500	0
539.1	86121821	324	1,500	0
534.9	86122209	318	1,550	0
517.0	86122412	328	1,650	0
552.5	86123012	322	1,500	0
529.2	87010512	320	1,500	0
525.4	87011306	326	1,500	0
551.9	87012615	324	1,550	0
567.2	87012715	324	1,500	0
534.3	87013109	324	1,500	0
515.3	87022624	316	1,550	0
598.4	87031312	320	1,550	0
525.8	87031918	324	1,450	0
521.7	87040818	324	1,550	0
584.3	87050906	318	1,650	0
587.3	87052515	320	1,650	0
557.2	87052918	316	1,650	0
578.7	87052918	318	1,650	0
576.5	87101218	318	1,550	0
597.5	87101512	318	1,650	0
556.5	87101715	318	1,550	0
580.0	87102618	318	1,500	0

Table 2-5. Summary of Predicted 3-Hour Average PSD Class II Increment Exceedances and Cedar Bay's Contribution

Maximum Predicted 3-Hour Concentration ($\mu g/m^3$)	Period (YYMMDDHH)	Receptor Location[a] Direction (degrees)	Receptor Location[a] Distance (meters)	Cedar Bay's Contribution ($\mu g/m^3$)
524.9	88011021	316	1,550	0
529.3	88011024	316	1,500	0
625.3	88031212	324	1,750	0.014
572.8	88031406	322	1,450	0
609.3	88031406	322	1,500	0
585.7	88050212	320	1,650	0
551.0	88050618	324	1,500	0
649.7	88060918	326	1,650	0
649.7	88060918	326	1,650	0
558.8	88060921	326	1,650	0
546.5	88070109	324	1,450	0
596.3	88090115	318	1,650	0
516.0	88101415	318	1,650	0
618.4	88101912	324	1,550	0
609.8	88111215	318	1,650	0
547.0	88111812	318	1,650	0
599.0	88112124	318	1,650	0
591.1	88112124	316	1,650	0
525.6	88121206	318	1,500	0
556.8	88121206	320	1,550	0
533.8	88122918	316	1,750	0

Notes:
YYMMDDHH = the two digit designation for the year, month, day, and hour.

Footnotes:
[a] Relative to the location of the CFB Stack.

Table 2-6. Maximum Predicted 3-Hour Average SO_2 Impacts Due to All Modeled Sources, PSD Class I Analysis

Concentration[a] ($\mu g/m^3$)	Receptor UTM Coordinates Easting (meters)	Receptor UTM Coordinates Northing (meters)	Time Period (YYMMDDHH)	Allowable 3-Hour SO_2 PSD Increment ($\mu g/m^3$)
Highest 3-Hour Average				
39.0	383000	3382000	84021315	b
31.1	390000	3384000	85071021	b
33.8	470500	3459000	86121112	b
34.8	390000	3384000	87091221	b
28.4	370000	3383000	88071909	b
Highest, Second-Highest, 3-Hour Average				
29.4	392000	3400000	84070409	25
24.3	391000	3390000	85102415	25
22.3	374000	3383000	86102521	25
25.8	391000	3390000	87062209	25
24.7	370000	3383000	88060606	25

Note:
YYMMDDHH = the two digit designation for the year, month, day, and hour.

Footnotes:
[a] Based on 5-year meteorological record, Jacksonville/Waycross, 1984 through 1988.
[b] Applicable only to the highest, second-highest, concentration predicted for a given year.

Table 2-7. Summary of Predicted 3-Hour Average PSD Class I Increment Exceedances and Cedar Bay's Contribution

Maximum Predicted Concentration ($\mu g/m^3$)	Period (YYMMDDHH)	Receptor UTM Coordinates Easting (meters)	Receptor UTM Coordinates Northing (meters)	Cedar Bay's Contribution ($\mu g/m^3$)
28.23	84012412	390000	3410000	0
31.00	84012412	392000	3400000	0
38.96	84021315	383000	3382000	0
31.73	84052912	470500	3459000	0.143
29.40	84070409	392000	3400000	0
29.45	84070409	390000	3410000	0
29.40	84070409	392000	3400000	0
28.97	84080109	370000	3383000	0
27.49	84080509	378000	3382000	0
26.85	84080509	374000	3383000	0
26.26	85061518	391000	3417000	0
31.06	85071021	390000	3384000	0
28.63	85071021	391000	3390000	0
31.06	85071021	390000	3384000	0
24.31	85102415	391000	3390000	0
25.46	85102415	390000	3410000	0
28.73	85102415	392000	3400000	0
26.64	85102415	390000	3395000	0
28.27	85110309	383000	3382000	0.794
25.10	86081321	392000	3400000	0
26.24	86093009	374000	3383000	0
22.31	86102521	374000	3383000	0
33.75	86121112	470500	3459000	0.068
26.40	87010103	374000	3383000	0
28.36	87010103	370000	3383000	0
27.85	87011809	383000	3382000	0
25.02	87033003	390000	3395000	0
25.52	87033003	391000	3390000	0
25.82	87062209	391000	3390000	0
34.80	87091221	390000	3384000	0
26.47	87091221	391000	3390000	0
25.48	87121421	383000	3382000	0
26.42	88040312	378000	3382000	0
24.74	88060606	370000	3383000	0
28.37	88071909	370000	3383000	0

Notes:
YYMMDDHH = the two digit designation for the year, month, day, and hour.