Golder
Associates

AIR QUALITY IMPACT ANALYSIS
FOR SULFUR DIOXIDE
OKEELANTA POWER L.P.
SOUTH BAY, FLORIDA

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1.0 AIR QUALITY IMPACT ANALYSIS FOR SULFUR DIOXIDE

Golder Associates Inc. (Golder), on behalf of Okeelanta Power L.P. (OkPLP), has performed additional air quality impact analyses for sulfur dioxide (SO_2) at the request of the Florida Department of Environmental Protection (FDEP). These analyses were based on modeling OkPLP's expected future maximum SO_2 emissions together with other SO_2 emission sources within the modeling and screening areas. The modeling area extended out to 8 kilometers (km), which is the distance at which the increase in SO_2 impacts are predicted to be below the 3-hour, 24-hour, and annual significant impact levels of 1, 5, and 25 micrograms per cubic meter ($\mu g/m^3$), respectively. Therefore, the screening area extended out to 58 km i.e., 50 km beyond the modeling area.

As shown in these analyses, OkPLP's SO_2 impacts, together with those from background SO_2 emission sources, are predicted to be below the national and state ambient air quality standards (AAQS), prevention of significant deterioration (PSD) Class II increments, and PSD Class I increments. The following summary provides a description of the methods and assumptions used to estimate total SO_2 air quality concentrations for OkPLP and other sources.

1.1 AIR MODELING METHODS AND APPROACH

SO_2 concentrations predicted in areas within 50 km of the OkPLP facility were predicted with the Industrial Source Complex Short-term (ISCST3, Version 00101) dispersion model (EPA, 2001) and 5 years of meteorological data from the National Weather Service (NWS) office at Palm Beach International Airport. The 5-year period of meteorological data was from 1987 through 1991. Generally, when using 5-years of meteorological data for the analysis, the highest annual and highest, second-highest (HSH) short-term concentrations are to be compared to the applicable AAQS and allowable PSD increments. The HSH 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 predicting maximum impacts at the Everglades National Park (NP) PSD Class I area, the California Puff (CALPUFF) modeling system was used. CALPUFF, Version 5.4 (EPA, 2000), is a

Langrangian puff model that is recommended by the FDEP, in coordination with the Federal Land Manager (FLM) for the Everglades NP, for predicting pollutant impacts at PSD Class I areas that are beyond 50 km from the project site. For this project, CALPUFF was used in a refined mode using a CALMET-developed wind field domain covering South Florida. A more detailed discussion of CALPUFF and the CALMET wind field used for the analysis is provided in Appendix A.

1.1.1 SIGNIFICANT IMPACT ANALYSIS

For the significant impact analysis, the difference between the future and actual SO_2 emissions of the OkPLP boilers were modeled. The maximum 3-hour, 24-hour, and annual concentrations are compared to the Class II significant impact levels in the vicinity of the plant, and to the Class I significant impact levels at the PSD Class I area. For all averaging times in which the predicted concentration is greater than the applicable significant impact level, further modeling is required. The Class II modeling area is also determined from the Class II significant impact analysis.

1.1.2 AAQS ANALYSIS

For the AAQS analysis, the future SO_2 emissions of the OkPLP boilers are modeled with background emission facilities. A non-modeled background concentration is added to the maximum predicted air quality to determine a total air quality concentration. The maximum annual and HSH short-term total concentrations are compared to the AAQS.

1.1.3 PSD CLASS II ANALYSIS

For the PSD Class II increment analysis, the future SO_2 emissions along with the PSD baseline source emissions of the OkPLP site are modeled with background emission facilities. The maximum annual and HSH short-term total concentrations are compared to the PSD Class II increments.

1.1.4 PSD CLASS I ANALYSIS

For the PSD Class I increment analysis, the future SO_2 emissions along with the PSD baseline source emissions of the OkPLP site are modeled with background emission facilities (all PSD sources within 150 km). The maximum annual and HSH short-term total concentrations are compared to the PSD Class I increments.

1.1.5 VISIBILITY ANALYSIS

The regional haze analysis was performed using the latest regulatory guidance as provided in the FLM's Air Quality Related Value Work Group (FLAG) Phase I report (December 2000). Using the hourly meteorological and relative humidity data used with the CALPUFF model, the daily change in background extinction is computed. Based on the recommendations of the FLAG Phase I Report (December 2000), the regional haze analysis considered only the maximum 24-hour increase in SO_2 emissions due to the proposed project. The hygroscopic and dry non-hygroscopic components used for calculating the daily background extinction coefficients for the Everglades NP were obtained from the FLAG document. For this analysis, the hygroscopic and dry non-hygroscopic components were 0.9 and 8.5 inverse millimeters (mm^{-1}), respectively.

2.0 EMISSION INVENTORY

The current and future maximum SO_2 emissions for the OkPLP boilers are presented in Table 2-1. Stack and operating parameters are presented in Table 2-2. The current actual SO_2 emissions data were based on current permit limits, AOR data, and Continuous Emissions Monitoring System (CEMS) data. Future maximum SO_2 emissions were based on expected future maximum emissions and the maximum annual heat input rate. Stack and operating data were obtained from the Title V permit application (1999).

Current actual hourly and future maximum hourly sulfuric acid mist (SAM) emissions are presented in Table 2-1. SAM emissions were based on SO_2 emissions and then converted to SAM assuming a 5-percent conversion of SO_2 to sulfur trioxide (SO_3), and using the ratio of the molecular weights of SAM to gaseous sulfate (98/80).

The emission inventories for background facilities were developed from databases obtained from the DEP, previous air modeling studies performed by Golder, and air permit data. All background sources in these inventories were located inside the modeling area.

For sources located in the screening area (defined as 50 km beyond the modeling area), a technique was used for eliminating sources in the modeling analyses if the source's emissions do not meet an emission criterion. This technique, which is approved for use by the FDEP and the U.S. Environmental Protection Agency, is the Screening Threshold method, developed by the North Carolina Department of Natural Resources and Community Development. The method is designed to objectively eliminate from the emission inventory those sources that are unlikely to have a significant interaction with the source undergoing evaluation. In general, sources that should be considered in the modeling analyses are those with emissions greater than a screening threshold value (in TPY) that is calculated by the following criteria:

$$Q = 20 \times D$$

where Q = the screening threshold value (TPY), and

D = The distance (km) from the proposed facility to the source undergoing evaluation for short-term analysis, or

The distance (km) from the edge of the proposed facility's significant impact area to the source undergoing evaluation for long-term (annual) analysis.

For this analysis, the long-term criterion was used since fewer facilities would be eliminated than with the short-term criterion. Also, the total emissions from a facility were used rather than emissions from individual sources for comparison to the screening threshold value. These methods result in a more conservative approach to produce higher-than-expected concentrations. Those facilities with maximum allowable emissions that are below the calculated *screening threshold* were eliminated from further consideration in the AAQS modeling analyses. However, certain large sources (<1,000 TPY) located beyond the screening area were also included in the modeling, based on EPA comments.

A summary of the facilities considered for inclusion in the AAQS and PSD Class II modeling analyses is presented in Table 2-3. This summary identifies facilities located within the modeling area and screening area. The facilities that were not included in the modeling analyses because SO_2 emissions were less than the screening threshold criteria are also identified.

A summary of the facilities considered for inclusion in the PSD Class I modeling analysis is presented in Table 2-4. This summary identifies all facilities located within 150 km of the PSD Class I area.

A summary of the stack, operating, and emission data for sources used in the modeling analyses is presented in Table 2-5.

3.0 RECEPTOR LOCATIONS

The maximum concentrations in the vicinity of OkPLP were predicted in a receptor grid that contained 573 discrete receptors. The discrete receptors included 393 receptors, separated by 100-meter spacing, located along OkPLP's property line and 180 additional offsite receptors in radials at 10-degree intervals and at distances of 4.0, 5.0, 6.0, 7.0, and 8.0 km from the cogeneration Boiler B's stack. A summary of the property boundary receptors is presented in Table 3-1. A plot of the property boundary, receptors, and building locations is presented in Figure 3-1. A summary of the Everglades NP Class I area receptors used in the PSD Class I increment analysis is presented in Table 3-2.

4.0 BUILDING DOWNWASH EFFECTS FOR OKPLP

All significant building structures within OkPLP's property boundary were determined by a site plot plan. The plot plan was presented in the original application (Attachment OC-FI-C2). A total of four building structures were evaluated. All building structures were processed in the EPA Building Input Profile (BPIP, Version 95086) program to determine direction-specific building heights and projected 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 4-1. A plot of the building dimensions and the cogeneration Boiler B stack location (the modeling origin) is presented in Figure 4-1.

5.0 BACKGROUND CONCENTRATIONS

To estimate the total SO_2 air quality concentrations, 3-hour, 24-hour, and annual background concentrations were added to the modeling results. The background concentration is considered to be the air quality concentration contributed by sources not included in the modeling evaluation. Because other background sources were modeled, a background value was used that was considered to be realistic but still conservative.

A summary of the SO_2 ambient monitoring data, in the vicinity of OkPLP for 1997 through 2000 is presented in Table 5-1. The SO_2 monitors nearest to the site are monitor ID 4150-001-J02, located at 300 North US 27 in South Bay and monitor ID 3840-004-G02 and 12-099-3004, located at 1050 15th Street in Riviera Beach. In this analysis, background concentrations were selected based on the second-highest concentrations measured from the nearest monitor located at 300 North US 27 in South Bay, since this monitor is much closer to OkPLP and is located in a more rural area of Palm Beach County.

For 1997, the second-highest of the 3-hour and 24-hour concentrations and the annual average concentration at this monitor was 47, 13, and 5 micrograms per cubic meter ($\mu g/m^3$), respectively. These background levels were added to the refined model-predicted concentrations to estimate total SO_2 air quality levels for comparison to the AAQS.

6.0 SUMMARY OF RESULTS

6.1 SIGNIFICANT IMPACT ANALYSES

The maximum SO_2 impacts due to the proposed increase in emissions at OkPLP compared to the Class II significant impact levels, are presented in Table 6-1. Based on the Class II significant impact analysis results, AAQS and PSD Class II increment analyses must be performed.

The maximum SO_2 impacts due to the increase in emissions compared to the Class I significant impact levels are presented in Table 6-2. Based on the Class I significant impact analysis results, a full PSD Class I increment analysis must be performed for the 24-hour averaging time.

6.2 AAQS ANALYSIS

A summary of the HSH 3-hour, HSH 24-hour, and maximum annual average SO_2 concentrations predicted in the AAQS screening analysis is presented in Table 6-3. Based on the screening results, modeling refinements were performed for all averaging times. The results of the refined modeling analyses, from this analysis, are summarized in Table 6-4. For the AAQS analysis, the HSH 3-hour, HSH 24-hour, and maximum annual average SO_2 concentrations due to all sources, including background concentrations, are 248.6, 74.2, and 15.7 $\mu g/m^3$, respectively. These concentrations are all well below the AAQS of 1,300; 260; and 60 $\mu g/m^3$, respectively.

6.3 PSD CLASS II ANALYSIS

A summary of the HSH 3-hour, HSH 24-hour, and maximum annual average SO_2 screening results predicted in the PSD Class II increment analysis is presented in Table 6-5. Based on the screening results, modeling refinements were performed for the 3-hour and 24-hour averaging times. Maximum annual concentrations were predicted to be less than zero at all receptors. The results of the refined modeling analyses from this analysis are summarized in Table 6-6. For this analysis, the HSH 3-hour and HSH 24-hour average SO_2 concentrations due to all sources are 46.0 and 10.7 $\mu g/m^3$, respectively. These concentrations are well below the PSD increments of 512 and 91 $\mu g/m^3$, respectively.

6.4 PSD CLASS I ANALYSIS

A summary of the HSH 24-hour average SO_2 results predicted at the Everglades NP PSD Class I area is presented in Table 6-7. For this analysis, the HSH 24-hour average SO_2 concentration due to all sources is 3.47 $\mu g/m^3$. This concentration is below the PSD Class I increment of 5 $\mu g/m^3$.

Based on these air modeling results, the maximum SO_2 concentrations from OkPLP and other SO_2 emission sources will comply with the AAQS and PSD Class I and II increments.

7.0 VISIBILITY ANALYSIS

A refined regional haze analysis was performed for the proposed project. The SO_2 and sulfuric acid mist emissions used in the regional haze analysis were presented in Table 2-1. The maximum predicted 24-hour visibility degradation due to the proposed increase in emissions was 1.38 percent. Since this predicted visibility degradation is well below the criteria level of 5 percent, it can be concluded that the proposed project will not adversely impact the background visibility levels at the Everglades NP PSD Class I area.

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Table 2-1. Cogeneration Boiler Emission Rates for Okeelanta Power, L.P.--Total all Three Boilers

		Total Heat Input Rate	CURRENT ACTUAL EMISSIONS				FUTURE POTENTIAL EMISSIONS			
			Short-Term Emissions		Annual Average Emissions		Short-Term Emissions		Annual Average Emissions	
Pollutant			lb/hr	g/sec	TPY	g/sec	lb/hr	g/sec	TPY	g/sec
Sulfur Dioxide	--3-Hour	2,145 MMBtu/hr [a]	321.75 [b]	40.54 ✓	--	--	429.0 [e]	81.08 54.05 ✓	--	--
	--24-Hour	2,145 MMBtu/hr [a]	214.50 [c]	27.03 ✓	--	--	~~364.7~~ [f]	~~45.95~~ ✓	--	--
	--Annual	11.5 x 10^{12} Btu/yr	--	--	219.0 [d]	6.30 ✓	--	54.05 ✓	402.50 [g]	11.58 ✓
Sulfuric Acid Mist	--24-Hour	2,145 MMBtu/hr [a]	13.14 [h]	1.66	--	--	22.3 [h]	2.81	--	--

[a] Based on three boilers operating at 715 MMBtu/hr each.

[b] Based on 0.15 lb/MMBtu, maximum 3-hour average SO_2 emissions from actual CEM data (Appendix B of letter to FDEP dated 6/8/01).

[c] Based on current 24-hour limit of 0.1 lb/MMBtu.

[d] Based on 2000 AOR data.

[e] Based on the expected future maximum of 0.2 lb/MMBtu.

[f] Based on the expected future maximum of 0.17 lb/MMBtu.

[g] Based on an annual maximum heat input rate of 11.5 x 10^{12} Btu/yr and 0.07 lb/MMBtu.

[h] Based on SO_2 emissions and then converted to H_2SO_4 mist assuming 5% conversion of SO_2 to SO_3, then using the ratio of the molecular weights of sulfuric acid mist to gaseous sulfate (98/80).

Note:
Btu/yr = British thermal units per year
g/sec = Grams per second
lb/hr = Pounds per hour
MMBtu/hr = Million British thermal units per hour
TPY = Tons per year

Table 2-2. Stack Parameters[a] for Okeelanta Power, L.P. Boilers

	Heat Input Rate	Stack/Vent Release Height		Stack/Vent Diameter		Gas Flow Rate	Gas Exit Temperature		Velocity	
ISCST ID	(MMBtu/hr)	ft	m	ft	m	(acfm)	^{0}F	K	ft/sec	m/sec
COGENF	715	199	60.66	10	3.05	300,000	352	450.9	63.6	19.39

[a] Representative of all 3 boiler stacks.

Note: acfm = Actual cubic feet per minute
^{0}F = Degrees Fahrenheit
K = Kelvin
m = Meters
m/sec = Meters per second
ft = Feet
ft/sec = Feet per second

Table 2-3. Summary of SO_2 Facilities Considered for Inclusion in the AAQS and PSD Class II Air Modeling Analyses

			UTM Coordinates		Relative to Okeelanta [a]				Maximum SO_2	Q, Emission	Include in
AIRS Number	Facility	County	East (km)	North (km)	X (km)	Y (km)	Distance (km)	Direction (deg)	Emissions (TPY)	Threshold [b] (Dist - SIA) x 20	Modeling Analysis ?
0990086	Glades Correctional Institute	Palm Beach	523.4	2955.2	-1.5	15.1	15.2	354	98	143.5	NO
0990026	Sugar Cane Growers	Palm Beach	534.9	2953.3	10.0	13.2	16.6	37	2,555	171.2	YES
0510001	Everglades Sugar	Hendry	509.6	2954.2	-15.3	14.1	20.8	313	1,216	256.1	YES
0510003	U.S. Sugar Clewiston	Hendry	506.1	2956.9	-18.8	16.8	25.2	312	7,806	344.3	YES
0990016	Atlantic Sugar	Palm Beach	552.9	2945.2	28.0	5.1	28.5	80	954	409.2	YES
0990061	U.S. Sugar -Bryant	Palm Beach	538.8	2968.1	13.9	28.0	31.3	26	2,698	465.2	YES
0990019	Osceola Farms	Palm Beach	544.2	2968.0	19.3	27.9	33.9	35	2,023	518.5	YES
0510015	Southern Gardens Citrus	Hendry	487.6	2957.6	-37.3	17.5	41.2	295	409	664.0	NO
0990021	Pratt & Whitney	Palm Beach	559.2	2978.3	34.3	38.2	51.3	42	504	866.8	NO
0850102	Bechtel Indiantown	Martin	545.6	2991.5	20.7	51.4	55.4	22	2,629	948.2	YES
0850001	FPL -Martin	Martin	543.1	2992.9	18.2	52.8	55.8	19	78,522	957.0	YES
0990234	Palm Beach Resource Recovery[c]	Palm Beach	585.8	2960.2	60.9	20.1	64.1	72	1,533	1122.6	YES
0110120	North Broward Resource Recovery	Broward	583.6	2907.6	58.7	-32.5	67.1	119	896	1181.9	NO
0990568	Lake Worth Utilities[c]	Palm Beach	592.8	2943.7	67.9	3.6	68.0	87	8,996	1199.9	YES
0990042	FPL -Riviera Beach[c]	Palm Beach	594.2	2960.6	69.3	20.5	72.3	74	73,475	1285.4	YES
0112119	South Broward Resource Recovery[c]	Broward	579.6	2883.3	54.7	-56.8	78.9	136	1,318	1417.1	YES
0110037	FPL -Lauderdale[c]	Broward	580.1	2883.3	55.2	-56.8	79.2	136	47,858	1424.1	YES
0110036	FPL -Port Everglades[c]	Broward	587.4	2885.3	62.5	-54.8	83.1	131	170,215	1502.4	YES
0850021	Stuart Contracting	Martin	575.2	3006.8	50.3	66.7	83.5	37	100	1510.8	NO
0250020	Tarmac[c]	Dade	562.9	2861.7	38.0	-78.4	87.1	154	2,792	1582.5	YES
0250348	Dade Co. Resource Recovery	Dade	564.3	2857.4	39.4	-82.7	91.6	155	857	1672.1	NO
0710019	Lee County Resource Recovery	Lee	424.0	2946.0	-100.9	5.9	101.1	273	490	1861.4	NO
0710000	FPL - Fort Myers [c]	Lee	422.1	2952.9	-102.8	12.8	103.6	277	22,702	1911.9	YES
	Fort Pierce Utilities [c]	St. Lucie	566.8	3036.3	41.9	96.2	104.9	24	2,708	1938.6	YES
	Vero Beach Power [c]	St. Lucie	567.1	3056.5	42.2	116.4	123.8	20	11,832	2316.3	YES

[a] Okeelanta Power Coordinates: 524.9 2940.1

[b] Based on North Carolina Screening Technique for annual average basis. "Dist" is the distance the facility is located from the project and SIA is the significant impact area. The proposed project's emissions are predicted to be significant to 8 km.

[c] Large sources (> 1,000 TPY) beyond the screening area (58 km) that were included in the inventory.

Note: deg = Degrees
Km = Kilometers
SIA = Significant impact area
TPY = Tons per year

SO_2 SIA 8km

Table 2-4. Summary of SO_2 Facilities Included in the PSD Class I Air Modeling Analysis

			UTM Coordinates		Relative to Everglades National Park			
AIRS Number	Facility	County	East (km)	North (km)	X (km)	Y (km)	Distance [a] (km)	Direction (deg)
0250348	Dade Co. Resource Recovery	Dade	564.3	2857.4	14.0	8.8	16.5	58
0250020	Tarmac	Dade	562.9	2861.7	12.6	13.1	18.2	44
0112119	South Broward Resource Recovery	Broward	579.6	2883.3	29.3	34.7	45.4	40
0110037	FPL -Lauderdale	Broward	580.1	2883.3	29.8	34.7	45.7	41
0110120	North Broward Resource Recovery	Broward	583.6	2907.6	33.3	59.0	67.7	29
0710019	Lee County Resource Recovery	Lee	424.0	2946.0	-30.0	82.0	87.3[b]	340
0990332	Okeelanta	Palm Beach	525.0	2937.4	-25.3	88.8	92.3	344
0710000	FPL - Fort Myers	Lee	422.1	2952.9	-31.9	88.9	94.5[b]	340
0990016	Atlantic Sugar	Palm Beach	552.9	2945.2	2.6	96.6	96.6	2
0990568	Lake Worth Utilities	Palm Beach	592.8	2943.7	42.5	95.1	104.2	24
0990026	Sugar Cane Growers Coop.	Palm Beach	534.9	2953.3	-15.4	104.7	105.8	352
0510003	U.S. Sugar Clewiston	Hendry	506.1	2956.9	-44.2	108.3	117.0	338
0990234	Palm Beach Resource Recovery	Palm Beach	585.8	2960.2	35.5	111.6	117.1	18
0990019	Osceola Farms	Palm Beach	544.2	2968.0	-6.1	119.4	119.6	357
0990061	U.S. Sugar -Bryant	Palm Beach	538.8	2968.1	-11.5	119.5	120.1	355
0510015	Southern Gardens Citrus	Hendry	487.6	2957.6	-62.7	109.0	125.7	330
0990021	Pratt & Whitney	Palm Beach	559.2	2978.3	8.9	129.7	130.0	4
0850102	Bechtel Indiantown	Martin	545.6	2991.5	-4.7	142.9	143.0	358
0850001	FPL -Martin	Martin	543.1	2992.9	-7.2	144.3	144.5	357

[a] Distance from the northeast corner of the Everglades National Park, unless otherwise noted.

[b] Distance from the northwestern corner of the Everglades National Park: 454 2864.0

Table 2-5. Summary of SO_2 Sources Included in the Air Modeling Analysis

				Stack and Operating Parameters									
AIRS			Modeling	Height	Diameter	Temper.	Velocity	Emission Rate (g/s)		PSD Source?	Modeled in		
Number	Facility	Units	ID Name	(m)	(m)	(K)	(m/s)	3-Hour	24-Hour	(EXP/CON)	AAQS	Class II	Class I
50PMB500332	Okeelanta [a]												
		Boiler 4 PSD Baseline	OKBLR4B	22.9	2.29	333.0	7.36	-10.95	-10.95	EXP	No	Yes	Yes
		Boiler 5 PSD Baseline	OKBLR5B	22.9	2.29	333.0	12.07	-15.64	-15.64	EXP	No	Yes	Yes
		Boiler 6 PSD Baseline	OKBLR6B	22.9	2.29	334.0	8.74	-15.64	-15.64	EXP	No	Yes	Yes
		Boiler 10 PSD Baseline	OKBLR10B	22.9	2.29	334.0	10.35	-17.15	-17.15	EXP	No	Yes	Yes
		Boiler 11 PSD Baseline	OKBLR11B	22.9	2.29	342.0	9.89	-16.79	-16.79	EXP	No	Yes	Yes
		Boiler 16 PSD Baseline	OKBLR16B	22.9	1.52	483.0	22.86	-1.47	-1.47	EXP	No	Yes	Yes
0990026	Sugar Cane Growers [a]												
		Unit 1&2	SUGCN12	45.7	1.87	339.0	21.95	41.20	41.20	CON	Yes	Yes	Yes
		Unit 3	SUGCN3	27.4	1.52	339.0	22.25	16.20	16.20	CON	Yes	Yes	Yes
		Unit 4 PSD	SUGCN4	54.9	2.44	339.0	21.73	38.20	38.20	CON	Yes	Yes	Yes
		Unit 5	SUGCN5	45.7	2.30	339.0	15.94	27.90	27.90	CON	Yes	Yes	Yes
		Unit 8 PSD	SUGCN8	47.2	2.90	339.0	13.62	23.50	23.50	~~CON~~	Yes	Yes	Yes
		Unit 1&2 PSD Baseline	SUGCN12B	24.4	1.40	344.0	11.40	-24.20	-24.20	EXP	No	Yes	Yes
		Unit 3 PSD Baseline	SUGCN3B	24.4	1.60	344.0	15.60	-4.40	-4.40	EXP	No	Yes	Yes
		Unit 4 PSD Baseline	SUGCN4B	25.9	1.63	344.0	11.20	-24.20	-24.20	EXP	No	Yes	Yes
		Unit 5 PSD Baseline	SUGCN5B	24.4	1.40	344.0	15.20	-16.20	-16.20	EXP	No	Yes	Yes
		Unit 6&7 PSD Baseline	SUGCN67B	12.2	1.52	606.0	11.20	-51.00	-51.00	EXP	No	Yes	Yes
0510001	Everglades Sugar [b]	Main Boiler	EVERGLAD	21.9	1.10	477.0	10.10	34.90	34.90	NO	Yes	No	No
0510003	US Sugar - Clewiston [c]												
		PSD Baseline (On-crop season only)											
		Unit 1 PSD Baseline	USSBRL1B	23.1	1.86	344.0	30.20	-79.86	-58.21	EXP	No	Yes	Yes
		Unit 2 PSD Baseline	USSBLR2B	23.1	1.86	343.0	35.70	-79.86	-58.21	EXP	No	Yes	Yes
		Unit 3 PSD Baseline	USSBLR3B	27.4	2.29	342.0	14.70	-48.30	-33.20	EXP	No	Yes	Yes
		East Pellet Plant PSD Baseline	EPELLET	12.2	1.52	347.0	8.54	-10.30	-10.30	EXP	No	Yes	Yes
		West Pellet Plant PSD Baseline	WPELLET	15.7	1.52	347.0	8.54	-10.30	-10.30	EXP	No	Yes	Yes
		On-crop season future											
		Unit 1	USSBRL1N	65.0	2.44	347.0	15.36	78.79	73.73	CON	Yes	Yes	Yes
		Unit 2	USSBLR2N	65.0	2.44	338.0	13.86	78.49	73.44	CON	Yes	Yes	Yes
		Unit 3	USSBLR3N	65.0	2.44	333.2	6.78	47.08	47.08	CON	Yes	Yes	Yes
		Unit 4	USSBLR4N	45.7	2.51	344.3	20.28	21.53	3.68	CON	Yes	Yes	Yes
		Unit 7	USSBLR7N	68.6	2.59	405.4	20.77	13.91	12.65	CON	Yes	Yes	Yes
		Off-crop season future											
		Unit 1	USSBRL1F	65.0	2.44	347.0	14.05	51.64	24.29	CON	Yes	Yes	Yes
		Unit 2	USSBLR2F	65.0	2.44	338.0	12.68	51.27	24.02	CON	Yes	Yes	Yes
		Unit 3	USSBLR3F	65.0	2.44	333.2	6.20	30.74	30.20	CON	Yes	Yes	Yes
		Unit 4	USSBLR4F	45.7	2.51	344.3	0.00	0.00	0.00	CON	Yes	Yes	Yes

Table 2-5. Summary of SO_2 Sources Included in the Air Modeling Analysis

				Stack and Operating Parameters				Emission Rate (g/s)			Modeled in		
AIRS Number	Facility	Units	Modeling ID Name	Height (m)	Diameter (m)	Temper. (K)	Velocity (m/s)	3-Hour	24-Hour	PSD Source? (EXP/CON)	AAQS	Class II	Class I
		Unit 7	USSBLR7F	68.6	2.59	405.4	23.60	17.39	15.81	CON	Yes	Yes	Yes
0990016	Atlantic Sugar [a]												
		Unit 1	ATLSUG1	27.4	1.83	346.0	17.97	16.28	16.28	CON	Yes	Yes	Yes
		Unit 2	ATLSUG2	27.4	1.83	350.0	23.36	16.28	16.28	CON	Yes	Yes	Yes
		Unit 3	ATLSUG3	27.4	1.83	350.0	21.56	16.02	16.02	CON	Yes	Yes	Yes
		Unit 4	ATLSUG4	27.4	1.83	344.0	25.16	16.21	16.21	CON	Yes	Yes	Yes
		Unit 5 PSD [b]	ATLSUG5	27.4	1.68	339.0	19.24	8.41	8.04	CON	Yes	Yes	Yes
		Unit 1 PSD Baseline	ATLSUG1B	18.9	1.92	506.0	12.70	-17.24	-17.24	EXP	No	Yes	Yes
		Unit 2 PSD Baseline	ATLSUG2B	18.9	1.92	511.0	10.90	-22.50	-22.50	EXP	No	Yes	Yes
		Unit 3 PSD Baseline	ATLSUG3B	21.9	1.83	522.0	17.50	-16.88	-16.88	EXP	No	Yes	Yes
		Unit 4 PSD Baseline	ATLSUG4B	18.3	1.83	344.0	15.00	-10.76	-10.76	EXP	No	Yes	Yes
0990061	US Sugar-Bryant [a]												
		Unit 5 PSD	USSBRY5	42.7	2.90	345.0	11.49	45.70	45.70	CON	Yes	Yes	Yes
		Unit 1,2&3	USBRY123	19.8	1.64	342.0	36.40	109.50	109.50	CON	Yes	Yes	Yes
		Unit 1 PSD Baseline	USSBRY1B	19.8	1.68	494.0	44.30	-36.50	-36.50	EXP	No	Yes	Yes
		Unit 2&3 PSD Baseline	USBRY23B	19.8	1.68	344.0	37.90	-73.00	-73.00	EXP	No	Yes	Yes
0990019	Osceola Farms [a]												
		Unit 2	OSBLR2	27.4	1.52	339.0	18.63	17.12	17.12	CON	Yes	Yes	Yes
		Unit 3	OSBLR3	27.4	1.92	344.0	14.34	30.74	30.74	CON	Yes	Yes	Yes
		Unit 4	OSBLR4	27.4	1.83	344.0	16.53	17.12	17.12	CON	Yes	Yes	Yes
		Unit 5	OSBLR5	27.4	1.52	344.0	17.85	18.00	18.00	CON	Yes	Yes	Yes
		Unit 6	OSBLR6	27.4	1.92	339.0	18.25	33.39	33.39	CON	Yes	Yes	Yes
		Unit 1 PSD Baseline	OSBLR1B	22.0	1.52	342.0	8.18	-5.07	-5.07	EXP	No	Yes	Yes
		Unit 2 PSD Baseline	OSBLR2B	22.0	1.52	341.0	18.10	-16.32	-16.32	EXP	No	Yes	Yes
		Unit 3 PSD Baseline	OSBLR3B	22.0	1.93	341.0	14.50	-7.26	-7.26	EXP	No	Yes	Yes
		Unit 4 PSD Baseline	OSBLR4B	22.0	1.83	341.0	18.80	-13.61	-13.61	EXP	No	Yes	Yes
50FTM260015	Southern Gardens Citrus - PSD												
		Peel Dryer	SGARDDRY	38.1	1.73	316.0	7.45	5.29	5.29	CON	No [c]	No [c]	Yes
		Boilers 1-3	SGARDBLR	16.8	1.22	478.0	14.22	6.88	6.88	CON	No [c]	No [c]	Yes
990021	Pratt & Whitney												
		Heater	PRATARCH	15.2	0.91	810.9	143.73	13.99	13.99	CON	No [c]	No [c]	Yes
		Boiler BO-12	PRATBO12	4.6	0.76	533.2	6.92	0.51	0.51	CON	No [c]	No [c]	Yes
0850102	Bechtel Indiantown PSD		BECHTIND	150.9	4.88	333.2	30.50	75.64	75.64	CON	Yes	Yes	Yes
0850001	FPL Martin												
		Units 1&2	MART12	152.1	7.99	420.9	21.03	1743.79	1743.79	NO	Yes	No	No
		Aux Blr PSD	MARTAUX	18.3	1.10	535.4	15.24	12.90	12.90	CON	Yes	Yes	Yes
		Diesel Gens PSD	MARTGEN	7.6	0.30	785.9	39.62	0.51	0.51	CON	Yes	Yes	Yes

Table 2-5. Summary of SO_2 Sources Included in the Air Modeling Analysis

AIRS Number	Facility	Units	Modeling ID Name	Stack and Operating Parameters Height (m)	Diameter (m)	Temper. (K)	Velocity (m/s)	Emission Rate (g/s) 3-Hour	24-Hour	PSD Source? (EXP/CON)	Modeled in AAQS	Class II	Class I	
		Units 3&4 PSD	MART34	64.9	6.10	410.9	18.90	470.40	470.40	CON	Yes	Yes	Yes	
		2 Simple Cycle CT	MARTCTs	18.3	6.17	853.2	37.63	25.98	25.98	CON	Yes	Yes	Yes	
0990234	Palm Beach Co. Resource Recovery													
		1&2 PSD	PBCRRF	76.2	2.04	505.2	24.90	85.05	85.05	CON	Yes	Yes	Yes	
110120	North Broward RRF PSD		NBCRRF	58.5	3.96	381.0	18.01	35.40	35.40	CON	No[c]	No[c]	Yes	ok
0990568	Lake Worth Utilities													
		Unit 3	LAKWTHU3	38.1	2.13	408.2	7.71	103.95	103.95	NO	Yes	No	No	
		Unit 4	LAKWTHU4	35.1	2.29	418.2	17.00	129.85	129.85	NO	Yes	No	No	
		Unit 5	LAKWTHU5	22.9	0.94	450.4	18.29	11.59	11.59	NO	Yes	No	No	
		HRSG	LAKWTHHR	45.7	5.49	377.6	13.74	12.79	12.79	CON	Yes	Yes	Yes	
0990042	FPL Riviera													
		Units 3&4 at 2.5%s fuel oil	RIVU34	90.8	4.88	401.5	18.90	2113.65	2113.65	NO	Yes	No	No	
0112119	South Broward RRF PSD		SBCRRF	59.4	3.96	381.0	18.01	37.91	37.91	CON	Yes	Yes	Yes	
0110037	FPL - Lauderdale													
		CTs 1-4 PSD	LAUDU45	45.7	5.49	438.7	14.60	271.15	271.15	CON	Yes	Yes	Yes	
		GT 1-12 (0.5% fuel oil)	LDGT1_12	13.7	2.37	733.2	114.31	552.80	552.80	NO	Yes	No	No	
		GT 13-24 (0.5% fuel oil)	LDGT1324	13.4	4.75	733.2	28.43	552.80	552.80	NO	Yes	No	No	
		4&5 PSD Baseline	FTLAU45B	46.0	4.27	422.0	14.63	-457.00	-457.00	EXP	No	Yes	Yes	
	FPL Port Everglades													
		Units 1&2 at 2.5%s fuel oil	PTEVU12	104.5	4.27	415.9	26.72	1593.90	1593.90	NO	Yes	No	No	
		Units 3&4 at 2.5%s fuel oil	PTEVU34	104.5	5.52	414.8	23.88	2772.00	2772.00	NO	Yes	No	No	
		GT 1-12 (0.5% fuel oil)	PTEVGTS	13.4	4.75	733.2	28.43	530.70	530.70	NO	Yes	No	No	
0250020	Tarmac													
		Kiln 1	TARMC1	61.0	2.44	465.0	12.80	5.67	5.67	NO	Yes	No	No	
		Kiln 2 PSD Baseline	TARMC2B	61.0	2.44	465.0	12.84	-5.71	-5.71	EXP	No	Yes	Yes	
		Kiln 3 PSD Baseline	TARMC3B	61.0	4.57	472.0	10.78	-2.76	-2.76	EXP	No	Yes	Yes	
		Kiln 2 PSD	TABMC2P	61.0	2.44	422.0	9.10	24.57	24.57	CON	Yes	Yes	Yes	
		Kiln 3 PSD	TARMC3P	61.0	4.57	450.0	11.04	51.43	51.43	CON	Yes	Yes	Yes	
0250348	Dade County RRF PSD													
		Units 1&2	DCRRF12	76.2	3.66	405.4	15.86	26.41	12.32	CON	No[c]	No[c]	Yes	
		Units 3&4	DCRRF34	76.2	3.66	405.4	15.86	26.41	12.32	CON	No[c]	No[c]	Yes	
0710019	Lee County RRF PSD		LEECORRF	83.8	1.88	388.5	19.81	14.00	14.00	CON	No[c]	No[c]	Yes	
0710000	FPL Fort Myers													

Table 2-5. Summary of SO_2 Sources Included in the Air Modeling Analysis

AIRS Number	Facility	Units	Modeling ID Name	Stack and Operating Parameters				Emission Rate (g/s)		PSD Source?	Modeled in		
				Height (m)	Diameter (m)	Temper. (K)	Velocity (m/s)	3-Hour	24-Hour	(EXP/CON)	AAQS	Class II	Class I
		Unit 1 PSD	FMU1	91.8	2.90	422.0	29.90	-585.50	-585.50	EXP	No	Yes	Yes
		Unit 2 PSD	FMU2	121.2	5.52	408.0	19.20	-1334	-1334.0	EXP	No	Yes	Yes
		HRSGs 1 - 6	FMYHR1_6	38.1	5.79	377.6	14.2	3.86	3.9	CON	Yes	Yes	Yes
		Gas Turbines 1 -12	FMYGT112	9.75	4.42	797.0	35.7	649.2	649.2	NO	Yes	No	No
	Fort Pierce Utilities												
		Units 6&7	FTPIER67	45.7	2.19	408.2	12.50	77.87	77.87	NO	Yes	No	No
	Vero Beach Power												
		Unit 1	VERBU1	60.96	1.07	437.0	32.42	28.77	28.77	NO	Yes	No	No
		Unit 2	VERBU2	60.96	1.07	434.3	37.57	84.21	84.21	NO	Yes	No	No
		Unit 3	VERBU3	60.96	1.83	440.4	19.93	142.07	142.07	NO	Yes	No	No
		Unit 4	VERBU4	60.96	2.13	425.4	24.36	69.05	69.05	NO	Yes	No	No
		Unit 5 Simple Cycle CT	VERBU5	38.10	3.35	416.5	19.56	15.50	15.50	CON	Yes	Yes	No

[a] Facilities or sources within facilities that operate only during the October 1 through April 31 crop season.

[b] Sugar mill sources that operate all year.

[c] Large source outside the 24-hour significant impact distance, but included in analysis.

[d] Future data represents worst case emissions for May 1 through September 31 off-crop season operation, and October 1-April 30 for on-crop season. Updated from PSD modeling information, Golder Associates (7/18/00). Baseline data represents November 1 though April 30.

[e] Not included in the AAQS or PSD Class II modeling because they screened out.

Note:
EXP = PSD expanding source
CON = PSD consuming source
NO = Source does not affect PSD increment

Table 3-1. Okeelanta Power, L.P. Property Boundary Receptors[a] Used In the Modeling Analysis

Coordinates[b]		Coordinates[b]		Coordinates[b]		Coordinates[b]		Coordinates[b]	
X (m)	Y (m)	X (m)	Y (m)	X (m)	Y (m)	X (m)	Y (m)	X (m)	Y (m)
-9699.6	444.2	-9509.5	3738.7	-6259.5	3791.6	-2959.5	3791.6	340.5	3791.6
-9693.9	544.0	-9459.5	3791.6	-6159.5	3791.6	-2859.5	3791.6	440.5	3791.6
-9688.1	643.9	-9359.5	3791.6	-6059.5	3791.6	-2759.5	3791.6	540.5	3791.6
-9682.3	743.7	-9259.5	3791.6	-5959.5	3791.6	-2659.5	3791.6	640.5	3791.6
-9676.6	843.5	-9159.5	3791.6	-5859.5	3791.6	-2559.5	3791.6	740.5	3791.6
-9670.8	943.4	-9059.5	3791.6	-5759.5	3791.6	-2459.5	3791.6	840.5	3791.6
-9665.1	1043.2	-8959.5	3791.6	-5659.5	3791.6	-2359.5	3791.6	940.5	3791.6
-9659.3	1143.0	-8859.5	3791.6	-5559.5	3791.6	-2259.5	3791.6	1040.5	3791.6
-9653.5	1242.9	-8759.5	3791.6	-5459.5	3791.6	-2159.5	3791.6	1140.5	3791.6
-9647.8	1342.7	-8659.5	3791.6	-5359.5	3791.6	-2059.5	3791.6	1240.5	3791.6
-9642.0	1442.5	-8559.5	3791.6	-5259.5	3791.6	-1959.5	3791.6	1340.5	3791.6
-9636.3	1542.4	-8459.5	3791.6	-5159.5	3791.6	-1859.5	3791.6	1440.5	3791.6
-9630.5	1642.2	-8359.5	3791.6	-5059.5	3791.6	-1759.5	3791.6	1540.5	3791.6
-9624.7	1742.0	-8259.5	3791.6	-4959.5	3791.6	-1659.5	3791.6	1640.5	3791.6
-9619.0	1841.9	-8159.5	3791.6	-4859.5	3791.6	-1559.5	3791.6	1740.5	3791.6
-9613.2	1941.7	-8059.5	3791.6	-4759.5	3791.6	-1459.5	3791.6	1840.5	3791.6
-9607.5	2041.5	-7959.5	3791.6	-4659.5	3791.6	-1359.5	3791.6	1940.5	3791.6
-9601.7	2141.4	-7859.5	3791.6	-4559.5	3791.6	-1259.5	3791.6	2040.5	3791.6
-9595.9	2241.2	-7759.5	3791.6	-4459.5	3791.6	-1159.5	3791.6	2140.5	3791.6
-9590.2	2341.0	-7659.5	3791.6	-4359.5	3791.6	-1059.5	3791.6	2240.5	3791.6
-9584.4	2440.9	-7559.5	3791.6	-4259.5	3791.6	-959.5	3791.6	2306.1	3757.2
-9578.7	2540.7	-7459.5	3791.6	-4159.5	3791.6	-859.5	3791.6	2306.1	3657.2
-9572.9	2640.5	-7359.5	3791.6	-4059.5	3791.6	-759.5	3791.6	2306.1	3557.2
-9567.1	2740.4	-7259.5	3791.6	-3959.5	3791.6	-659.5	3791.6	2306.1	3457.2
-9561.4	2840.2	-7159.5	3791.6	-3859.5	3791.6	-559.5	3791.6	2306.1	3357.2
-9555.6	2940.0	-7059.5	3791.6	-3759.5	3791.6	-459.5	3791.6	2306.1	3257.2
-9549.9	3039.9	-6959.5	3791.6	-3659.5	3791.6	-359.5	3791.6	2306.1	3157.2
-9544.1	3139.7	-6859.5	3791.6	-3559.5	3791.6	-259.5	3791.6	2306.1	3057.2
-9538.3	3239.5	-6759.5	3791.6	-3459.5	3791.6	-159.5	3791.6	2306.1	2957.2
-9532.6	3339.4	-6659.5	3791.6	-3359.5	3791.6	-59.5	3791.6	2306.1	2857.2
-9526.8	3439.2	-6559.5	3791.6	-3259.5	3791.6	40.5	3791.6	2306.1	2757.2
-9521.1	3539.0	-6459.5	3791.6	-3159.5	3791.6	140.5	3791.6	2306.1	2657.2
-9515.3	3638.9	-6359.5	3791.6	-3059.5	3791.6	240.5	3791.6	2306.1	2557.2

Table 3-1. Okeelanta Power, L.P. Property Boundary Receptors[a] Used In the Modeling Analysis (continued)

Coordinates[b]		Coordinates[b]		Coordinates[b]		Coordinates[b]		Coordinates[b]	
X (m)	Y (m)	X (m)	Y (m)	X (m)	Y (m)	X (m)	Y (m)	X (m)	Y (m)
2306.1	2457.2	3448.7	299.8	3696.1	-2838.9	396.1	-2838.9	-2903.9	-2838.9
2306.1	2357.2	3448.7	199.8	3596.1	-2838.9	296.1	-2838.9	-3003.9	-2838.9
2306.1	2257.2	3448.7	99.8	3496.1	-2838.9	196.1	-2838.9	-3103.9	-2838.9
2306.1	2157.2	3448.7	-0.2	3396.1	-2838.9	96.1	-2838.9	-3203.9	-2838.9
2366.8	2117.9	3448.7	-100.2	3296.1	-2838.9	-3.9	-2838.9	-3303.9	-2838.9
2466.8	2117.9	3448.7	-200.2	3196.1	-2838.9	-103.9	-2838.9	-3403.9	-2838.9
2566.8	2117.9	3448.7	-300.2	3096.1	-2838.9	-203.9	-2838.9	-3503.9	-2838.9
2666.8	2117.9	3448.7	-400.2	2996.1	-2838.9	-303.9	-2838.9	-3603.9	-2838.9
2766.8	2117.9	3448.7	-500.2	2896.1	-2838.9	-403.9	-2838.9	-3703.9	-2838.9
2866.8	2117.9	3448.7	-600.2	2796.1	-2838.9	-503.9	-2838.9	-3803.9	-2838.9
2966.8	2117.9	3448.7	-700.2	2696.1	-2838.9	-603.9	-2838.9	-3903.9	-2838.9
3066.8	2117.9	3448.7	-800.2	2596.1	-2838.9	-703.9	-2838.9	-4003.9	-2838.9
3166.8	2117.9	3448.7	-900.2	2496.1	-2838.9	-803.9	-2838.9	-4103.9	-2838.9
3266.8	2117.9	3448.7	-1000.2	2396.1	-2838.9	-903.9	-2838.9	-4203.9	-2838.9
3366.8	2117.9	3448.7	-1100.2	2296.1	-2838.9	-1003.9	-2838.9	-4303.9	-2838.9
3448.7	2099.8	3448.7	-1200.2	2196.1	-2838.9	-1103.9	-2838.9	-4403.9	-2838.9
3448.7	1999.8	3448.7	-1300.2	2096.1	-2838.9	-1203.9	-2838.9	-4503.9	-2838.9
3448.7	1899.8	3448.7	-1400.2	1996.1	-2838.9	-1303.9	-2838.9	-4603.9	-2838.9
3448.7	1799.8	3448.7	-1500.2	1896.1	-2838.9	-1403.9	-2838.9	-4703.9	-2838.9
3448.7	1699.8	3448.7	-1600.2	1796.1	-2838.9	-1503.9	-2838.9	-4803.9	-2838.9
3448.7	1599.8	3448.7	-1700.2	1696.1	-2838.9	-1603.9	-2838.9	-4903.9	-2838.9
3448.7	1499.8	3448.7	-1800.2	1596.1	-2838.9	-1703.9	-2838.9	-5003.9	-2838.9
3448.7	1399.8	3448.7	-1900.2	1496.1	-2838.9	-1803.9	-2838.9	-5103.9	-2838.9
3448.7	1299.8	3448.7	-2000.2	1396.1	-2838.9	-1903.9	-2838.9	-5203.9	-2838.9
3448.7	1199.8	3448.7	-2100.2	1296.1	-2838.9	-2003.9	-2838.9	-5303.9	-2838.9
3448.7	1099.8	3483.0	-2191.1	1196.1	-2838.9	-2103.9	-2838.9	-5403.9	-2838.9
3448.7	999.8	3532.4	-2278.0	1096.1	-2838.9	-2203.9	-2838.9	-5503.9	-2838.9
3448.7	899.8	3581.8	-2365.0	996.1	-2838.9	-2303.9	-2838.9	-5603.9	-2838.9
3448.7	799.8	3631.2	-2451.9	896.1	-2838.9	-2403.9	-2838.9	-5703.9	-2838.9
3448.7	699.8	3680.6	-2538.9	796.1	-2838.9	-2503.9	-2838.9	-5803.9	-2838.9
3448.7	599.8	3730.0	-2625.8	696.1	-2838.9	-2603.9	-2838.9	-5903.9	-2838.9
3448.7	499.8	3779.4	-2712.8	596.1	-2838.9	-2703.9	-2838.9	-6003.9	-2838.9
3448.7	399.8	3828.8	-2799.7	496.1	-2838.9	-2803.9	-2838.9	-6103.9	-2838.9

Table 3-1. Okeelanta Power, L.P. Property Boundary Receptors[a] Used In the Modeling Analysis (continued)

Coordinates[b]		Coordinates[b]	
X (m)	Y (m)	X (m)	Y (m)
-6203.9	-2838.9	-9120.5	-2368.5
-6303.9	-2838.9	-9140.7	-2270.6
-6403.9	-2838.9	-9160.9	-2172.6
-6503.9	-2838.9	-9181.0	-2074.7
-6603.9	-2838.9	-9201.2	-1976.7
-6703.9	-2838.9	-9221.4	-1878.8
-6803.9	-2838.9	-9241.5	-1780.9
-6903.9	-2838.9	-9261.7	-1682.9
-7003.9	-2838.9	-9281.9	-1585.0
-7103.9	-2838.9	-9302.0	-1487.0
-7203.9	-2838.9	-9322.2	-1389.1
-7303.9	-2838.9	-9342.3	-1291.1
-7403.9	-2838.9	-9362.5	-1193.2
-7503.9	-2838.9	-9382.7	-1095.2
-7603.9	-2838.9	-9402.8	-997.3
-7703.9	-2838.9	-9423.0	-899.3
-7803.9	-2838.9	-9443.2	-801.4
-7903.9	-2838.9	-9463.3	-703.5
-8003.9	-2838.9	-9483.5	-605.5
-8103.9	-2838.9	-9503.7	-507.6
-8203.9	-2838.9	-9523.8	-409.6
-8303.9	-2838.9	-9544.0	-311.7
-8403.9	-2838.9	-9564.2	-213.7
-8503.9	-2838.9	-9584.3	-115.8
-8603.9	-2838.9	-9604.5	-17.8
-8703.9	-2838.9	-9624.7	80.1
-8803.9	-2838.9	-9644.8	178.1
-8903.9	-2838.9	-9665.0	276.0
-9003.9	-2838.9	-9685.2	373.9
-9039.9	-2760.3		
-9060.0	-2662.4		
-9080.2	-2564.4		
-9100.4	-2466.5		

[a] Receptors were selected at 100-meter spacing along property boundary.

[b] Distances are relative to the OkPLP Boiler B stack.

Note: m = meter

Table 3-2. Everglades National Park Receptors Used in the PSD Class I Modeling Analysis

UTM Coordinates (m)		UTM Coordinates (m)		UTM Coordinates (m)		UTM Coordinates (m)	
East	North	East	North	East	North	East	North
557000	2789000 1	538000	2848600	514500	2837000	470000	2860000
556600	2792000 2	537000	2848600	514500	2836000	469000	2860000
556000	2796000 3	536000	2848600	514500	2835000	468000	2860000
553000	2796500 4	535000	2848600 40	514500	2834000	467000	2860000
548000	2796500 5	534000	2848600	514500	2833000	466000	2860000
542700	2796500	533000	2848600	514500	2832500	465000	2860000
542700	2800000	532000	2848600	510000	2832500	464000	2860000
542700	2805000	531000	2848600	509000	2832500	463000	2860000
542700	2810000	530000	2848600 45	508000	2832500	462000	2860000
542000	2811000 10	529000	2848600	507000	2832500	461000	2860000
541300	2814000	528000	2848600	506000	2832500	460000	2860000
542700	2816000	527000	2848600	505000	2832500	459500	2863200
544100	2820000	526000	2848600	504000	2832500	459000	2863200
543500	2824600	525000	2848600 50	503000	2832500	458000	2863200
545000	2829000 15	524000	2848600	502000	2832500	457000	2863200
545700	2832200	523000	2848600	501000	2832500	456000	2863200
546200	2835700	522000	2848600	500000	2832500	455000	2863200
548600	2837500	521000	2848600	499000	2832500	454000	2863200
550300	2839000	520000	2848600 55	498000	2832500		
545000	2839000 20	519000	2848600	497000	2832500		
540000	2839000	518000	2848600	496000	2832500		
550500	2844000	517000	2848600	495000	2832500		
545000	2844000	516000	2848600	495000	2833000		
540000	2844000	515000	2848600 60	495000	2834000		
550300	2848600 25	514500	2848600	495000	2835000		
549000	2848600 26	514500	2848000	495000	2836000		
548000	2848600	514500	2847600	494500	2837000		
547000	2848600	514500	2846600	491500	2841000		
546000	2848600	514500	2845000	488500	2845500		
545000	2848600 30	514500	2844000	483000	2848500		
544000	2848600	514500	2843000	480000	2852500		
543000	2848600	514500	2842000	475000	2854000		
542000	2848600	514500	2841000	473500	2857000		
541000	2848600	514500	2840000	473000	2860000		
540000	2848600 35	514500	2839000	472000	2860000		
539000	2848600	514500	2838000	471000	2860000		

Note: m = meter
Okeelanta Power L.P.'s coordinates are 524900 m E, 2940100 m N.

Table 4-1. OkPLP Building Dimensions Used in the Modeling Analysis

Structure	Height		Length		Width	
	ft	m	ft	m	ft	m
Boiler Building	139	42.44	207	63.12	114	34.84
Electrostatic Precipitator Building No. 1	107	32.54	50	15.24	71	21.76
Electrostatic Precipitator Building No. 2	107	32.54	50	15.24	71	21.76
Electrostatic Precipitator Building No. 3	107	32.54	50	15.24	71	21.76

Table 5-1. Summary of Continuous Sulfur Dioxide Ambient Monitoring Data Collected Near South Bay

County	Station ID	Monitor Location	Year	Number of Observations	Concentration $\mu g/m^3$ Maximum 3-hour	2nd High 3-hour	Maximum 24-hour	2nd High 24-hour	Annual Average
Palm Beach	4150-001-J02	South Bay-300 North US 27	1997	8,486	55	47	19	13	5
Palm Beach	3840-004-G02	Riviera Beach-1050 15th Street	1997	8,274	165	154	50	37	4
Palm Beach	12-099-3004	Riveria Beach-1050 15th Street	1998	8,299	177 (0.068 ppm)	31 (0.012 ppm)	24 (0.009 ppm)	10 (0.004 ppm)	3 (0.001 ppm)
			1999	8,221	45 (0.017 ppm)	37 (0.014 ppm)	34 (0.013 ppm)	34 (0.013 ppm)	5 (0.002 ppm)
			2000	8,404	34 (0.013 ppm)	31 (0.012 ppm)	26 (0.010 ppm)	21 (0.008 ppm)	5 (0.002 ppm)

Note: $\mu g/m^3$ = micrograms per cubic meter
ppm = parts per million

	MAX	MAX	ANN AVE
1998	31	13	2
1999	/		
2000	39	10	2

29.16

47.61

Table 6-1. Maximum Predicted SO_2 Impacts Due to the Proposed Project Only
Okeelanta Power, L.P.

Pollutant/ Averaging Time		Concentration [a] (µg/m³)	Receptor Location [b] Direction (degrees)	Receptor Location [b] Distance (m)	Time Period (YYMMDDHH)	EPA Significant Impact Level (µg/m³)	SIGN? BD SI
Annual		0.1	311.7	5,703	87123124		
		0.1	155.5	3,121	88123124		No
		0.2	316.8	5,201	89123124	1	
		0.1	314.5	5,410	90123124		
		0.1	309.7	5,930	91123124		
Highest 24-Hour		8.7 6.1 ✓	229.3	4,356	87110724		9.5
		8.6 6.0 ✓	337.6	4,100	88012024		9.5
9.5	9	8.5 5.8 ✓	316.8	5,201	89031524	5	Yes
		8.3 5.8 ✓	324.0	4,690	90101024		10
		8.1 5.7 ✓	341.6	3,995	91030224		9.0
Highest 3-Hour		11.5 ✓	216.5	3,534	87053018		
		12.9 11.4 ✓	158.9	3,043	88102603		
	13	12.8 11.2 ✓	157.2	3,081	89120312	25	No
		12.4 11.4 ✓	170.1	2,882	90011315		
		12.3 10.2 ✓	168.1	2,901	91110424		

[a] Based on 5-year meteorological record, West Palm Beach, 1987 to 1991.

[b] Relative to OkPLP Boiler B stack.

Note: YYMMDDHH = Year, Month, Day, Hour Ending

Table 6-2. Summary of Maximum Pollutant Concentrations Predicted for the Project Only Compared to the EPA Class I Significant Impact Levels and PSD Class I Increments

Pollutant	Averaging Time	Maximum Concentration[a] (µg/m³)	EPA Class I Significant Impact Levels (µg/m³)	PSD Class I Increments (µg/m³)	SIGN ?
SO_2	Annual	0.002	0.1	.20/.178 .29 2	NO
	24-Hour	0.29	0.34 0.2	5	Yes
	3-Hour	0.38	0.57 1.0	25	No

[a] Highest concentration predicted with CALPUFF model and CALMET South Florida Domain, 1990.

Table 6-3. Maximum Predicted SO_2 Impacts For All Sources,
AAQS Screening Analysis, Okeelanta Power, L.P.

Pollutant/ Averaging Time	Concentration [a] (μg/m^3)	Receptor Location [b] Direction (degrees)	Distance (m)	Time Period (YYMMDDHH)
Annual	10.1	302.0	7,148	87123124
	10.3	294.1	9,270	88123124
	10.7	297.9	8,102	89123124
	10.4	300.0	7,577	90123124
	10.4	293.9	9,362	91123124
HSH 24-Hour	51.7	312.4	5,628	87041424
	61.2	160.0	8,000	88112024
	50.8	100.0	8,000	89060424
	43.9	311.7	5,703	90031624
	52.2	180.0	8,000	91051724
HSH 3-Hour	185.7	150.0	8,000	87110921
	174.6	312.4	5,628	88071621
	177.0	120.0	6,000	89020624
	186.3	180.0	8,000	90090721
	200.7	130.0	7,000	91032124

[a] Based on 5-year meteorological record, West Palm Beach, 1987 to 1991.

[b] Relative to OkPLP Boiler B stack.

Note: YYMMDDHH = Year, Month, Day, Hour Ending
HSH = Highest, Second-Highest

Table 6-4. Maximum Predicted SO_2 Concentrations for All Sources Compared to the AAQS - Refined Analysis

Pollutant/ Averaging Time	Concentration ($\mu g/m^3$)[a] Total	Modeled Sources	Background	Receptor Location[b] Direction (degree)	Distance (m)	Time Period (YYMMDDHH)	Florida AAQS ($\mu g/m^3$)
Annual	15.1	10.1	5	302	7,148	87123124	
	15.3	10.3	5	294	9,270	88123124	
	15.7	10.7	5	298	8,102	89123124	60
	15.4	10.4	5	300	7,577	90123124	
	15.4	10.4	5	294	9,362	91123124	
Ram model HSH 24-Hour .2/.17	76 ~~74.2~~ 6	61.2 63	13	160	8,000	88112024	260
HSH 3-Hour	232.7	185.7	47	151	8,000	87110921	
	233.4	186.4	47	178	8,000	90090721	1,300
.3/.20	248.6 347	201.6	201 47	128	7,000	91032124	

No SIA for 3hr

[a] Based on 5-year meteorological record, West Palm Beach, 1987 to 1991.

[b] Relative to OkPLP Boiler B stack.

Note: YYMMDDHH = Year, Month, Day, Hour Ending
HSH = Highest, Second-Highest

Table 6-5. Maximum Predicted SO_2 Impacts For All Sources,
PSD Class II Screening Analysis, Okeelanta Power L.P.

Pollutant/ Averaging Time	Concentration [a] (µg/m³)	Receptor Location [b] Direction (degree)	 Distance (m)	Time Period (YYMMDDHH)
Annual	<0.0	All	All [c]	87123124
	<0.0	All	All [c]	88123124
	<0.0	All	All [c]	89123124
	<0.0	All	All [c]	90123124
	<0.0	All	All [c]	91123124
HSH 24-Hour .2 lbs/mmBTU 12	12.4 10.6	219	3,656	87052824
	12.1 10.4	237	5,156	88061224
	11.7 10.1	317	5,201	89060424
	11.1 9.8	225	3,990	90061324
	12.4 10.7	235	4,908	91060924
HSH 3-Hour .3 lbs/mmBTU 54	50.6 39.9	208	3,213	87053003
	49.2 46.0	292	10,098	88071409
	54.1 39.5	329	4,414	89060521
	53.7 43.9	285 -2604	9,930 -2839	90080409
	49.6 41.1	310	8,000	91090209

[a] Based on 5-year meteorological record, West Palm Beach, 1987 to 1991.

[b] Relative to OkPLP Boiler B stack.

[c] Maximum concentrations were predicted to be less than zero at all receptors.

Note: YYMMDDHH = Year, Month, Day, Hour Ending
HSH = Highest, Second-Highest

Table 6-6. Maximum Predicted SO_2 Concentrations for All Sources Compared to the PSD Class II Increment Refined Analysis, Okeelanta Power L.P.

Pollutant/ Averaging Time		Concentration [a] (µg/m³)	Receptor Location [b] Direction (degree)	Distance (m)	Time Period (YYMMDDHH)	PSD Increment (µg/m³)
Annual		<0.0	All	All [c]	All years	20
HSH 24-Hour	12.4	10.6	219	3,656	87052824	
		10.4	237	5,156	88061224	
		10.1	317	5,201	89060424	91
		9.8	225	3,990	90061324	
		10.7	235	4,908	91060924	
HSH 3-Hour		46.0	292	10,098	88071409	512
		43.9	285	9,930	90080409	

[a] Based on 5-year meteorological record, West Palm Beach, 1987 to 1991.

[b] Relative to OkPLP Boiler B stack.

[c] Maximum concentrations were predicted to be less than zero for all receptors.

Note: YYMMDDHH = Year, Month, Day, Hour Ending
HSH = Highest, Second-Highest

Table 6-7. Summary of Maximum 24-Hour Average SO_2 Concentrations Predicted for PSD Sources at the Everglades National Park Compared to the Allowable PSD Class I Increments

Averaging Time	Maximum Concentration[a] (µg/m^3)	Receptor Location (m)		Period Ending (Julian day/ hour/year)	Allowable PSD Class I Increments (µg/m^3)
		UTM East	UTM North		
24-Hour	3.47	54500	2848600	307/23/90	5

[a] Concentrations are second-highest predicted with CALPUFF model and CALMET South Florida Domain, 1990.

Note: m = meter
UTM = Universal Transverse Mercator
µg/m^3 = micrograms per cubic meter

29

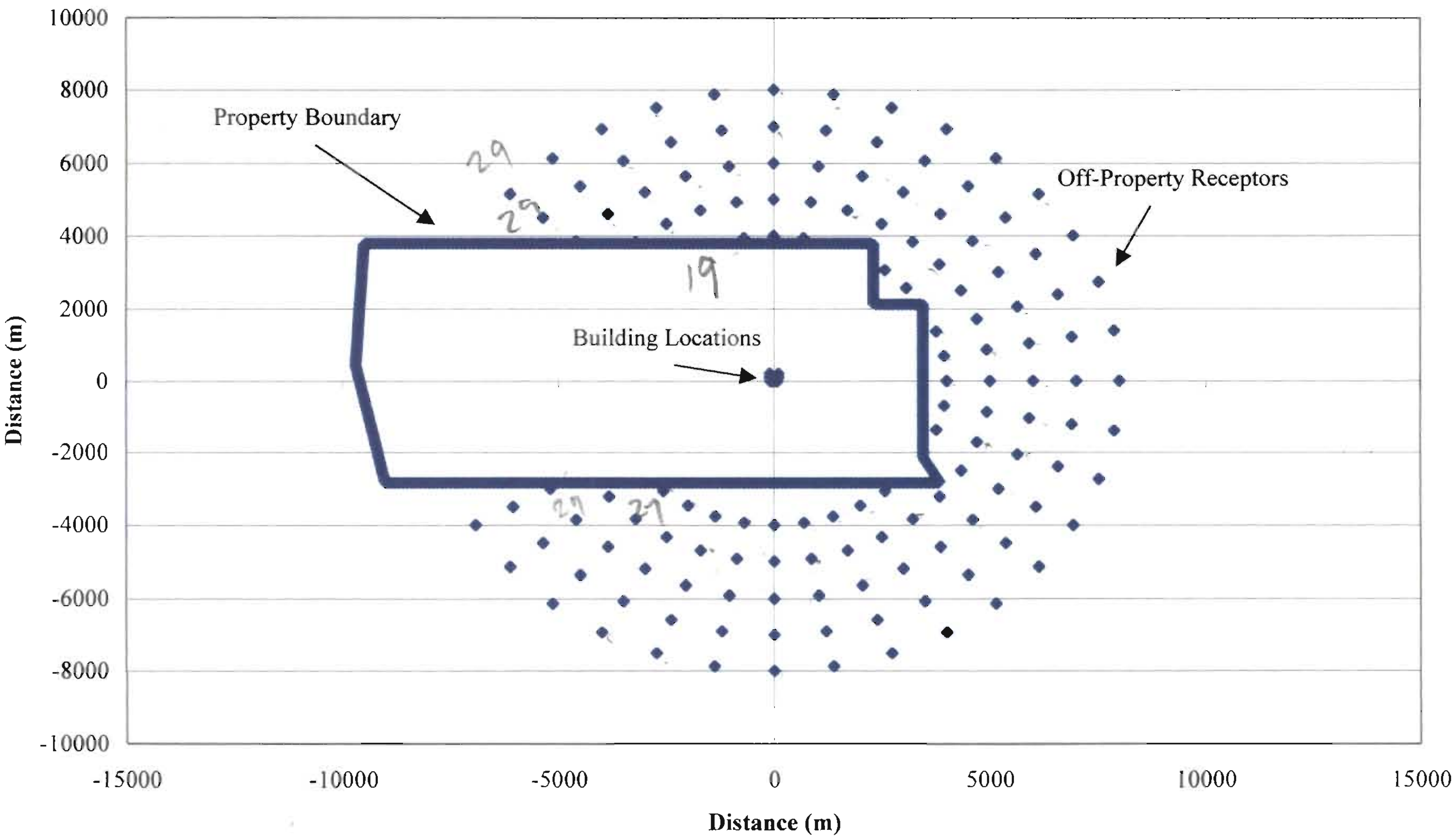

Figure 3-1. Okeelanta Power, L.P.
Building, Property Boundary, and Receptor Locations

Source: Golder, 2001.

Golder Associates

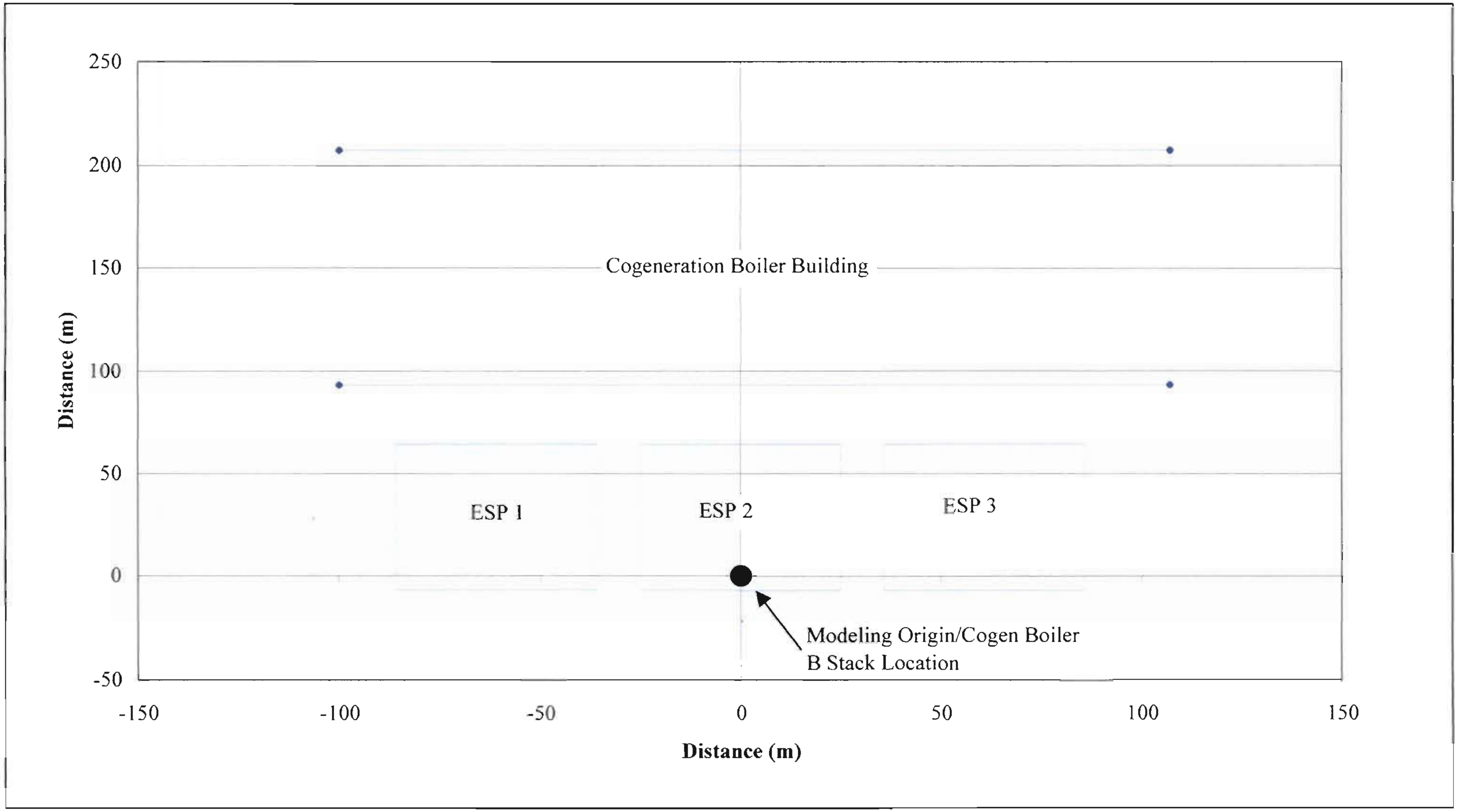

Figure 4-1. Building and Modeling Origin Locations Used in the Modeling Analysis
Okeelanta Power L.P.

Source: Golder, 2001.

Golder Associates

APPENDIX A

CALPUFF MODEL DESCRIPTION AND METHODOLOGY

A.0 CALPUFF MODEL DESCRIPTION AND METHODOLOGY

A.1 INTRODUCTION

As part of the new source review requirements under Prevention of Significant Deterioration (PSD) regulations, new sources are required to address air quality impacts at PSD Class I areas. As part of the PSD analysis report submitted to the Florida Department of Environmental Protection (DEP), the air quality impacts due to the potential emissions of the proposed Cargill Riverview modification are required to be addressed at the PSD Class I area of the Everglades National Park (ENP). The ENP is located approximately 92.3 km south of the facility site and is the nearest Class I area to the facility.

The evaluation of air quality impacts are not only concerned with determining compliance with PSD Class I increments but also assessing a source's impact on Air Quality Related Values (AQRVs), such as regional haze. Further, compliance with PSD Class I increments can be evaluated by determining if the source's impacts are less than the proposed U.S. Environmental Protection Agency (EPA) Class I significant impact levels. The significant impact levels are threshold levels that are used to determine the type of air impact analyses needed for the facility. If the new source's impacts are predicted to be less than significant, then the source's impacts are assumed not to have a significant adverse affect on air quality and additional modeling with other sources is not required. However, if the source's impacts are predicted to be greater than the significant impact levels, additional modeling with other sources is required to demonstrate compliance with Class I increments.

Currently there are several air quality modeling approaches recommended by the Interagency Workgroup on Air Quality Models (IWAQM) to perform these analyses. The IWAQM consists of EPA and Federal Land Managers (FLM) of Class I areas who are responsible for ensuring that AQRVs are not adversely impacted by new and existing sources. These recommendations have been summarized in two documents:

- *Interagency Workgroup on Air Quality Models (IWAQM), Phase 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 Proposed Project, air quality analyses were performed that assess the facility's impacts in the PSD Class I area of the ENP using the refined modeling approach from the IWAQM Phase 2 report for:

- Significant impact analysis,

- SO_2 PSD Class I increment analysis, and
- Regional haze analysis.

The refined analysis approach was used instead of the screening analysis approach since the air quality impacts are based on generally more realistic assumptions, include more detailed meteorological data, and are estimated at locations at the Class I area.

A.2 GENERAL AIR MODELING APPROACH

The general modeling approach was based on using the long-range transport model, California Puff model (CALPUFF, Version 5.4). At distances beyond 50 km, the ISCST3 model is considered to over-predict air quality impacts, because it is a steady-state model. At those distances, the CALPUFF model is recommended for use. Recently, the FLM have requested that air quality impacts, such as for regional haze, for a source located more than 50 km from a Class I area be predicted using the CALPUFF model. The Florida DEP has also recommended that the CALPUFF model be used to assess if the source has a significant impact at a Class I area located beyond 50 km from the source. As a result, a significant impact and regional haze analyses were performed using the CALPUFF model to assess the facility's impacts at the ENP.

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.

A regional haze analysis was performed to determine the affect that the facility's emissions will have on background regional haze levels at the ENP. In the regional haze analysis, the change in visual range, as calculated by a deciview change, was estimated for the facility in accordance with the IWAQM recommendations. Based on those recommendations, the CALPUFF model is used to predict the maximum 24-hour average sulfate (SO_4), nitrate (NO_3), and fine particulate (PM_{10}) concentrations as well as ammonium sulfate [$(NH_4)_2SO_4$] and ammonium nitrate (NH_4NO_3) concentrations. The change in visibility due to a source, estimated as a percentage, is then calculated based on the change from background data.

The following sections present the methods and assumptions used to assess the refined significant impact and regional haze analyses performed for the proposed project. The results of these analyses are presented in Section 1.0.

A.3 MODEL SELECTION AND SETTINGS

The California Puff (CALPUFF, version 5.4) air modeling system was used to model to assess the Proposed Project's impacts at the PSD Class I area for comparison to the PSD Class I significant impact levels and to the regional haze visibility criteria. CALPUFF is a non-steady state Lagrangian Gaussian puff long-range transport model that includes algorithms for building downwash effects as well as chemical transformations (important for visibility controlling pollutants), and wet/dry deposition. The CALPUFF meteorological and geophysical data preprocessor (CALMET, Version 5.2), 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 and FLAG reports.

A.3.1 CALPUFF MODEL APPROACHES AND SETTINGS

The IWAQM has recommended approaches for performing a Phase 2 refined modeling analyses that are presented in Table A-1. These approaches involve use of meteorological data, selection of receptors and dispersion conditions, and processing of model output.

The specific settings used in the CALPUFF model are presented in Table A-2.

A.3.2 EMISSION INVENTORY AND BUILDING WAKE EFFECTS

The CALPUFF model included the facility's emission, stack, and operating data as well as building dimensions to account for the effects of building-induced downwash on the emission sources. Dimensions for all significant building structures were processed with the Building Profile Input Program (BPIP), Version 95086, and were included in the CALPUFF model input. Section 2.0 presents a listing of the facility's emissions and structures included in the analysis.

A.4 RECEPTOR LOCATIONS

For the refined analyses, pollutant concentrations were predicted in an array of 126 discrete receptors located at the ENP area. These receptors are the same as those used in the PSD Class I analysis performed. These receptors were presented in Section 3.0, Table 3-2.

A.5 METEOROLOGICAL DATA

A.5.1 REFINED ANALYSIS

CALMET was used to develop the gridded parameter fields required for the refined modeling analyses. The follow sections discuss the specific data used and processed in the CALMET model.

A.5.2 CALMET SETTINGS

The CALMET settings contained in Table A-3 were used for the refined modeling analysis. With the exception of hourly precipitation data files, all input data files needed for CALMET were developed by the FDEP staff.

A.5.3 MODELING DOMAIN

A rectangular modeling domain extending 450 km in the east-west (x) direction and 470 km in the north-south (y) direction was used for the refined modeling analysis. The southwest corner of the domain is the origin and is located at 23.8 degrees north latitude and 83.5 degrees west longitude. This location is in the Gulf of Mexico approximately 110 km west of Venice, Florida. For the processing of meteorological and geophysical data, the domain contains 90 grid cells in the x-direction and 94 grid cells in the y-direction. The domain grid resolution is 5 km. The air modeling analysis was performed in the UTM coordinate system.

A.5.4 MESOSCALE MODEL – GENERATION 4 (MM4) DATA

Pennsylvania State University in conjunction with the NCAR Assessment Laboratory developed the MM4 data set, a prognostic wind field or "guess" field, for the United States. The hourly meteorological variables used to create this data set (wind, temperature, dew point depression, and geopotential height for eight standard levels and up to 15 significant levels) are extensive and only allow for one data base set for the year 1990. The analysis used the MM4 data to initialize the CALMET wind field. The MM4 data have a horizontal spacing of 80 km and are used to simulate atmospheric variables within the modeling domain.

The MM4 subset domain was provided by FDEP and consisted of a 7 x 7- cell rectangle, with 80 km grid resolution, extending from the MM4 grid points (50,6) to (57,13). These data were processed to create a MM4.DAT file, for input to the CALMET model.

The MM4 data set used in the CALMET, although advanced, lacks the fine detail of specific temporal and spatial meteorological variables and geophysical data. These variables were processed into the appropriate format and introduced into the CALMET model through the additional data files obtained from the following sources.

A.5.5 SURFACE DATA STATIONS AND PROCESSING

The surface station data processed for the CALPUFF analyses consisted of data from eight NWS stations or Federal Aviation Administration (FAA) Flight Service stations for Orlando, Fort Myers, Daytona Beach, Vero Beach, Key West, Miami, Tampa, and West Palm Beach. A summary of the surface station information and locations are presented in Table A-4. The surface station parameters include wind speed, wind direction, cloud ceiling height, opaque cloud cover, dry bulb temperature, relative humidity, station pressure, and a precipitation code that is based on current weather conditions. The surface station data were processed by FDEP into a SURF.DAT file format for CALMET input.

Because the modeling domain extends largely over water, C-Man station data from Venice, Sombrero Key, and Lake Worth was obtained. These data were processed by Florida DEP into an over-water surface station format (i.e., SEA*.DAT) for input to CALMET. The over-water station data include wind direction, wind speed and air temperature.

A.5.6 UPPER AIR DATA STATIONS AND PROCESSING

The analysis included three upper air NWS stations located in Ruskin, Key West, and West Palm Beach. Data for each station were obtained from the Florida DEP in a format for CALMET input.

The data and locations for the upper air stations are presented in Table A-4.

A.5.7 PRECIPITATION DATA STATIONS AND PROCESSING

Precipitation data were processed from a network of hourly precipitation data files collected from primary and secondary NWS precipitation-recording stations located within the latitude and longitudinal limits of the modeling domain. Data for 23 stations were obtained in NCDC TD-3240 variable format and converted into a fixed-length format. The utility programs PXTRACT and PMERGE were then used to process the data into the format for the PRECIP.DAT file that is used by CALMET. A listing of the precipitation stations used for the modeling analysis is presented in Table A-5.

A.5.8 GEOPHYSICAL DATA PROCESSING

The land-use and terrain information data were developed by the FDEP for the modeling domain and were provided in a GEO.DAT file format for input to CALMET. Terrain elevations for each grid cell of the modeling domain were obtained from Digital Elevation Model (DEM) files obtained from US Geographical Survey (USGS). The DEM data was extracted for the modeling domain grid using the utility extraction program LCELEV. Land-use data were obtained from the USGS GIS.DAT which is based on the ARM3 data. The resolution of the GIS.DAT file is one-eighth of a degree in the east-west direction and one-twelfth of a degree in the north-south direction. Land-use values for the domain grid were obtained with the utility program CAL-LAND. Other parameters processed for the modeling domain by CAL-LAND include surface roughness, surface Albedo, Bowen ratio, soil heat flux, and leaf index field. The land-use parameter values were based on annual averaged values.

Table A-1. Refined Modeling Analyses Recommendations[a]

Model Input/Output	Description
Meteorology	Use CALMET (minimum 6 to 10 layers in the vertical; top layer must extend above the maximum mixing depth expected); horizontal domain extends 50 to 80 km beyond outer receptors and sources being modeled; terrain elevation and land-use data is resolved for the situation.
Receptors	Within Class I area(s) of concern; obtain regulatory concurrence on coverage.
Dispersion	1. CALPUFF with default dispersion settings. 2. Use MESOPUFF II chemistry with wet and dry deposition. 3. Define background values for ozone and ammonia for area.
Processing	1. For PSD increments: use highest, second highest 3-hour and 24-hour average SO_2 concentrations; highest, second highest 24-hour average PM_{10} concentrations; and highest annual average SO_2, PM_{10} and NO_x concentrations. 2. For haze: 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.

Note:

[a] IWAQM Phase II report (12/98) and FLAG document (12/00)

Table A-2. CALPUFF Model Settings

Parameter	Setting
Pollutant Species	SO_2, SO_4, NO_x, HNO_3, and NO_3, PM_{10}, and FL
Chemical Transformation	MESOPUFF II scheme, 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, NO_x, FL, CO, and Be
Model Processing	For haze: highest predicted 24-hour extinction change (%) for the year For significant impact analysis: highest predicted annual and highest short-term averaging time concentrations for SO_2, NO_x, and PM_{10}
Background Values [a]	Ozone: 80 ppb; Ammonia: 10 ppb

Note:

[a] Recommended values by the Florida DEP.

Table A-3. CALMET Settings

Parameter	Setting
Horizontal Grid Dimensions	450 by 470 km, 5 km grid resolution
Vertical Grid	9 layers
Weather Station Data Inputs	8 surface, 3 upper air, 23 precipitation stations
Wind model options	Diagnostic wind model, no kinematic effects
Prognostic wind field model	MM4 data, 80 km resolution, 7 x 7 grid, used for wind field initialization
Output	Binary hourly gridded meteorological data file for CALPUFF input

Table A-4. Surface and Upper Air Stations Used in the CALPUFF Analysis

			UTM Coordinates			
Station Name	Station Symbol	WBAN Number	Easting (km)	Northing (km)	Zone	Anemometer Height (m)
<u>Surface Stations</u>						
Tampa	TPA	12842	349.20	3094.25	17	6.7
Daytona Beach	DAB	12834	495.14	3228.05	17	9.1
Orlando	ORL	12815	468.96	3146.88	17	10.1
Vero Beach	VER	12843	557.52	3058.36	17	6.7
Fort Myers	FMY	12835	413.65	2940.38	17	6.1
Miami	MIA	12839	566.82	2857.20	17	7.0
Key West	EYW	12836	424.03	2715.14	17	18.3
West Palm Beach	PBI	12844	587.87	2951.43	17	10.1
<u>Upper Air Stations</u>						
Ruskin	TBW	12842	349.20	3094.28	17	NA
West Palm Beach	PBI	12844	587.87	2951.42	17	NA
Key West	EYW	12836	424.03	2715.14	17	NA

Table A-5. Hourly Precipitation Stations Used in the CALPUFF Analysis

Station Name	Station Number	UTM Coordinate		
		Easting (km)	Northing (km)	Zone
Belle Glade HRCN GT 4	80616	528.19	2953.03	17
Boca Raton	80845	588.75	2916.52	17
Canal Point Gate 5	81271	536.43	2971.51	17
Clewiston US Engineers	81654	546.19	2912.73	17
Fort Myers FAA/AP	83186	413.99	2940.71	17
Homestead Exp Stn	84091	550.26	2820.21	17
Key West Intl AP	84570	423.67	2715.51	17
Miami WSCMO Airport	85663	570.20	2856.17	17
Moore Haven Lock 1	85895	491.61	2967.80	17
North New River Canal #	86323	546.58	2912.48	17
Ortona Lock 2	86657	470.17	2962.27	17
Parrish	86880	366.99	3054.39	17
Pennsuco 5 WNW	86988	554.70	2867.81	17
Port Mayaca S 1 Canal	87293	538.04	2984.44	17
St Lucie New Lock 1	87859	571.04	2999.35	17
St Petersburg	87886	339.61	3071.99	17
Tamiami Trail 40 Mi BEN	88780	517.64	2849.04	17
Tampa WSCMO AP	88788	348.48	3093.67	17
Trail Glade Ranges	89010	551.57	2849.99	17
Venice	89176	357.59	2998.18	17
Venus	89184	467.27	3001.22	17
Vero Beach 4 W	89219	554.27	3056.50	17
West Palm Beach Int AP	89525	589.61	2951.63	17