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February 4, 1993

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SITING COORDINATION

VIA HAND DELIVERY

Hamilton S. Oven, Jr.
Power Plant Siting Administrator
Department of Environmental Regulation
2600 Blair Stone Road, Room 612
Tallahassee, FL 32399

RE: Cedar Bay Cogeneration Project
PA-88-24; DOAH Case No. 88-3740

Dear Buck:

Enclosed are six copies of a revised Air Quality Analysis prepared by ENSR Consulting and Engineering on behalf of the Cedar Bay Cogeneration Project in response to comments received to date. Computer printouts of the modeling conducted in support of the Air Quality Analysis will be forwarded to you shortly. We look forward to feedback from you and your staff.

Sincerely,

Gary P. Sams

cc: Richard T. Donelan (letter only)
Gregory K. Radlinski (four copies of report)
Rufus Pennington
James A. Heard
Scott Shirley
Lawrence N. Curtin
Other Counsel of Record

Cedar Bay Cogeneration Project
Air Quality Analysis
February 1993

ENSR Consulting and Engineering

Acton, Massachusetts

Document Number 5402-027-230

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PREFACE

The Air Quality Analysis prepared by ENSR Consulting and Engineering is separated into five sections. The first two sections show that, on balance, the air quality impacts of the CBCP as proposed to be modified and the addition of the three proposed package boilers scheduled for the Seminole Kraft facility necessary to provide 640,000 pounds of steam per hour are less than the air quality impacts of the Seminole Kraft recycling operation without the CBCP and that the air quality impacts of the CBCP as proposed to be modified along with the three proposed package boilers at full capacity will be less than Cedar Bay as certified. The third section demonstrates that the CBCP as proposed to be modified will comply with certain nonprocedural agency standards. The fourth section presents a review of air emission control technologies. The fifth section demonstrates that the CBCP as proposed to be modified will not adversely impact soils, vegetation or visibility.

In Section 1, "Net Emissions Changes," the total annual tons of pollutants emitted are compared. This comparison is presented in terms similar to those used in the presentation before the Siting Board regarding issuance of the Board's Order Instituting Modification Proceedings.

In Section 2, "Net Air Quality Impacts," dispersion modeling of the air quality impacts at multiple receptor points is compared to demonstrate the net air quality improvement associated with the CBCP.

In Section 3, "The CBCP's Compliance with Prevention of Significant Deterioration (PSD) Increments and Ambient Air Quality Standards (AAQS), and Comparison to Draft Air Toxics No Threat Levels (NTLs)," information is presented to demonstrate that the CBCP as proposed to be modified will comply with PSD increments and AAQS, both of which are nonprocedural agency standards. For informational purposes, air quality impacts due to the air toxic emissions of the CBCP are compared to Florida's draft air toxics NTLs.

In Section 4, "Control Technology Assessment," a review of the air emissions control technologies and emission rates proposed for the combustion sources and aggregate materials handling equipment at the CBCP is presented. This section contains technical and economic analyses of the controls for air emission sources for the project. For the circulating fluidized bed boilers, these controls include: boiler design and selective non-catalytic reduction for control of nitrogen oxides, fabric filtration for control of particulate matter and trace metals, boiler design and operation for control of carbon monoxide and volatile organic compounds, and limestone injection for control of sulfur dioxide and acid gases.

Section 5, "Additional Analyses", demonstrates that the CBCP will not have an adverse impact on soils, vegetation, or visibility in either the area surrounding the facility, the Timucuan Preserve or the two PSD Class I areas: the Okefenokee and Wolf Island Wilderness Areas. This section also demonstrates that the CBCP cooling tower will not cause any significant fogging or icing on nearby transportation routes.

EXECUTIVE SUMMARY

The objective of the information presented in this document is to provide data useful for assessing:

1) whether, on balance, the air pollutant emissions and air quality impacts of the Cedar Bay Cogeneration Project (CBCP), as proposed to be modified, and the addition of the three new proposed package boilers scheduled for the Seminole Kraft Corporation (SKC) site necessary to provide 640,000 lb. of steam per hour for SKC's use. will be less than the emissions and air quality impacts of the future SKC recycling operation, providing 640,000 lb. of steam per hour for SKC's use without the CBCP.

2) whether, on balance, the permitted air pollutant emissions and air quality impacts of the CBCP, as proposed to be modified, and the addition of the three new proposed package boilers scheduled for the SKC site at their permitted capacity, will be less than the emissions and air quality impacts of the CBCP as certified;

3) whether, on balance, the permitted air pollutant emissions and air quality impacts of the CBCP, as proposed to be modified, and the addition of the three new proposed package boilers scheduled for the SKC site at their permitted capacity, will be less than the emissions and air quality impacts of the future SKC recycling operation at permitted capacity without the power plant;

4) whether the CBCP, as proposed to be modified, would either cause or contribute to a violation of an ambient air quality standard (AAQS) or cause or contribute to a violation of the allowable Prevention of Significant Deterioration (PSD) increments, in either the region surrounding the facility (a PSD Class II area) or the two distant PSD Class I areas. The two PSD Class I areas are the Okefenokee and Wolf Island Wilderness areas in Georgia. In addition, information is presented to provide data useful for assessing whether the CBCP would produce air toxics concentrations above the Draft Florida No Threat Levels (NTLs);

5) whether the CBCP, as proposed to be modified, would induce significant indirect pollutant emissions as result of directly related growth, create adverse impacts on soils, vegetation or visibility, and whether the cooling tower vapor plume would cause significant fogging or icing on nearby transportation routes; and

6) updated information on air emission controls and emission rates. The lower air pollutant emission rates for the CBCP CFB boilers, and the inclusion of a new add-on technology (selective non-catalytic reduction) may require some changes to the original conditions of certification and air permit. To provide the State and EPA with accurate and updated information on the project for review of the proposed changes, ENSR, on behalf of U.S. Generating Company, developed a technical review of the air emission controls and emission rates.

The "CBCP as certified" refers to the facility as described in the Final Order and Power Plant Site Certification PA 88-24 dated February 11, 1991 and the March 28, 1991 Final Determination by the FDER, Permit No. PSD-FL-137. The "CBCP as proposed to be modified" refers to the facility as described in the Amended Petition for Modification of Certification filed with the Division of Administrative Hearings on July 22, 1992, plus further improvements proposed by the CBCP.

The "future SKC Recycling Operation without the power plant" refers to the two bark and three oil-fired boilers presently at the SKC site as they could be operated should the CBCP not be. In this hypothetical future case, without the CBCP, it is ENSR's understanding that the exhausts of the three power boilers would be combined and exhausted through a newly constructed 125-foot stack to lessen susceptibility to aerodynamic downwash effects caused by nearby structures.

The "addition of the three new proposed package boilers scheduled for the SKC site necessary to provide the 640,000 lb of steam for SKC's use" refers to three package boilers proposed by SKC capable of producing a total of 375,000 lb/hr of steam. For purposes of the technical analyses, it is assumed that the 640,000 lb/hr steam requirement is met by the CBCP supplying 380,000 lb/hr and the SKC package boilers supplying 260,000 lb/hr.

The "addition of the three new proposed package boilers scheduled for the SKC site at their permitted capacity" refers to these same boilers producing a total of 375,000 lb/hr of steam.

The proposed SKC package boilers will be capable of accommodating either fuel oil or natural gas. Not yet permitted, these boilers will, according to the SKC permit application, fire No. 2 distillate fuel oil with a maximum sulfur content of 0.5% and an annual average sulfur content of 0.3%.

In making the assessments for pollutant emissions, the maximum annual emissions of health criteria pollutants, other regulated pollutants, and non-regulated air toxics pollutants are compared. To compare the air quality impacts, evaluate compliance with the AAQS and PSD increments, compare the air quality impacts to the draft NTLs, evaluate soils, vegetation and

visibility impacts, and characterize cooling tower impacts, comprehensive atmospheric dispersion modeling was performed in accordance with EPA and Florida DER Guidelines.

Table ES-1 illustrates the difference in annual pollutant emissions between CBCP as proposed to be modified plus the SKC package boilers, and the future SKC recycling operation (both cases at 640,000 lb/hr steam usage by SKC). This table demonstrates the decreases or increases in the actual annual emissions of four categories of pollutants by operating the CBCP and the SKC package boilers and shutting down the SKC power and bark boilers. The health criteria and PSD increment pollutants are those for which ambient air quality standards or PSD increments have been established. The total regulated pollutants include the criteria and all PSD regulatory pollutants. Non-regulated air toxics represent twenty different compounds emitted by the sources in question which are included in the list of 751 compounds cited in Florida's Draft Air Toxics Permitting Strategy. In aggregating health criteria, PSD increment and regulated pollutants, TSP and PM-10 are treated as individual pollutants exclusive of one another, although PM-10 are a portion of TSP. Because PM-10 and TSP are also treated exclusively when comparing ambient impacts (the health criteria standards address PM-10 while the PSD increments address TSP), the emissions comparisons treats them as different pollutants for consistency with the standards and PSD increments.

The comparisons of annual emissions shown in Table ES-1 assume that the SKC package boilers always fire fuel oil. To the extent that they fire natural gas on an annual basis, the decreases in emissions would be greater. As shown in Table ES-1 decreases in air pollutant emissions are achieved by the CBCP, as proposed to be modified, in each category, except non-regulated air toxics.

A comparison of air quality impacts between the CBCP, as proposed to be modified plus the SKC package boilers, and the SKC recycling operation without the CBCP (both cases at 640,000 lb/hr steam usage by SKC) is summarized in Table ES-2. The table summarizes the changes due to the CBCP as proposed to be modified and the SKC package boilers for each criteria pollutant as well as total air toxics. Three values are listed for each pollutant: 1) the change to the maximum predicted concentration of the pollutant anywhere (higher, lower or insignificant maximum concentration); 2) the net effect on air quality on a regional basis in terms of the highest predicted pollutant concentrations (improved, insignificant, or degraded); and 3) the percent of locations for which modeling was performed which showed a net benefit in terms of the highest concentrations. A total of 1008 locations, referred to as "model receptors," were addressed. The majority of these fall within 10 kilometers of the CBCP, but a portion extend as far as 25 kilometers. As shown in Table ES-2, the CBCP as proposed to be modified and the SKC package boilers result in either lower or insignificant maximum concentrations of all criteria pollutants and total air toxics, a net

TABLE ES-1

CBCP as Proposed to be Modified Plus SKC Package Boilers
vs.
SKC Recycling
(Both Cases at 640,000 lb/hr Steam for SKC)
Net Change in Annual Emissions Due To
CBCP and SKC Package Boilers Firing Oil

Pollutants Category	Net Change
Health Criteria and PSD Increments	Decrease 343 tons
Total Regulated	Decrease 594 tons
Total Non-Regulated Air Toxics	Increase 29 tons
Total Pollutants	Decrease 565 tons

TABLE ES-2

CBCP as Proposed to be Modified Plus SKC Package Boilers
vs.
SKC Recycling
(Both Cases at 640,000 lb/hr Steam)
Air Quality Changes Due to CBCP Plus SKC Package Boilers Firing Oil[a]

Pollutant	Maximum Concentration	Net Regional Air Quality Effect	Percent of Locations with Air Quality Benefit
3-hour SO_2	Lower	Improved	97.6
24-hour SO_2	Lower	Improved	98.2
Annual SO_2	Lower	Improved	99.5
24-hour PM-10	Lower	Improved	98.2
Annual PM-10	Higher	Insignificant	91.4
1-hour CO	Insignificant	Insignificant	Not applicable
8-hour CO	Insignificant	Insignificant	Not applicable
Annual NO_2	Lower	Improved	99.6
Monthly Pb	Insignificant	Insignificant	Not applicable
Annual Pb	Insignificant	Insignificant	Not applicable
8-hour Air Toxics	Lower	Improved	99.6
24-hour Air Toxics	Lower	Improved	99.6
Annual Air Toxics	Lower	Improved	99.6

[a]See Section 2

improvement or insignificant change in the highest concentrations on a regional basis, and a net air quality benefit at virtually all locations.

A summary of the comparison of the maximum permitted annual pollutant emissions between CBCP as certified and CBCP as proposed to be modified plus the SKC package boilers is presented in Table ES-3. This table illustrates the decrease in emissions resulting from CBCP as proposed to be modified plus the SKC package boilers for the four pollutant categories. As shown in the table, decreases are achieved in all categories of pollutants except non-regulated air toxics, which don't change.

A summary of the differences in air quality impacts at permitted capacity between CBCP as certified and CBCP as proposed to be modified plus the SKC package boilers is presented in Table ES-4. Lower or insignificant maximum concentrations are shown to result from Cedar Bay as proposed to be modified for most pollutants with the exception of SO_2. However, the net effect on highest SO_2 concentrations is insignificant on a regional basis. Impacts of CO are insignificant in each case, so a meaningful comparison cannot be made. Annual average PM-10 impacts, although lower in terms of the maximum concentrations, are not significantly affected on a regional basis with a small number of locations experiencing a benefit. Although there is an average improvement, the magnitude of the improvement is not significant.

Table ES-5a summarizes the comparison of maximum permitted emissions between CBCP as proposed to be modified plus the SKC package boilers, and the SKC recycling operation. This table shows an increase in each of the four pollutant categories. However, these changes do not account for substantial additional decreases that are associated with the shutdown of recovery boilers, lime kilns and smelt dissolving tanks at SKC as a result of SKC converting to a recycling operation.

According to the PSD permit application for the SKC package boilers, substantial decreases in baseline emissions will be achieved. These are listed in Table ES-5b. As shown in the table, the overall result is a net decrease in the first three pollutant categories. Decreases in non-regulated air toxics were not estimated for the application, but these would also offset the increases shown in Table ES-5a at least to some extent.

Notwithstanding the above calculated emission increases, as shown in Table ES-6, maximum pollutant concentrations are lower or insignificant for the CBCP as proposed to be modified. In addition, for the individual pollutants, either a net regional air quality benefit or an insignificant change results and the vast majority of locations experience a benefit with the CBCP as proposed to be modified, compared to the SKC recycling operation.

TABLE ES-3

CBCP as Certified vs. CBCP as Proposed to be Modified Plus SKC Package Boilers
Net Change in Permitted Annual Emissions Due to CBCP as Proposed to be Modified Plus SKC Package Boilers

Pollutants Category	Net Change
Health Criteria and PSD Increments	Decrease 2,099 tons
Total Regulated	Decrease 3,519 tons
Total Non Regulated Air Toxics	No Change
Total Pollutants	Decrease 3,519 tons

TABLE ES-4

CBCP as Certified vs. CBCP as Proposed to be Modified Plus SKC Package Boilers
Air Quality Changes Due to CBCP as Proposed to be Modified Plus SKC Package Boilers Firing Oil[a]

Pollutant	Maximum Concentration	Net Regional Air Quality Effect	Percent of Locations with Air Quality Benefit
3-hour SO_2	Higher	Insignificant	80.1
24-hour SO_2	Higher	Insignificant	73.6
Annual SO_2	Lower	Insignificant	45.6
24-hour PM-10	Lower	Insignificant	64.8
Annual PM-10	Lower	Insignificant	30.6
1-hour CO	Insignificant	Insignificant	Not Applicable
8-hour CO	Insignificant	Insignificant	Not Applicable
Annual NO_2	Lower	Insignificant	44.2
Monthly Pb	Insignificant	Insignificant	Not Applicable
Annual Pb	Insignificant	Insignificant	Not Applicable
8-hour Air Toxics	Lower	Improved	95.6
24-hour Air Toxics	Lower	Improved	95.6
Annual Air Toxics	Lower	Improved	95.4

[a]See Section 2

TABLE ES-5a

CBCP as Proposed to be Modified Plus SKC Package Boilers vs. SKC Recycling Net Change in Permitted Annual Emissions Due to CBCP as Proposed to be Modified Plus SKC Package Boilers Firing Oil

Pollutants Category	Net Change
Health Criteria and PSD Increments	Increase 270 tons
Total Regulated	Increase 20 tons
Total Non Regulated Air Toxics	Increase 36 tons
Total Pollutants	Increase 56 tons

TABLE ES-5b

Net Changes Due To Additional Sources Shutting Down[a] at SKC for Conversion to Recycling Operation

Pollutants Category	Net Change	Combined Net Change with CBCP
Health Criteria and PSD Increments	Decrease 4,668 tons	Decrease 4,398 tons
Total Regulated	Decrease 4,712 tons	Decrease 4,692 tons
[a]Recovery Boilers, Lime Kilns, Smelt Dissolving Tanks		

TABLE ES-6

CBCP as Proposed to be Modified Plus SKC Package Boilers at Permitted Capacity vs. SKC Recycling at Permitted Capacity Air Quality Changes Due to CBCP Plus SKC Package Boilers[a]

Pollutant	Maximum Concentration	Net Regional Air Quality Effect	Percent of Locations with Air Quality Benefit
3-hour SO_2	Lower	Improved	97.7
24-hour SO_2	Lower	Improved	98.1
Annual SO_2	Lower	Improved	99.5
24-hour PM-10	Lower	Insignificant	97.8
Annual PM-10	Higher	Insignificant	90.6
1-hour CO	Insignificant	Insignificant	Not Applicable
8-hour CO	Insignificant	Insignificant	Not Applicable
Annual NO_2	Lower	Improved	99.6
Monthly Pb	Insignificant	Insignificant	Not Applicable
Annual Pb	Insignificant	Insignificant	Not Applicable
8-hour Air Toxics	Lower	Improved	99.6
24-hour Air Toxics	Lower	Improved	99.6
Annual Air Toxics	Lower	Improved	99.6

[a]See Section 2

Table ES-7 summarizes the results of the modeling for compliance with AAQS and PSD increments and for comparison to the Draft Air Toxics NTLs. For the applicable AAQS and PSD increment pollutants, the predicted compliance status is listed. "Compliance" indicates that an evaluation of all major sources in Duval County in addition to Cedar Bay demonstrates compliance with the standard. "Insignificant Impacts" indicates that no evaluation of the standard was performed since Cedar Bay impacts were insignificant. "Does not cause or contribute to a violation" indicates that all major sources in Duval County were modeled but only those total concentrations to which the Cedar Bay facility contributed a significant concentration were evaluated, and those concentrations were predicted to be below the standards. As shown in the table, the predicted compliance status for each criteria pollutant and standard is favorable. For the draft No Threat Levels, the CBCP, as proposed to be modified complies with all NTLs examined. Some compounds have NTLs for more than one averaging period.

As demonstrated by the foregoing summary and further documented herein, the Cedar Bay Cogeneration Project as proposed to be modified, plus the new proposed SKC package boilers on balance, in terms of pollutant emissions and air quality, result in lower environmental impacts than either the SKC recycling operation or the Cedar Bay facility as originally certified. In addition, the Cedar Bay Cogeneration Project, as proposed to be modified, will comply with all applicable ambient air quality standards and prevention of significant deterioration increments, neither causing nor contributing to a violation.

The results of additional analyses conducted further indicate that:

1) No additional significant emissions and thus no additional significant air quality impacts will result from any growth directly related to the CBCP of a residential, commercial or industrial nature,

2) No adverse impacts on soils or vegetation will occur due to the CBCP, in either the region surrounding the CBCP, other nearby sensitive areas, or the distant PSD Class I wilderness areas, and

3) No significant affects of the cooling tower on fogging or icing of local transportation routes or salt deposition in the area surrounding the CBCP will occur.

TABLE ES-7

CBCP as Proposed to be Modified
Compliance with Ambient Air Quality Standards (AAQS) and PSD Increments, and Comparison to Draft Air Toxics No Threat Levels (NTLs)

Pollutant	Standard	Predicted Compliance Status
SO_2	AAQS PSD Class II PSD Class I	Does Not Cause or Contribute to a Violation Does Not Cause or Contribute to a Violation Compliance
PM-10	AAQS	Does Not Cause or Contribute to a Violation
TSP	PSD Class II PSD Class I	Compliance Compliance
CO	AAQS	Insignificant Impacts
NO_2	AAQS PSD Class II PSD Class I	Does Not Cause or Contribute to a Violation Does Not Cause or Contribute to a Violation Compliance
Pb	AAQS	Insignificant Impacts
Air Toxics	Draft NTL's	Compliance

1.0 COMPARISON NO. 1: NET EMISSION CHANGES

1.1 Introduction

The objective of the information to be presented for Comparison No. 1 is to provide emission data useful for the modeling of the maximum allowable emissions in Section 2 to follow and for assessing whether, on balance, the maximum allowable emissions of --

1) the CBCP, as proposed to be modified, and the addition of the three new proposed boilers scheduled for the Seminole Kraft Corporation (SKC) site, will be less than the maximum allowable emissions of the CBCP as certified,

2) the CBCP, as proposed to be modified, and the three new proposed boilers scheduled for SKC's site operating as necessary to provide 640,000 lb of steam per hour for SKC's use, will be less than the maximum allowable emissions of SKC's future recycling operation without the CBCP when it uses 640,000 lb of steam per hour, and

3) the CBCP, as proposed to be modified, and the three new proposed boilers scheduled for SKC's site, will be less than the maximum allowable emissions of the future SKC recycling operation without the CBCP.

The "CBCP as certified" refers to 3 coal-fired circulating fluidized bed (CFB) boilers capable of generating 225 MW of electricity and supplying SKC with a total steam generating capacity of 640,000 lb/hr, two limestone dryers fired by No. 2 distillate fuel oil, associated coal and other aggregate material (e.g., limestone, ash) handling equipment, and a cooling tower, as described in the Final Order and Power Plant Site Certification PA 88-24 dated February 11, 1991, and the March 28, 1991 Final Determination by the Department of Environmental Regulation (DER), Permit No. PSD-FL-137.

The "CBCP as proposed to be modified" refers to the CFB boilers generating 250 MW of electricity and supplying SKC with 380,000 lb/hr of process steam, two limestone dryers fired by No. 2 distillate fuel oil, associated coal and other aggregate material (e.g., limestone, ash) handling equipment, and a cooling tower, as described in the Amended Petition for Modification of Certification filed with the Division of Administrative Hearings on July 22, 1992, plus further improvements proposed by the CBCP. These collectively include proposed reductions in the CBCP's emissions of SO_2, NO_x, TSP, PM-10, CO, VOCs, Mercury, Lead, Beryllium, Sulfuric Acid Mist, Fluorides, and other trace elements.

The "SKC's future recycling operation without the CBCP" refers to the two bark and three power boilers presently at SKC's site, as they would be operated should the CBCP not be operated. As currently permitted, the three power boilers would fire Grade No. 6 residual fuel oil with a maximum sulfur content of 2.27 or 1.0% depending on PM emissions. Power Boiler No. 1 has a steam generating capacity of 135,000 lb/hr while Power Boilers Nos. 2 and 3 each have a steam capacity of 180,000 lb/hr. In the future hypothetical case, without the CBCP, ENSR understands that the exhausts of the three power boilers would be combined and exhausted through a newly constructed 125 foot stack to lessen susceptibility to aerodynamic downwash effects caused by nearby structures. The bark, or "carbonaceous" fuel, boilers each have a steam generation capacity of 125,000 lb/hr. In addition to bark, they are also permitted to fire Grade No. 6 residual fuel oil with a maximum sulfur content of 2.27%, as well as recycle rejects, including plastic components (i.e. bale bindings: strappings and wrappings).

"The addition of the three new proposed boilers scheduled for SKC's site" refers to three package boilers proposed by SKC capable of producing a total of 375,000 lb/hr of steam. For purposes of the technical analyses for Comparison No. 2 (and hence No. 1, as well), the CBCP explains that, when SKC's recycling operation needs 640,000 lb/hr of steam, the CBCP is to supply 380,000 lb/hr, and the SKC package boilers are to supply the 260,000 lb/hr balance.

The maximum allowable emissions from the CBCP, "the three new proposed boilers scheduled for the SKC site," and "the future SKC recycling operation without the CBCP" will be based on permit conditions (and the improvements expected in the to be updated conditions of certification for the CBCP, as appropriate) and full load except where partial loads are an express part of the case being analyzed. For the partial load configurations, the maximum allowable emissions will be based on permitted emission rates (and the improvements expected in the to be updated conditions of certification for the CBCP, as appropriate).

The proposed SKC package boilers are capable of accommodating either fuel oil or natural gas. Not yet permitted, SKC's current plan calls for No. 2 distillate fuel oil with a maximum sulfur content of 0.5%, and an annual average sulfur content of 0.3%.

To make the comparisons set forth above, the differences in total annual maximum allowable emissions are compared amongst 5 cases. These are:

Case 1: the 3 power boilers and 2 bark boilers operating in their "without the CBCP" mode at a total annualized steam production rate of 640,000 lb/hr, (which corresponds to an annual capacity factor of 85.9 percent),

Case 1a: the 3 power boilers and 2 bark boilers operating in their "without the CBCP" mode at their maximum total annualized steam production rate of 745,000 lb/hr,

Case 2: the CBCP as certified consistent with its emission limitations,

Case 3: the CBCP, as proposed to be modified, generating electricity and supplying a total annualized steam production rate of 380,000 lb/hr to SKC, (at an 85.5 percent annual capacity factor and consistent with its proposed emission limitations), plus the addition of the 3 new package boilers at the SKC recycling operation under two fuel scenarios, fuel oil or natural gas, at a total annualized steam production rate of 260,000 lb/hr, (which corresponds to an annual capacity factor of 69.3 percent), and

Case 4: the CBCP, as proposed to be modified, consistent with its annual average emission limitations, plus the addition of the 3 new package boilers at the SKC recycling operation under two fuel scenarios, fuel oil or natural gas, consistent with their proposed annual average emission limitations.

Three assessments are presented:

Assessment A: Case No. 4
vs.
Case No. 2

Assessment B: Case No. 3.
vs.
Case No. 1

Assessment C: Case No. 4
vs.
Case No. 1a

1.2 Source Data and Assumptions

The annual emissions for Case 1 are listed in Tables 1-1 and 1-2; their derivation is described in Appendix A. Data are listed for the power boilers and bark boilers. As explained in Appendix A, the power boilers are permitted to fire oil; and the bark boilers are permitted to fire either recycle rejects, bark, or 2.27% sulfur oil. There is no restriction on the particular mix of fuels that could be fired in the bark boilers or in the mix of energy generated by all five boilers. While SKC provided data on the capacities and fuels for its boilers and stack parameters, ENSR calculated

TABLE 1-1

Case 1: Maximum Regulated Pollutant Emissions Modeled in Section 2 for SKC's Emission Sources Power and Bark Boilers as Necessary to Generate 640,000 lb/hr Total Annualized Steam

	Total Power Boilers		Bark Boiler #1		Bark Boiler #2		Total
Pollutant	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	Total ton/yr
SO2	744.7	3262	34.0	149	34.0	149	3,560
NOx	302.6	1325	46.85	205.5	46.85	205.5	1,736
CO	17.6	77	241.3	1057	241.3	1057	2,191
TSP	53.3	233	38.6	169	38.6	169	572
PM-10	37.8	166	33.6	147	33.6	147	460
VOC	2.7	12	50.2	220	50.2	220	451
Lead	0.0149	0.065	0.0147	0.064	0.0147	0.064	0.19
Mercury	0.0017	0.0075	0.00046	0.0020	0.00046	0.0020	0.012
Beryllium	0.0028	0.0125	0.00001	6.1e-05	0.00001	6.1e-05	0.013
Fluorides	0.063	0.275	23.16	101.4	23.16	101.4	203.2
H2SO4 mist	16.25	71.2	1.61	7.04	1.61	7.04	85.2
Notes: See Appendix A							

TABLE 1-2

Case 1: Maximum Non-Regulated Pollutant Emissions Modeled in Section 2 for SKC's Emission Sources Power and Bark Boilers as Necessary to Generate 640,000 lb/hr Total Annualized Steam

Pollutant	Total Power Boilers		Bark Boiler #1		Bark Boiler #2		Total
	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	Total ton/yr
Antimony	0.00975	0.043	0.00081	0.0035	0.00081	0.0035	0.050
Arsenic	0.01286	0.056	0.00011	0.0005	0.00011	0.0005	0.057
Barium	0.00768	0.034	0.08299	0.363	0.08299	0.363	0.76
Bromine	0.00373	0.016	1.80	7.90	1.80	7.90	15.82
Cadmium	0.00837	0.037	0.0023	0.010	0.0023	0.010	0.057
Cobalt	0.01386	0.061	0.60	2.62	0.60	2.62	5.30
HCl	0.35178	1.541	2.32	10.14	2.32	10.14	21.8
Indium	0.00810	0.035	0.155	0.68	0.155	0.68	1.39
Chromium VI	0.00011	0.00049	0.00005	0.00022	0.00005	0.00022	0.0009
Copper	0.14817	0.649	0.0077	0.034	0.0077	0.034	0.72
Formaldehyde	0.21587	0.945	0.164	0.72	0.164	0.72	2.38
Manganese	0.01386	0.061	0.013	0.057	0.013	0.057	0.18
Molybdenum	0.02601	0.114	0.3092	1.35	0.3092	1.35	2.82
Nickel	0.67158	2.942	0.017	0.076	0.017	0.076	3.09
Phosphorous	0.03091	0.135	0.069	0.30	0.069	0.30	0.74
POM	0.00490	0.021	0.0483	0.21	0.0483	0.21	0.44
Selenium	0.00162	0.007	0.00013	0.0006	0.00013	0.0006	0.008
Tin	0.17589	0.770	0.19585	0.86	0.19585	0.86	2.49
Vanadium	2.38	10.42	0.061	0.266	0.061	0.266	10.95
Zinc	0.04104	0.180	0.168	0.735	0.168	0.735	1.65
Notes: See Appendix A							

from permits and other primary references emission factors for specific substances and performed the modeling analyses. Substance-specific emission factors had to be assessed for each possible fuel mix and load allocation so as to identify the maximum short-term emissions to model in Section 2 for SKC's boilers at the partial load relevant to Case 1. Then, the maximum allowable short-term emissions could be established, modeled, and extended to the longer-term averages for the balance of the modeling that used internally consistent emissions data and followed standard modeling practice. In other words, ENSR found the individual steam rates, heat inputs, fuels, and emission factors corresponding to the maximum emissions for the short-term averaging times applicable to each substance and extended them to the needed annual averaging periods, consistent with the total steam loads associated with the analysis in question.

The annual emissions from combustion sources for Case 1a are listed in Tables 1-3 and 1-4. As in Case 1, the maximum emissions were derived from a composite of the maximum allowable emission rates; but the analysis was simpler since there were no elections as to how much energy the various boilers needed to produce (they all were assessed at rated capacity). (See Appendix A).

ENSR also performed the analyses described in Appendix A to confirm that these emission rates represent a conservative description of what maximum emissions are from SKC's boilers, notwithstanding the fact that the data in Tables 1-1 through 1-4 represent a composite of maximum individual emission rates associated with the alternative fuel scenarios. While only one of many possible fuel mixes could occur over any one year, each year may have maxima of several substances; and other years may have the maxima of the other substances. All maxima need to be modeled. Moreover, there is a permitted fuel scenario with total emissions higher than those presented in Tables 1-1 through 1-4 for SKC's boilers; and fairness in the modeling analysis requires the consistent use of maximum short-term emission factors. ENSR believes that this approach affords a reasonable annualized representation of individual maximum emission rates

The annual emissions from combustion sources for Case 2, CBCP as certified, are listed in Tables 1-5 and 1-6.

Tables 1-7 through 1-10 list the annual emissions from combustion sources for Case 3, CBCP as proposed to be modified, but at 85.5% annual capacity; with the proposed SKC package boilers on natural gas and fuel oil, at 260,000 lb/hr annualized steam rate (a capacity factor of 69.3%), which provides the 640,000 lb/hr of steam to SKC for its use.

Tables 1-11 through 1-14 list the annual combustion source emissions for Case 4, CBCP as proposed to be modified with the SKC package boilers on natural gas and fuel oil, all at permitted capacity. The emissions listed for the CBCP CFB boilers represent the exclusive firing of coal.

TABLE 1-3

Case 1a: Maximum Regulated Pollutant Emissions Modeled in Section 2 for SKC's Emission Sources Power and Bark Boilers as Necessary to Generate 745,000 lb/hr Total Annualized Steam

Pollutant	Total Power Boilers		Bark Boiler #1		Bark Boiler #2		
	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	Total ton/yr
SO_2	744.7	3262	58.6	256.5	58.6	256.5	3775
NO_x	302.6	1325	80.75	354	80.75	354	2033
CO	22.3	98	241.3	1057	241.3	1057	2212
TSP	67.7	297	38.6	169	38.6	169	635
PM-10	48.1	211	33.6	147	33.6	147	505
VOC	3.5	15	50.2	220	50.2	220	455
Lead	0.0190	0.083	0.0147	0.064	0.0147	0.064	0.21
Mercury	0.0022	0.0095	0.00046	0.0020	0.00046	0.0020	0.014
Beryllium	0.0028	0.0125	0.00002	1.06e-04	0.00002	1.06e-04	0.013
Fluorides	0.080	0.350	23.16	101.4	23.16	101.4	203.2
H_2SO_4 mist	16.25	71.2	2.76	12.13	2.76	12.13	95.4

Notes: See Appendix A

TABLE 1-4

Case 1a: Maximum Non-Regulated Pollutant Emissions Modeled in Section 2 for SKC's Emission Sources Power and Bark Boilers as Necessary to Generate 745,000 lb/hr Total Annualized Steam

Pollutant	Total Power Boilers		Bark Boiler #1		Bark Boiler #2		Total ton/yr
	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	
Antimony	0.00975	0.043	0.00139	0.006	0.00139	0.006	0.055
Arsenic	0.01286	0.056	0.00018	0.0008	0.00018	0.0008	0.058
Barium	0.00975	0.043	0.08299	0.363	0.08299	0.363	0.77
Bromine	0.00474	0.021	1.80	7.90	1.80	7.90	15.82
Cadmium	0.01063	0.047	0.0023	0.010	0.0023	0.010	0.067
Cobalt	0.01760	0.077	0.60	2.62	0.60	2.62	5.32
HCl	0.44682	1.957	2.32	10.14	2.32	10.14	22.2
Indium	0.01029	0.045	0.155	0.68	0.155	0.68	1.40
Chromium VI	0.00014	0.00062	0.00005	0.00022	0.00005	0.00022	0.0011
Copper	0.18821	0.824	0.0077	0.034	0.0077	0.034	0.89
Formaldehyde	0.27419	1.201	0.164	0.72	0.164	0.72	2.64
Manganese	0.01760	0.077	0.013	0.057	0.013	0.057	0.19
Molybdenum	0.03304	0.145	0.3092	1.35	0.3092	1.35	2.85
Nickel	0.85302	3.736	0.017	0.076	0.017	0.076	3.89
Phosphorous	0.03927	0.172	0.069	0.30	0.069	0.30	0.78
POM	0.00623	0.027	0.0483	0.21	0.0483	0.21	0.45
Selenium	0.00162	0.007	0.00023	0.001	0.00023	0.001	0.009
Tin	0.22341	0.979	0.19585	0.86	0.19585	0.86	2.69
Vanadium	2.38	10.42	0.104	0.46	0.104	0.46	11.34
Zinc	0.05213	0.228	0.168	0.735	0.168	0.735	1.70

Notes: See Appendix A

TABLE 1-5

Case 2: Maximum Regulated Pollutant Emissions for Cedar Bay as Certified (a)

Pollutant	CFB		Limestone Dryers (b)		Total (tons/yr)
	(lb/MMBtu)	(tons/yr)	(lb/hr)	(tons/yr)	
SO2	0.31 (c)	4,015	5.00	43.8	4,058.8
NOx	0.29 (d)	3,767	2.40	21.0	3,788.0
CO	0.19	2,468	0.60	5.2	2,473.2
TSP (PM)	0.020	260	0.25	2.2	262.2
PM-10	0.020	257	0.25	2.2	259.2
VOC	0.015	195	0.05	0.4	195.4
Lead	0.007	91	1.52e-04(e)	1.33e-03(e)	91.0
Beryllium	0.00011	1.5	4.26e-05(e)	3.73e-04(e)	1.5
Mercury	0.00026	3.4	5.11e-05(e)	4.48e-04(e)	3.4
Fluorides	0.086	1,122	5.45e-04(e)	4.78e-03(e)	1,122.0
H2SO4 mist	0.024	308	0.20(e)	1.75(e)	309.8

Notes:
NA = Not Available
(a) Source: Final Order and Certification PA-88-24 (2/11/91) and Final Determination, AES/Cedar Bay Cogeneration Project, Duval County, FL Permit No. PSD-FL-137 (3/28/91).
(b) lb/hr values represent emissions limits for each of two limestone dryers
Annual emissions are for both dryers, based on permitted 8760 hrs/yr operation
(c) 12 month running average
(d) 30 day running average
(e) For emissions not specified in (a), emissions in terms of lb/10^{12} Btu supplied by Bechtel, Correspondence from A. Nawaz to M. Carney (U.S. Generating Company): converted to lb/hr based on fuel rate of 120 gal/hr and heating value of 142,000 Btu/gal.

TABLE 1-6

Case 2: Maximum Non-Regulated Pollutant Emissions for Cedar Bay as Certified (a)

Pollutant	CFB		Limestone Dryers (c)		Total (tons/yr)
	(lb/MMBtu)[b]	(tons/yr)	(lb/hr)	(tons/yr)	
Antimony	1.06e-05	0.14	6.82e-05	5.97e-04	0.14
Arsenic	1.44e-04	1.9	7.16e-05	6.27e-04	1.9
Barium	6.11e-04	7.9	4.60e-05	4.03e-04	7.9
Bromine	-	-	1.19e-04	1.04e-03	1.04e-03
Cadmium	3.15e-05	0.41	1.79e-04	1.57e-03	4.12e-01
Cobalt	3.78e-05	0.49	1.07e-03	9.37e-03	0.50
HCl	1.81e-03	23.5	1.12e-02	9.81e-02	23.6
Indium	1.40e-07	1.82e-03			1.82e-03
Chromium VI	1.06e-06	1.38e-02	3.41e-06	2.99e-05	1.38e-02
Copper	8.04e-05	1.0	4.77e-03	4.18e-02	1.0
Formaldehyde	1.30e-04	1.7	6.90e-03	6.04e-02	1.8
Manganese	5.00e-04	6.5	1.79e-04	1.57e-03	6.5
Molybdenum	1.00e-04	1.3	8.32e-04	7.29e-03	1.3
Nickel	8.08e-05	1.0	2.90e-03	2.54e-02	1.0
Phosphorous	3.35e-04	4.4	1.81e-03	1.59e-02	4.4
POM	1.86e-05	0.24	3.83e-04	3.36e-03	0.24
Selenium	1.58e-05	0.21	1.93e-04	1.69e-03	0.21

TABLE 1-6 (Cont'd)

Case 2: Maximum Non-Regulated Pollutant Emissions for Cedar Bay as Certified (a)

Pollutant	CFB		Limestone Dryers (c)		Total (tons/yr)
	(lb/MMBtu)[b]	(tons/yr)	(lb/hr)	(tons/yr)	
Tin	3.94e-05	0.51	5.62e-03	4.92e-02	0.56
Vanadium	3.21e-04	4.2	1.28e-02	1.12e-01	4.3
Zinc	3.73e-03	48.45	2.56e-03	2.24e-02	48.5
Radionuclides (d)	8.66e-10	0.022	NA	NA	0.022

Notes:
NA - Not Available
(a) Emissions estimated based on emission factors developed by Bechtel Power (Letter from A. Nawaz, Bechtel to M. Carney, U.S. Generating Company)
(b) Annual average.
(c) lb/hr values represent emissions limits for each of two limestone dryers
Annual emissions are for both dryers, based on permitted 8760 hrs/yr operation
(d) Emission units expressed as curies

TABLE 1-7

Case 3: Maximum Regulated Pollutant Emissions for Cedar Bay as Proposed to be Modified (a) and SKC Package Boilers Firing Natural Gas at 260,000 lb/hr Steam

	CFB		Limestone Dryers (d)		SK Package Boilers (e)		Total
Pollutant	(lb/MMBtu)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(tons/yr)
SO2	0.20 (b)	2388.5	5.00	14.6	0.07	1.0	2404.1
NOx	0.17 (c)	2030.2	2.40	7.0	24.3	319.3	2356.5
CO	0.175 (c)	2089.9	0.60	1.8	43.4	569.9	2661.6
TSP	0.018	215.0	0.25	0.73	0.61	8.0	223.7
PM-10	0.018	215.0	0.25	0.73	0.61	8.0	223.7
VOC	0.015	179.1	0.05	0.15	0.17	2.2	181.5
Lead (b)	6.03e-05	0.72	1.52e-04	4.44e-04	NA	NA	0.72
Beryllium (b)	8.70e-06	0.10	4.26e-05	1.24e-04	NA	NA	0.10
Mercury (b)	2.89e-05	0.35	5.11e-05	1.49e-04	1.7e-06	2.2e-05	0.35
Fluorides (b)	7.44e-04	8.9	5.45e-04	1.59e-03	NA	NA	8.9
H2SO4 mist	4.66e-04	5.6	0.20	0.58	NA	NA	6.2

Notes:
NA = Not Applicable
(a) Source: Final Order and Certification PA-88-24 (2/11/91) and Amended Petition for Modification of Certification (July 22, 1992 Before the State of Florida, Division of Administrative Hearings, In Re: AES Cedar Bay Cogeneration Project, Power Plant Site Certification Application PA-88-24) plus additional improvements by CBCP.
(b) 12 month running average
(c) 30 day running average
(d) Lb/hr values represent emission limits for each of two limestone dryers
Annual emissions are for both dryers and are based on maximum operation of 8 hours/day each, 365 days/yr
(e) Firing natural gas - lb/hr values for each of three boilers - emissions data from ENSR 1993

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TABLE 1-8

Case 3: Maximum Non-Regulated Pollutant Emissions for Cedar Bay as Proposed to be Modified (a) and SKC Package Boilers Firing Natural Gas at 260,000 lb/hr Steam

	CFB		Limestone Dryers (c)		SK Package Boilers (d)		Total
Pollutant	(lb/MMBtu)(b)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(tons/yr)
Antimony	1.06e-05	0.13	6.82e-05	1.99e-04	NA	NA	0.13
Arsenic	1.44e-04	1.7	7.16e-05	2.09e-04	NA	NA	1.7
Barium	6.11e-04	7.3	4.60e-05	1.34e-04	NA	NA	7.3
Bromine			1.19e-04	3.47e-04	NA	NA	3.47e-04
Cadmium	3.15e-05	0.38	1.79e-04	5.23e-04	NA	NA	0.38
Cobalt	3.78e-05	0.45	1.07e-03	3.12e-03	NA	NA	0.45
HCl	1.81e-03	21.6	1.12e-02	3.27e-02	NA	NA	21.6
Indium	1.40e-07	1.67e-03	NA	NA	NA	NA	1.67e-03
Chromium VI	1.06e-06	1.27e-02	3.41e-06	9.96e-06	NA	NA	1.27e-02
Copper	8.04e-05	0.96	4.77e-03	1.39e-02	NA	NA	0.97
Formaldehyde	1.30e-04	1.6	6.90e-03	2.01e-02	NA	NA	1.6
Manganese	5.00e-04	6.0	1.79e-04	5.23e-04	NA	NA	6.0
Molybdenum	1.00e-04	1.2	8.32e-04	2.43e-03	NA	NA	1.2
Nickel	8.08e-05	0.96	2.90e-03	8.47e-03	NA	NA	0.97
Phosphorous	3.35e-04	4.0	1.81e-03	5.29e-03	NA	NA	4.0
POM	1.86e-05	0.22	3.83e-04	1.12e-03	NA	NA	0.22
Selenium	1.58e-05	0.19	1.93e-04	5.64e-04	NA	NA	0.19
Tin	3.94e-05	0.47	5.62e-03	1.64e-02	NA	NA	0.49

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TABLE 1-8 (Cont'd)

Case 3: Maximum Non-Regulated Pollutant Emissions for Cedar Bay as Proposed to be Modified (a) and SKC Package Boilers Firing Natural Gas at 260,000 lb/hr Steam

	CFB		Limestone Dryers (c)		SK Package Boilers (d)		Total (tons/yr)
Pollutant	(lb/MMBtu)(b)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	
Vanadium	3.21e-04	3.8	1.28e-02	3.73e-02	NA	NA	3.8
Zinc	3.73e-03	44.5	2.56e-03	7.48e-03	NA	NA	44.5
Radionuclides (e)	8.66e-10	0.020	NA	NA	NA	NA	0.020

Notes:
NA - Not applicable
(a) Source: emission factors developed by Bechtel Power
(b) Annual Average
(c) Lb/hr values represent emission limits for each of two limestone dryers
Annual emissions are for both dryers and are based on maximum operation of 8 hours/day each, 365 days/yr
(d) Firing natural gas - lb/hr values for each of three boilers - emissions data from ENSR 1993
(e) Emission units expressed as curies

TABLE 1-9

Case 3: Maximum Regulated Pollutant Emissions for Cedar Bay as Proposed to be Modified (a) and SKC Package Boilers Firing Distillate Oil at 260,000 lb/hr Steam

	CFB		Limestone Dryers (d)		SK Package Boilers (e)		Total
Pollutant	(lb/MMBtu)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(tons/yr)
SO2	0.20 (b)	2388.5	5.00	14.6	34.2	449.1	2852.2
NOx	0.17 (c)	2030.2	2.40	7.0	22.8	299.4	2336.6
CO	0.175 (c)	2089.9	0.60	1.8	42	551.9	2643.6
TSP	0.018	215.0	0.25	0.73	5.7	74.9	290.6
PM-10	0.018	215.0	0.25	0.73	2.8	37.4	253.1
VOC	0.015	179.1	0.05	0.15	0.16	2.2	181.5
Lead (b)	6.03e-05	0.72	1.52e-04	4.44e-04	1.0e-03	1.3e-02	0.73
Beryllium (b)	8.70e-06	0.10	4.26e-05	1.24e-04	2.8e-04	3.7e-03	0.10
Mercury (b)	2.89e-05	0.35	5.11e-05	1.49e-04	3.9e-04	5.1e-03	0.36
Fluorides (b)	7.44e-04	8.9	5.45e-04	1.59e-03	3.7e-03	4.9e-02	9.0
H2SO4 mist	4.66e-04	5.6	0.20	0.58	1.7	22.3	28.5

(a) Source: Final Order and Certification PA-88-24 (2/11/91) and Amended Petition for Modification of Certification (July 22, 1992 Before the State of Florida, Division of Administrative Hearings, In Re: AES Cedar Bay Cogeneration Project, Power Plant Site Certification Application PA-88-24) plus additional improvements by CBCP.
(b) 12 month running average
(c) 30 day running average
(d) Lb/hr values represent emission limits for each of two limestone dryers
Annual emissions are for both dryers and are based on maximum operation of 8 hours/day each, 365 days/yr
(e) Firing distillate oil - lb/hr values for each of three boilers - emissions data from ENSR 1993

TABLE 1-10

Case 3: Maximum Non-regulated Pollutant Emissions for Cedar Bay as Proposed to be Modified (a) and SKC Package Boilers Firing Distillate Oil at 260,000 lb/hr Steam

Pollutant	CFB		Limestone Dryers (c)		SK Package Boilers (d)		Total (tons/yr)
	(lb/MMBtu)(b)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	
Antimony	1.06e-05	0.13	6.82e-05	1.99e-04	4.6e-04	0.006	0.14
Arsenic	1.44e-04	1.7	7.16e-05	2.09e-04	4.8e-04	6.3e-03	1.7
Barium	6.11e-04	7.3	4.60e-05	1.34e-04	3.1e-04	4.0e-03	7.3
Bromine			1.19e-04	3.47e-04	8.0e-04	1.05e-02	0.01
Cadmium	3.15e-05	0.38	1.79e-04	5.23e-04	1.2e-03	1.6e-02	0.40
Cobalt	3.78e-05	0.45	1.07e-03	3.12e-03	1.0e-03	1.32e-02	0.47
HCl	1.81e-03	21.6	1.12e-02	3.27e-02	7.52e-02	0.99	22.6
Indium	1.40e-07	1.67e-03	NA	NA	1.73e-03	2.28e-02	2.45e-02
Chromium VI	1.06e-06	1.27e-02	3.41e-06	9.96e-06	5.0e-05	7.0e-04	0.01
Copper	8.04e-05	0.96	4.77e-03	1.39e-02	3.19e-02	0.42	1.4
Formaldehyde	1.30e-04	1.6	6.90e-03	2.01e-02	4.61e-02	0.61	2.2
Manganese	5.00e-04	6.0	1.79e-04	5.23e-04	1.1e-03	1.45e-02	6.0
Molybdenum	1.00e-04	1.2	8.32e-04	2.43e-03	5.6e-03	0.07	1.3
Nickel	8.08e-05	0.96	2.90e-03	8.47e-03	1.94e-02	2.5e-01	1.2
Phosphorous	3.35e-04	4.0	1.81e-03	5.29e-03	1.21e-02	0.16	4.2
POM	1.86e-05	0.22	3.83e-04	1.12e-03	3.0e-05	4.0e-04	0.22
Selenium	1.58e-05	0.19	1.93e-04	5.64e-04	1.3e-03	1.7e-02	0.21
Tin	3.94e-05	0.47	5.62e-03	1.64e-02	3.76e-02	0.49	0.98
Vanadium	3.21e-04	3.8	1.28e-02	3.73e-02	5.13e-02	0.67	4.5

TABLE 1-10 (Cont'd)

Case 3: Maximum Non-Regulated Pollutant Emissions for Cedar Bay as Proposed to be Modified (a) and SKC Package Boilers Firing Distillate Oil at 260,000 lb/hr Steam

Pollutant	CFB		Limestone Dryers (c)		SK Package Boilers (d)		Total (tons/yr)
	(lb/MMBtu)(b)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	
Zinc	3.73e-03	44.5	2.56e-03	7.48e-03	1.12e-02	0.15	44.7
Radionuclides (e)	8.66e-10	0.020	NA	NA	NA	NA	0.020

Notes:
NA - Not available
(a) Source: emission factors developed by Bechtel Power
(b) Annual Average
(c) Lb/hr values represent emission limits for each of two limestone dryers
Annual emissions are for both dryers and are based on maximum operation of 8 hours/day each, 365 days/yr
(d) Firing distillate oil - lb/hr values for each of three boilers - emissions data from ENSR 1993
(e) Emission units expressed as curies

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TABLE 1-11

Case 4: Maximum Regulated Pollutant Emissions for Cedar Bay as Proposed to be Modified (a) and SKC Package Boilers Firing Natural Gas at 375,000 lb/hr Steam

	CFB		Limestone Dryers (d)		SK Package Boilers (e)		Total
Pollutant	(lb/MMBtu)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(tons/yr)
SO2	0.20 (b)	2,598.0	5.0	14.6	0.1	1.4	2,614.0
NOx	0.17 (c)	2,208.3	2.4	7.0	34.9	459.1	2,674.4
CO	0.175 (c)	2,273.3	0.6	1.8	62.4	819.9	3,095.0
TSP	0.018	233.8	0.25	0.73	0.87	11.5	246.0
PM-10	0.018	233.8	0.25	0.73	0.87	11.5	246.0
VOC	0.015	194.9	0.05	0.15	0.24	3.2	198.3
Lead (b)	6.03e-05	0.78	1.52e-04	4.44e-04	NA	NA	0.78
Beryllium (b)	8.70e-06	0.11	4.26e-05	1.24e-04	NA	NA	0.11
Mercury (b)	2.89e-05	0.38	5.11e-05	1.49e-04	2.4e-06	3.21e-05	0.38
Fluorides (b)	7.44e-04	9.7	5.45e-04	1.59e-03	NA	NA	9.7
H2SO4 mist	4.66e-04	6.1	0.20	0.58	NA	NA	6.7

Notes:
NA = Not Applicable
(a) Source: Final Order and Certification PA-88-24 (2/11/91) and Amended Petition for Modificaiton of Certification (July 22, 1992 Before the State of Florida, Division of Administrative Hearings, In Re: AES Cedar Bay Cogeneration Project, Power Plant Site Certification Application PA-88-24) plus additional improvements by CBCP.
(b) 12 month running average
(c) 30 day running average
(d) Lb/hr values represent emission limits for each of two limestone dryers
Annual emissions are for both dryers and are based on maximum operation of 8 hours/day each; 365 days/yr
(e) Firing natural gas - lb/hr values for each of three boilers - emissions data from SKC Permit Application

TABLE 1-12

Case 4: Maximum Non-Regulated Pollutant Emissions for Cedar Bay as Proposed to be Modified (a) and SKC Package Boilers Firing Natural Gas at 375,000 lb/hr Steam

Pollutant	CFB		Limestone Dryers (c)		SK Package Boilers (d)		Total (tons/yr)
	(lb/MMBtu) (b)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	
Antimony	1.06e-05	0.14	6.82e-05	1.99e-04	NA	NA	0.14
Arsenic	1.44e-04	1.9	7.16e-05	2.09e-04	NA	NA	1.9
Barium	6.11e-04	7.9	4.60e-05	1.34e-04	NA	NA	7.9
Bromine			1.19e-04	3.47e-04	NA	NA	3.47e-04
Cadmium	3.15e-05	0.41	1.79e-04	5.23e-04	NA	NA	0.41
Cobalt	3.78e-05	0.49	1.07e-03	3.12e-03	NA	NA	0.49
HCl	1.81e-03	23.5	1.12e-02	3.27e-02	NA	NA	23.5
Indium	1.40e-07	1.82e-03	NA	NA	NA	NA	1.82e-03
Chromium VI	1.06e-06	1.38e-02	3.14e-06	9.96e-06	NA	NA	1.38e-02
Copper	8.04e-05	1.0	4.77e-03	1.39e-02	NA	NA	1.0
Formaldehyde	1.30e-04	1.7	6.90e-03	2.01e-02	NA	NA	1.7
Manganese	5.00e-04	6.5	1.79e-04	5.23e-04	NA	NA	6.5
Molybdenum	1.00e-04	1.3	8.32e-04	2.43e-03	NA	NA	1.3
Nickel	8.08e-05	1.0	2.90e-03	8.47e-03	NA	NA	1.0
Phosphorous	3.35e-04	4.4	1.81e-03	5.29e-03	NA	NA	4.4
POM	1.86e-05	0.24	3.83e-04	1.12e-03	NA	NA	0.24
Selenium	1.58e-05	0.21	1.93e-04	5.64e-04	NA	NA	0.21
Tin	3.94e-05	0.51	5.62e-03	1.64e-02	NA	NA	0.53
Vanadium	3.21e-04	4.2	1.28e-02	3.73e-02	NA	NA	4.2

TABLE 1-12 (Cont'd)

Case 4: Maximum Non-Regulated Pollutant Emissions for Cedar Bay as Proposed to be Modified (a) and SKC Package Boilers Firing Natural Gas at 375,000 lb/hr Steam

Pollutant	CFB		Limestone Dryers (c)		SK Package Boilers (d)		Total (tons/yr)
	(lb/MMBtu) (b)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	
Zinc	3.73e-03	48.5	2.56e-03	7.48e-03	NA	NA	48.5
Radionuclides (e)	8.66e-10	0.022	NA	NA	NA	NA	0.022

Notes:
NA - Not applicable
(a) Source: emission factors provided by Bechtel Power (2-2-93)
(b) Annual Average
(c) Lb/hr values represent emission limits for each of two limestone dryers
Annual emissions are for both dryers and are based on maximum operation of 8 hours/day each, 365 days/yr
(d) Firing natural gas - lb/hr values for each of three boilers - emissions data from SKC Permit Application
(e) Emission units expressed as curies

TABLE 1-13

Case 4: Maximum Regulated Pollutant Emissions for Cedar Bay as Proposed to be Modified (a) and SKC Package Boilers Firing Distillate Oil at 375,000 lb/hr Steam

Pollutant	CFB		Limestone Dryers (d)		SK Package Boilers (e)		Total (tons/yr)
	(lb/MMBtu)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	
SO2 (b)	0.20	2,598.0	5.0	14.6	49.35	648.5	3,261.1
NOx (c)	0.17	2,208.3	2.4	7.0	32.9	432.3	2,647.6
CO (c)	0.175	2,273.3	0.6	1.8	61.04	801.9	3,077
TSP	0.018	233.8	0.25	0.73	8.23	108.1	342.6
PM-10	0.018	233.8	0.25	0.73	4.11	54.0	288.5
VOC	0.015	194.9	0.05	0.15	0.24	3.1	198.2
Lead (b)	6.03e-05	0.78	1.52e-04	4.44e-04	1.46e-03	1.9e-02	0.80
Beryllium (b)	8.70e-06	0.11	4.26e-05	1.24e-04	4.11e-04	5.4e-03	0.12
Mercury (b)	2.89e-05	0.38	5.11e-05	1.49e-04	5.59e-04	7.3e-03	0.39
Fluorides (b)	7.44e-04	9.7	5.45e-04	1.59e-03	5.3e-03	7.0e-02	9.8
H2SO4 mist	4.66e-04	6.1	0.20	0.58	2.47	32.4	39.1

(a) Source: Final Order and Certification PA-88-24 (2/11/91) and Amended Petition for Modification of Certification (July 22, 1992 Before the State of Florida, Division of Administrative Hearings, In Re: AES Cedar Bay Cogeneration Project, Power Plant Site Certification Application PA-88-24) plus additional improvements by CBCP.
(b) 12 month running average
(c) 30 day running average
(d) Lb/hr values represent emission limits for each of two limestone dryers
Annual emissions are for both dryers and are based on maximum operation of 8 hours/day each, 365 days/yr
(e) Firing distillate oil - lb/hr values for each of three boilers - emissions data from SKC Permit Application

TABLE 1-14

Case 4: Maximum Non-Regulated Pollutant Emissions for Cedar Bay as Proposed to be Modified (a) and SKC Package Boilers Firing Distillate Oil at 375,000 lb/hr Steam

Pollutant	CFB		Limestone Dryers (c)		SK Package Boilers (d)		Total (tons/yr)
	(lb/MMBtu)(b)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	
Antimony	1.06e-05	0.14	6.82e-05	1.99e-04	6.6e-04(f)	8.6e-03	0.15
Arsenic	1.44e-04	1.9	7.16e-05	2.09e-04	7.0e-04	9.1e-03	1.9
Barium	6.11e-04	7.9	4.60e-05	1.34e-04	4.0e-04	5.8e-03	7.9
Bromine			1.19e-04	3.47e-04	1.2e-03	1.51e-02	0.02
Cadmium	3.15e-05	0.41	1.79e-04	5.23e-04	1.7e-03	2.3e-02	0.43
Cobalt	3.78e-05	0.49	1.07e-03	3.12e-03	1.45e-03(f)	0.02	0.51
HCl	1.81e-03	23.5	1.12e-02	3.27e-02	1.04e-01(f)	1.43	25.0
Indium	1.40e-07	1.82e-03	NA	NA	2.5e-03(f)	3.29e-02	0.03
Chromium VI	1.06e-06	1.38e-02	3.41e-06	9.96e-06	8.0e-05(f)	0.001	0.01
Copper	8.04e-05	1.0	4.77e-03	1.39e-02	4.61e-02	0.61	1.6
Formaldehyde	1.30e-04	1.7	6.90e-03	2.01e-02	6.66e-02(f)	0.88	2.6
Manganese	5.00e-04	6.5	1.79e-04	5.23e-04	1.6e-03	0.02	6.5
Molybdenum	1.00e-04	1.3	8.32e-04	2.43e-03	8.0e-03	0.11	1.4
Nickel	8.08e-05	1.0	2.90e-03	8.47e-03	2.8e-02	0.37	1.4
Phosphorous	3.35e-04	4.4	1.81e-03	5.29e-03	1.74e-02	0.23	4.6
POM	1.86e-05	0.24	3.83e-04	1.12e-03	5.0e-05(f)	6.0e-04	0.24
Selenium	1.58e-05	0.21	1.93e-04	5.64e-04	1.9e-03	0.02	0.23
Tin	3.94e-05	0.51	5.62e-03	1.64e-02	5.43e-02	0.71	1.2
Vanadium	3.21e-04	4.2	1.28e-02	3.73e-02	7.4e-02(f)	0.97	5.2

TABLE 1-14 (Cont'd)

Case 4: Maximum Non-Regulated Pollutant Emissions for Cedar Bay as Proposed to be Modified (a) and SKC Package Boilers Firing Distillate Oil at 375,000 lb/hr Steam

Pollutant	CFB		Limestone Dryers (c)		SK Package Boilers (d)		Total (tons/yr)
	(lb/MMBtu)(b)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	
Zinc	3.73e-03	48.5	2.56e-03	7.48e-03	1.61e-02(f)	0.21	48.7
Radionuclides (e)	8.66e-10	0.022	NA	NA	NA	NA	0.022

Notes:
NA - Not Available
(a) Source: emission factors developed by Bechtel Power
(b) Annual Average
(c) Lb/hr values represent emission limits for each of two limestone dryers
Annual emissions are for both dryers and are based on maximum operation of 8 hours/day each, 365 days/yr
(d) Firing distillate oil - lb/hr values for each of three boilers - emissions data from SKC Permit Application (unless otherwise noted)
(e) Emission units expressed as curies
(f) Firing distillate oil - lb/hr values for each of three boilers - emissions data from ENSR 1993

According to the CBCP, emissions from the firing of distillate oil during start-up, or the small quantities of short-fiber rejects from SKC, will be lower.

The above tables list emissions only from combustion sources at the CBCP. Additional particulate emissions are generated in the form of dust from aggregate materials handling and storage as well as from the cooling tower in the form of suspended and dissolved solids in the drift droplets. Table 1-15 lists the total annual emissions of PM-10 and TSP associated with these operations at the respective facilities. The PM-10 and TSP emissions from the sources listed in Table 1-15 are incorporated into the comparisons presented in the following section. Details of the various sources, controls, and calculations of emissions from these operations are provided in Appendix B with the exception of PM-10/TSP emissions from aggregate materials handling for the CBCP as Certified. Those emissions were taken from Table 3.4-5 of the Site Certification Application, Amendment 3.

1.3 Findings

The results of Assessment A, the CBCP as proposed to be modified at full load with SKC package boilers on fuel oil, Case 4, vs the CBCP as certified, Case 2, are presented in Table 1-16. The results of Assessment A with the SKC package boilers on natural gas are presented in Table 1-17. The total aggregate emissions shown count both TSP and PM-10 as individual substances, even though PM-10 are a portion of TSP. In the context of ambient standards, which are established for PM-10, and PSD increments, which are established for TSP, the air quality impacts analyses treat the two substances exclusively. In order to be consistent with this treatment, they are also treated individually for emissions aggregation purposes. These tables show that, for Assessment A, while annual emissions of some substances emitted by the CBCP and the SKC package boilers as proposed in Case 4 are greater than for the CBCP as certified in Case 2, others decrease substantially. Thus, on balance, the aggregate annual emissions of Case 4 are lower; and current proposals are associated with much fewer emissions than the CBCP as certified.

The results of Assessment B, Case 3 vs. Case 1, comparing the powering of the recycle operation at SKC at partial load with and without the CBCP are presented in Tables 1-18 and 1-19. These tables show that, for Assessment B, while annual emissions of some substances for the combination of the CBCP and SKC's three package boilers in Case 3 are greater than for SKC's five existing boilers in Case 1, others decrease enough such that, on balance, the aggregate annual emissions of Case 3, the "With CBCP" case, are lower than for the "Without the CBCP" case.

TABLE 1-15

TSP/PM-10 Emissions from Aggregate Materials Handling and Storage and Cooling Tower Operations[a]

Facility	Operation	Annual Particulate Emissions (ton/yr)	
		TSP	PM-10
Cedar Bay as Certified[b]	Coal, Ash, Limestone Handling and Storage	7.69	7.69
	Cooling Tower Drift	49.4	49.4
Cedar Bay as Proposed to be Modified	Coal, Ash, Limestone Handling and Storage	10.12	9.22
	Cooling Tower Drift	24.7	24.7

[a]See Appendix B
[b]Source: SCA, Amendment 3

TABLE 1-16

Emissions Comparison (tons/yr) Assessment A
Case 4: Cedar Bay as Proposed to be Modified with SKC Package Boilers at 375 k lb/hr Steam Firing Distillate Oil vs. Case 2: Cedar Bay as Certified

Pollutant	Case 2	Case 4	Change
SO2	4,058.8	3,261.1	-797.7
NOx	3,788.0	2,647.6	-1140.4
CO	2,473.3	3077	603.7
TSP	319.3	377.4	58.1
PM-10	316.3	322.4	6.1
VOC	195.4	198.2	2.8
Lead	91.0	0.80	-90.2
Beryllium	1.5	0.12	-1.38
Mercury	3.4	0.39	-3.01
Fluorides	1,122.0	9.8	-1112.2
H2SO4 mist	309.8	39.1	-270.7
Antimony	0.14	0.15	0.01
Arsenic	1.9	1.9	0
Barium	7.9	7.9	0
Bromine	1.04e-03	0.02	0.02
Cadmium	0.41	0.43	0.02
Cobalt	0.50	0.51	0.01
HCl	23.6	25.0	1.4
Indium	1.82e-03	0.03	0.03
Chromium VI	1.38e-02	0.01	0
Copper	1.0	1.6	0.5
Formaldehyde	1.8	2.6	0.8
Manganese	6.5	6.5	0
Molybdenum	1.3	1.4	0.1
Nickel	1.0	1.4	0.4
Phosphorous	4.4	4.6	0.2
POM	0.24	0.24	0
Selenium	0.21	0.23	0.02
Tin	0.56	1.2	0.64

TABLE 1-16 (Cont'd)

Emissions Comparison (tons/yr) Assessment A
Case 4: Cedar Bay as Proposed to be Modified with SKC Package Boilers at 375 k lb/hr Steam Firing Distillate Oil vs. Case 2: Cedar Bay as Certified

Pollutant	Case 2	Case 4	Change
Vanadium	4.3	5.2	0.9
Zinc	48.5	48.7	0.2
Radionuclides (curies)	0.022	0.022	0
Subtotal Non-Regulated Trace Pollutants	104.3	109.6	5.3
Total Aggregate Emissions	12,783.1	10,043.4	-2,739.7

TABLE 1-17

Emissions Comparison (Tons/yr), Assessment A
Case 4: Cedar Bay as Proposed to be Modified with SKC Package Boilers at 375 k lb/hr Steam Firing Natural Gas vs. Case 2: Cedar Bay as Certified

Pollutant	Case 2	Case 4	Change
SO2	4,058.8	2,614.0	-1444.8
NOx	3,788.0	2,674.4	-1113.6
CO	2,473.3	3,095.0	621.7
TSP	319.3	280.8	-38.5
PM-10	316.3	279.9	-36.4
VOC	195.4	198.3	2.9
Lead	91.0	0.78	-90.22
Beryllium	1.5	0.11	-1.39
Mercury	3.4	0.38	-3.02
Fluorides	1,122.0	9.7	-1112.3
H2SO4 mist	309.8	6.7	-303.1
Antimony	0.14	0.14	0
Arsenic	1.9	1.9	0
Barium	7.9	7.9	0
Bromine	1.04e-03	3.47e-04	0
Cadmium	0.41	0.41	0
Cobalt	0.50	0.49	-0.01
HCl	23.6	23.5	-0.1
Indium	1.82e-03	1.82e-03	0
Chromium VI	1.38e-02	1.38e-02	0
Copper	1.0	1.0	0
Formaldehyde	1.8	1.7	-0.1
Manganese	6.5	6.5	0
Molybdenum	1.3	1.3	0
Nickel	1.0	1.0	0
Phosphorous	4.4	4.4	0
POM	0.24	0.24	0
Selenium	0.21	0.21	0
Tin	0.56	0.53	-0.03

TABLE 1-17 (Cont'd)

Emissions Comparison (tons/yr) Assessment A
Case 4: Cedar Bay as Proposed to be Modified with SKC Package Boilers at 375 k lb/hr Steam Firing Natural Gas vs. Case 2: Cedar Bay as Certified

Pollutant	Case 2	Case 4	Change
Vanadium	4.3	4.2	-0.1
Zinc	48.5	48.5	0
Radionuclides (curies)	0.022	0.022	0
Subtotal Non-Regulated Trace Pollutants	104.3	103.9	-0.4
Total Aggregate Emissions	12,783.1	9,264.0	-3,519.1

TABLE 1-18

Emissions Comparison (Tons/yr), Assessment B
Case 3: Cedar Bay as Proposed to be Modified Supplying 380 k lb/hr Steam to SKC with SKC Package Boilers at 260 k lb/hr Steam vs. Case 1: the Future Operation of the 3 Power Boilers and 2 Bark Boilers at 640 k lb/hr Steam for the SKC Recycling Operation

Pollutant	Case 1 SK Power & Bark Boilers	Case 3 Cedar Bay & SK Package Boilers			Net Change	
		Cedar Bay	SK Boilers Firing Oil	SK Boilers Firing Gas	SK Boilers Firing Oil	SK Boilers Firing Gas
SO2	3,560.0	2403.1	449.1	1.0	-707.8	-1155.9
NOx	1,736	2037.2	299.4	319.3	600.6	620.5
CO	2,191	2091.7	551.9	569.9	452.6	470.6
TSP	572	250.6	74.9	8.0	-246.5	-313.4
PM-10	460	249.7	37.4	8.0	-172.9	-202.3
VOC	451	179.3	2.2	2.2	-269.5	-269.5
Lead	0.19	0.72	0.013	NA	0.54	0.53
Mercury	0.012	0.35	0.005	2.2e-05	0.34	0.34
Beryllium	0.013	0.10	0.004	NA	0.09	0.09
Fluorides	203.2	8.9	0.049	NA	-194.3	-194.3
H2SO4 mist	85.2	6.2	22.3	NA	-56.7	-79.0
Subtotal Non-Regulated Trace Pollutants[a]	70.7	95.5	3.9	NA	28.7	24.8
Total Aggregate Emissions	9329.3	7323.4	1441.2	908.4	-564.7	-1097.5

[a]See Table 1-19
NA = Not Applicable

TABLE 1-19

Non-Regulated Emissions Comparison (Tons/yr), Assessment B
Case 3: Cedar Bay as Proposed to be Modified Supplying 380 k lb/hr Steam to SKC with SKC Package Boilers at 260 k lb/hr Steam vs. Case 1: the Future Operation of the 3 Power Boilers and 2 Bark Boilers at 640 k lb/hr Steam for the SKC Recycling Operation

Pollutant	Case 1 SK Power & Bark Boilers	Case 3 Cedar Bay & SK Package Boilers			Net Change	
		Cedar Bay	SK Boilers Firing Oil	SK Boilers Firing Gas	SK Boilers Firing Oil	SK Boilers Firing Gas
Antimony	0.050	0.13	0.006	NA	0.09	0.08
Arsenic	0.057	1.7	0.006	NA	1.6	1.6
Barium	0.76	7.3	0.004	NA	6.5	6.5
Bromine	15.82	3.47e-04	1.05e-02	NA	-15.8	-15.8
Cadmium	0.057	0.38	0.016	NA	0.34	0.32
Cobalt	5.30	0.45	1.32e-02	NA	-4.8	-4.9
HCl	21.8	21.6	0.99	NA	0.8	-0.2
Indium	1.39	1.67e-03	2.28e-02	NA	-1.37	-1.39
Chromium VI	0.0009	1.27e-02	7.0e-04	NA	0.01	0.01
Copper	0.72	0.97	0.42	NA	0.67	0.25
Formaldehyde	2.38	1.6	0.61	NA	-0.17	-0.8
Manganese	0.18	6.0	0.015	NA	5.8	5.8
Molybdenum	2.82	1.2	0.07	NA	-1.6	-1.6
Nickel	3.09	0.97	0.25	NA	-1.9	-2.1
Phosphorous	0.74	4.0	0.16	NA	3.4	3.3
POM	0.44	0.22	4.0e-04	NA	-0.22	-0.22
Selenium	0.008	0.19	0.017	NA	0.20	0.18
Tin	2.49	0.49	0.49	NA	-1.5	-2.0
Vanadium	10.95	3.8	0.67	NA	-6.5	-7.2
Zinc	1.65	44.5	0.15	NA	43.0	42.9
Radionuclides	NA	0.020	NA	NA	0.020	0.020

NA = Not Applicable

The results of Assessment C, Case 4 vs. Case 1a (comparing the "With the CBCP" case and the "Without the CBCP" case, respectively), at full load are presented in Tables 1-20 and 1-21. These tables show that, for Assessment C, while annual emissions of some substances in Case 4 are greater than for Case 1a, others decrease. The aggregate annual emissions are higher for Case 4, the "With the CBCP" case, when SKC's package boilers are on oil and lower when SKC's package boilers are on gas.

This comparison does not, however, account for additional substantial decreases in baseline emissions resulting from the shutdown of recovery boilers, lime kilns, and smelt dissolving tanks at SKC as a result of the conversion to a recycling operation. Table 1-22 lists these changes. These estimates are taken from the PSD permit application filed by SKC for the proposed package boilers. It is shown in Table 1-22 that decreases in baseline emissions resulting from the additional SKC shutdowns more than offset the increases shown in Table 1-20. Such a comparison is a more realistic assessment of the emissions at the SKC/CBCP site before conception of the CBCP and after the operation of the CBCP. In addition, as will be shown in Section 2 of the report, even though emissions of some substances increase for Case 4 vs. Case 1a, there will be a net benefit to air quality from Case 4 even ignoring the additional reductions in Table 1-22.

TABLE 1-20

Emissions Comparison (Tons/yr), Assessment C
Case 4: Cedar Bay as Proposed to be Modified Supplying 380k lb/hr Steam to SKC with SKC Package Boilers at 375k lb/hr Steam vs. Case 1a: The Future Operation of the 3 Power Boilers and 2 Bark Boilers at 745k lb/hr Steam for the SKC Recycling Operation

Pollutant	Case 1a SK Power & Bark Boilers	Case 4 Cedar Bay and SK Package Boilers			Net Change	
		Cedar Bay	SK Boilers Firing Oil	SK Boilers Firing Gas	SK Boilers Firing Oil	SK Boilers Firing Gas
SO_2	3775	2612.6	648.5	1.4	-513.9	-1161
NO_x	2033	2215.3	432.3	459.1	614.6	641.4
CO	2212	2275.1	801.9	819.9	865.0	883.0
TSP	635	269.4	108.1	11.5	-257.5	-354.1
PM-10	505	268.5	54.0	11.5	-182.5	-225.0
VOC	455	195.1	3.1	3.2	-256.8	-256.7
Lead	0.21	0.78	1.9E-02	NA	0.59	0.57
Mercury	0.014	0.38	7.3E-03	3.21E-05	0.37	0.37
Beryllium	0.013	0.11	5.4E-03	NA	0.10	0.10
Fluorides	203.2	9.7	7.0E-02	NA	-193.4	-193.5
H_2SO_4 Mist	95.4	6.7	32.4	NA	-56.3	-88.7
Subtotal Non-Regulated Trace Pollutants[a]	73.12	103.9	5.7	NA	36.5	30.8
Total Aggregate Emissions	9987.0	7957.6	2086.0	1306.6	56.6	-722.8

[a]See Table 1-21
NA = Not Applicable

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TABLE 1-21

Non-Regulated Emissions Comparison (Tons/yr), Assessment C
Case 4: Cedar Bay as Proposed to be Modified Supplying 380k lb/hr Steam to SKC with SKC Package Boiler at 375k lb/hr Steam vs. Case 1a: The Future Operation of the 3 Power Boilers and 2 Bark Boilers at 745k lb/hr Steam for the SKC Recycling Operation

Pollutant	Case 1a: SK Power & Bark Boilers	Case 4 Cedar Bay and SK Package Boilers			Net Charge	
		Cedar Bay	SK Boilers Firing Oil	SK Boilers Firing Gas	SK Boilers Firing Oil	SK Boilers Firing Gas
Antimony	0.055	0.14	8.6e-03	NA	0.09	0.09
Arsenic	0.058	1.9	9.1-03	NA	1.9	1.8
Barium	0.77	7.9	5.8-03	NA	7.1	7.1
Bromine	15.82	3.47e-04	1.51e-02	NA	-15.8	-15.8
Cadmium	0.067	0.41	2.3-02	NA	0.37	0.34
Cobalt	5.32	0.49	0.02	NA	-4.8	-4.8
HCl	22.2	23.5	1.43	NA	2.7	1.3
Indium	1.40	1.82e-03	3.29e-02	NA	-1.37	-1.4
Chromium VI	0.0011	1.38e-02	0.001	NA	0.01	0.01
Copper	0.89	1.0	0.61	NA	0.72	0.11
Formaldehyde	2.64	1.7	0.88	NA	-0.06	-0.94
Manganese	0.19	6.5	0.02	NA	6.3	6.3
Molybdenum	2.85	1.3	0.11	NA	-1.4	-1.6
Nickel	3.89	1.0	0.37	NA	-2.5	-2.9
Phosphorous	0.78	4.4	0.23	NA	3.9	3.6

TABLE 1-21 (Cont'd)

Non-Regulated Emissions Comparison (Tons/yr), Assessment C
Case 4: Cedar Bay as Proposed to be Modified Supplying 380K lb/hr Steam to SKC with SKC Package Boiler at 375k lb/hr Steam vs. Case 1a: The Future Operation of the 3 Power Boilers and 2 Bark Boilers at 745k lb/hr Steam for the SKC Recycling Operation

Pollutant	Case 1a: SK Power & Bark Boilers	Case 4 Cedar Bay and SK Package Boilers			Net Charge	
		Cedar Bay	SK Boilers Firing Oil	SK Boilers Firing Gas	SK Boilers Firing Oil	SK Boilers Firing Gas
POM	0.45	0.24	6.0e-04	NA	-0.21	-0.21
Selenium	0.009	0.21	0.02	NA	0.22	0.20
Tin	2.69	0.53	0.71	NA	-1.5	-2.2
Vanadium	11.34	4.2	0.97	NA	-6.2	-7.1
Zinc	1.7	48.5	0.21	NA	47.0	46.8
Radionuclides	NA	0.022	NA	NA	0.022	0.022

NA = Not Applicable

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TABLE 1-22

Estimated Baseline Emissions Decreases Due To Additional Sources[a] Shutting Down at SKC from Conversion to Recycling Operation

Pollutant	Emissions Change (tons/yr)
SO_2	-31.2
NO_x	-500.6
CO	-2,816.4
TSP	-521.8
PM-10	-413.7
VOC	-384.7
Lead	0
Mercury	-0.0045
Beryllium	0
Fluoride	0
H_2SO_4	-43.9
Total Aggregate	-4,712.3

[a]Recovery Boilers, Lime Kilns, Smelt Dissolving Tanks
Source: SKC Permit Application

2.0 COMPARISON NO. 2: NET AIR QUALITY IMPACTS

2.1 Introduction

The objective of the information to be presented for Comparison No. 2 is to provide data useful for assessing whether applying standard modeling routines, taking into account maximum allowable emissions rates, indicates that, on balance, the air quality impacts of--

1) the CBCP, as proposed to be modified, and the addition of the three new proposed package boilers scheduled for the SKC site, will be less than the air quality impacts of the CBCP as certified,

2) the CBCP, as proposed to be modified, and the addition of the three new proposed package boilers scheduled for the SKC site necessary to provide 640,000 lb. of steam per hour for SKC's use, will be less than the air quality impacts of the SKC recycling operation without the CBCP, and

3) the CBCP, as proposed to be modified, and the addition of the three new proposed package boilers scheduled for SKC's site, will be less than the air quality impacts of SKC's recycling operation without the CBCP all at their permitted capacities.

In applying Comparison No. 2, the differences in air quality impacts based on routine application of atmospheric dispersion modeling taking into account maximum allowable emission rates are compared amongst 5 cases. These are:

Case 1: the 3 power boilers and 2 bark boilers operating in their "without the CBCP" mode at a total annualized steam production rate of 640,000 lb/hr, (which corresponds to an annual capacity factor of 85.9 percent),

Case 1a: the 3 power boilers and 2 bark boilers operating in their "without the CBCP" mode at their maximum total annualized steam production rate of 745,000 lb/hr,

Case 2: the CBCP as certified consistent with its emission limitations,

Case 3: the CBCP, as proposed to be modified, generating electricity and supplying a total annualized steam production rate of 380,000 lb/hr to SKC (consistent with its proposed emission limitations including its annual average limitations and ignoring

the 85.5% capacity factor used in Comparison 1 for conservatism) plus the addition of the 3 new package boilers at the SKC recycling operation under two fuel scenarios, fuel oil or natural gas, at a total annualized steam production rate of 260,000 lb/hr, (which corresponds to an annual capacity factor of 69.3 percent), and

Case 4: the CBCP, as proposed to be modified, consistent with its annual average emission limitations, plus the addition of the 3 new package boilers at the SKC recycling operation under two fuel scenarios, fuel oil or natural gas, consistent with their proposed annual average emission limitations.

Three assessments are presented:

Assessment A: Case No. 4
vs.
Case No. 2

Assessment B: Case No. 3
vs.
Case No. 1

Assessment C: Case No. 4
vs.
Case No. 1a

2.2 Methodology

The methodology to be employed in this demonstration is the application of air quality dispersion modeling in accordance with EPA and DER requirements for federal new source review taking into account the maximum allowable emission rates for all modeled sources. The only departure from these requirements is that, in Assessment B, partial load will be modeled; but, in all cases, the maximum allowable emission rates associated with the relevant loads will be modeled to produce a fair set of comparisons. Air quality impacts are modeled for the five emissions for which there are ambient standards (SO_2, PM-10, NO_2, CO, and Pb), and an aggregation of trace pollutants that are emitted by the CBCP and for which most are on the list included in the Draft Florida Air Toxics Permitting Strategy.

The model selected for this application is the EPA's Industrial Source Complex Short Term (ISCST2) model (Version 92062). This is the recommended model according to EPA's "Guidelines on Air Quality Models (EPA 1986, 1987)", for application to SKC and the CBCP.

According to the guidelines, it is applicable to elevated point sources, volume, area and line sources of non-photochemical substances located in areas of flat or gently rolling terrain, either urban or rural in dispersion environment. It is also capable of simulating the effects of aerodynamic building downwash on the dispersion of source plumes, where applicable. The model requires as input hourly observed meteorological conditions of surface wind speed, wind direction, temperature, atmospheric stability, and boundary layer mixing depth. In accordance with EPA guidelines, these data are obtained from the nearest representative national weather service stations, for a five-year historical period so as to represent a comprehensive profile of future expected conditions from year to year. For this application the meteorological data is taken from surface observations at Jacksonville International Airport and upper air observations at Ware County Airport in Waycross, Georgia, the nearest representative upper air station. It is influenced by the same large scale air masses that would influence the Jacksonville area, climatologically speaking. Data for the years 1983 through 1987 were employed, since this time period was readily available and acceptable to Florida DER.

The ISCST model requires the specification of several application options, most of which have EPA recommended default values, but some of which must be specified by the user. Table 2-1 lists the options selected for this application. The building downwash option is used where appropriate to simulate the aerodynamic effects of nearby structures on the dispersion of emissions from stacks that could be subject to downwash. These include all combustion source stacks at the CBCP and SKC except for the CFB boilers' stack, which is designed in accordance with EPA Good Engineering Practice (GEP) guidelines to avoid downwash effects. The rural dispersion option is chosen based on the land-use within a 3 km radius of the facilities according to a classification scheme recommended in the EPA Guideline. Well over 50% of this area is rural, for which the guidelines suggest the rural option. All terrain in the model application is considered to be flat, that is having the same ground-level elevation as the base of the CBCP's CFB stack. According to U.S. Geological Survey maps of the region, terrain in the region varies very little, with no abrupt changes which would affect air flow, and only minor variations from the CBCP ground elevation. Thus, it would be inappropriate to simulate any terrain effects on plume dispersion. All of the source input data used in the modeling is described in detail in Section 2.4.

2.3 Analysis Results to be Presented

In Comparison No. 2, ENSR reports the net air quality effects of the CBCP as proposed to be modified plus the three package boilers vs the CBCP as certified, (Case No. 4 vs Case No. 2 (Assessment A)); the nominal commercial arrangement among the CBCP/SKC/FPL to produce 640,000 lb/hr of steam (Case No. 3 vs Case No. 1 (Assessment B)); and a repeat of Assessment B but at permitted capacity (Case No. 4 vs Case No. 1a (Assessment C)). Three comparisons will be made. First, the maximum predicted concentrations over all receptors, for each emission

TABLE 2-1

ISCST2 Modeling Options

Option Description	Value
Dispersion Parameters	Rural
*Wind Profile Exponents	0.07, 0.07, 0.10, 0.15, 0.35, 0.55
*Vertical Potential Temperature Gradient	0.02, 0.035
*Stack-Tip Downwash	Used
*Buoyancy Induced Dispersion	Used
Anemometer Height (actual)	6.1 m
*Decay Coefficient	0.0
Building Downwash	Used as applicable for CBCP and SKC sources
*Gradual Plume Rise	Not used (except for building wake effect modeling)

* Default values recommended by EPA.

modeled, including the substances for which there are ambient standards, and total air toxics for applicable averaging periods, are compared between the cases.

Second, the maximum predicted concentrations for applicable averaging periods are identified at each receptor. For Assessment A, these maximum receptor-specific impacts of the CBCP as certified, Case No. 2, are subtracted from the maximum receptor specific impacts of the CBCP with its new emission rates plus the package boilers, Case No. 4. For any receptor, a positive difference indicates a degradation in air quality, a negative difference indicates an improvement in air quality. The sum of the increases are subtracted from the sum of the absolute values of the decreases. This value is then divided by the total number of receptor points (1,008) in the receptor grid. If this value is a positive number, then a net air quality improvement is associated with the CBCP and the three package boilers. This approach is consistent with the definition of net air quality improvement in Rule 17-2.510(7)(a)1, Florida Administrative Code.

Third, ENSR estimated the total number of receptors whose air quality would be improved in the case associated with the modifications proposed for the CBCP.

For Assessment B, the same analysis is performed with the impacts of Case No. 1 subtracted from the impacts of Case No. 3. For Assessment C, the same analysis is performed with the impacts of Case No. 1a subtracted from the impacts of Case No. 4.

Maximum ground-level concentrations, predicted by atmospheric dispersion modeling for averaging periods consistent with the Florida ambient air quality standards for each substance, are compared for Assessment A, B and C. For total air toxics, maximum ground-level concentrations, predicted for averaging periods consistent with the Florida Draft Permitting Strategy are compared. Table 2-2 lists the substances and the applicable concentration averaging periods for the ambient standards. For all averaging periods the maximum allowable emission rates are employed for each individual pollutant, whether or not they can all occur simultaneously. This is required for evaluating compliance with ambient standards since the short-term (1- to 24-hour) AAQS are written not to be exceeded more than once per year at any location and the long-term AAQS can't be exceeded in any year. The modeling for AAQS compliance must, therefore, represent a worst-case composite of maximum emissions for each pollutant. For these reasons, this approach was followed for the modeling in Comparison No. 2. In addition, since the comparisons in Section 1 are intended to reflect environmental impacts to the extent represented by total emissions, the same compositing is followed for Section 1, since it is consistent with modeling practice and produces fair comparisons as long as the necessary conservatisms identified in Appendix A are used.

TABLE 2-2

Concentration Averaging Periods Employed In Modeling

Pollutant	Averaging Period					
	1-Hr	3-Hr	8-Hr	24-Hr	Monthly	Annual
SO_2		X		X		X
PM-10				X		X
NO_2						X
CO	X		X			
Pb[a]					X	X
Total Air Toxics			X	X		X

[a] AAQS is 3-month averaging period, monthly and annual periods used for lead to bracket 3-month average

Ground-level concentrations are predicted at 1,008 locations input as model receptors. A circular (polar) grid of receptors is represented by the intersection of 36 radials at 10° intervals and 28 concentric circles (rings) centered on the CBCP CFB stack location. The ring distances along the radial are specified at the following intervals:

Range (km)	Interval (km)
0.1 to 1.0	0.1
1.0 to 2.0	0.25
2.0 to 5.0	0.5
5.0 to 10.0	1.0
10.0 to 25.0	5.0

The radius of 25 kilometers extends well beyond the distances where maximum impacts were modeled to occur and beyond the distances where significant concentration gradient was predicted. The receptor grid also includes receptors located within the property boundaries of the two facilities. This type of receptor grid is most dense closest to the source origin, in this case the stack for the CBCP CFB's boilers. Therefore, in terms of the net air quality effects, the modeling results are most highly resolved within the near field and less highly resolved in the far field. As is shown in Section 3, the significant impact area of the CBCP extends no further than 5 kilometers, and the CBCP's maximum impacts are predicted much closer than this. A total of 720 of the 1,008 receptors are located within 5 km. Also, due to the short height of SKC source's stacks and their susceptibility to building downwash, their highest impacts would also be expected within this range. Therefore, the receptor grid is designed to allow a thorough comparison of the air quality impacts within the range where the highest concentrations and the most significant differences would be experienced.

The FAC regulation on which this approach is based refers to a "uniform" receptor grid that could be construed to refer to a rectangular grid. Even though such a grid has each receptor site associated with the same amount of geography, it is not a good option for this case since a 50x50 km rectangular grid would have 97% of its receptors beyond the CBCP's significant impact area. Such an approach would not capture the essence of the comparisons being made. As a result, this study uses a polar grid to assess in detail the geography of most interest in a grid system that is radially "uniform."

2.4 SKC's and the CBCP's Source Input Data Employed in the Modeling

The ISCST2 model requires specification of hourly average emission rates and exhaust parameters, and pertinent building dimensions, where applied, for each individual source (e.g.,

stack) being modeled. To address the subject issue these parameters are developed for the following source configurations:

1. the CBCP as currently certified; including the CFB's, the limestone dryers, cooling tower, and aggregate materials handling and storage operations, constrained by all of the emission limitations in the conditions of certification,
2. the CBCP as proposed to be modified including the same sources as above, with the CFBs constrained by the emission limitations expected to be included in the updated conditions of certification,
3. SKC's Power Boilers and Bark Boilers in the future recycling mode, at the energy output rate necessary to produce 640,000 lb/steam per hour, and at the permitted capacity of 745,000 lb/steam per hour,
4. SKC's proposed Package Boilers firing fuel-oil at 260,000 lb/steam per hour and 375,000 lb/steam per hour, and
5. SKC's proposed Package Boilers firing natural gas at 260,000 lb/steam per hour and 375,000 lb/hr.

Tables 2-3 through 2-8 list the pertinent exhaust parameters for the combustion source configurations. Physical exhaust parameters for SKC Bark Boilers were derived from data provided by SKC. Parameters for the new stack with combined power boiler exhausts were derived from data provided by SKC. Physical exhaust parameters for the CBCP as certified are taken from the SCA. Physical exhaust parameters for the CBCP as proposed to be modified were provided by Bechtel. As discussed in Section 2.2., the ISCST2 model requires building dimensions for simulating downwash effects. The plot plan provided in Figure 2-1 identifies pertinent stack and building locations for both CBCP and SKC. The building dimensions provided in the figure and the location of the individual stacks relative to these buildings were evaluated to develop dimensions for input to the model for those buildings causing downwash. These buildings were identified as the CFB Boiler Building and the SKC buildings housing the power boilers, bark boilers, and recovery boilers. Based on the geometry presented in Figure 2-1, wind direction specific building parameters, including building heights and widths (normalized to the specified wind directions) were developed as input to the ISCST2 model.

Hourly and annual emission rates used in the modeling of the combustion sources for Section 2 comparisons are summarized in Section 1. The annual emission rates from Section 1 (tons/yr) were used for modeling annual average concentrations. The hourly emission rates from Section 1 were used for modeling concentrations for all other averaging periods with the exceptions noted below. Annual average emission rates for the CBCP are derived from the emission limitations contained in the conditions of certification and the emission reductions expected for the CBCP. For the CFB as certified case, short-term SO_2 emissions are based on the 0.6 lb/MMBtu limit,

TABLE 2-3

Stack Exhaust Parameters for SKC Power Boilers and Bark Boilers In Future Recycling Mode[a] at 640,000 lb/hr Total Steam Generation Bark Boilers at Full Load

	PB1	PB2	PB3	BB1	BB2
Steam Flow (lb/hr)	100,000	145,000	145,000	125,000	125,000
Heat Input (MMBtu/hr)	137	198	198	193	193
Fuel Type	Oil	Oil	Oil	Bark	Bark
UTM East (km)[b]	441.871			441.849	441.856
UTM North (km)[b]	3365.587			3365.613	3365.606
Stack height (m)	38.1			41.5	41.5
Stack diameter (m)	3.20			2.46	2.46
Temperature (deg. K)[b]	443			332	332
Velocity (m/s)[b]	13.78			13.08	13.08

Source: SKC except where noted
[a]Power boilers exhausted through new common stack
[b]ENSR 1993, based on SKC stack test data and plot plan

TABLE 2-4

Stack Parameters for SKC Power Boilers and Bark Boilers In Future Recycling Mode[a] at 640,000 lb/hr Total Steam Generation Power Boilers at Full Load

	PB1	PB2	PB3	BB1	BB2
Steam Flow (lb/hr)	135,000	180,000	180,000	72,500	72,500
Heat Input (MMBtu/hr)	185	246	246	112	112
Fuel Type	Oil	Oil	Oil	Bark/Oil	Bark/Oil
UTM East (km)[b]	441.871			441.849	441.856
UTM North (km)[b]	3365.587			3365.613	3365.606
Stack height (m)	38.1			41.5	41.5
Stack diameter (m)	3.20			2.46	2.46
Temperature (deg. K)[b]	443			332	332
Velocity (m/s)[b]	17.48			7.59	7.59

Source: SKC except where noted
(a) Power Boilers exhausted through new common stack
(b) ENSR 1993, based on SKC stack test data and plot plan

TABLE 2-5

Stack Exhaust Parameters for SKC Power Boilers and Bark Boilers in Future Recycling Mode[a] at 745,000 lb/hr Total Steam Generation

	PB1	PB2	PB3	BB1	BB2
Steam Flow (lb/hr)	135,000	180,000	180,000	125,000	125,000
Heat Input (MMBtu/hr)	185	246	246	193	193
Fuel Type	Oil	Oil	Oil	Bark Bark/Oil	Bark Bark/Oil
UTM East (km)[b]	441.871			441.849	441.856
UTM North (km)[b]	3365.587			3365.613	3365.606
Stack Height (m)	38.1			41.5	41.5
Stack Diameter (m)	3.2			2.46	2.46
Temperature (K)[b]	443			332	332
Velocity (m/s)[b]	17.48			13.08	13.08

Source: SKC except where noted
[a]Power boilers exhausted through new common stack
[b]ENSR 1993, based on SKC stack test data and plot plan

TABLE 2-6

The CBCP
Physical Stack Exhaust Parameters

Parameter	CBCP As Certified		CBCP As Modified (a)		
	CFBs	Limestone Dryers	CFBs	Limestone Dryer #1	Limestone Dryer #2
UTM East (km)	441.610	441.664	441.610	441.660	441.668
UTM North (km)	3365.540	3365.680	3365.540	3365.790	3365.682
Stack Height (m)	129.54	9.14	122.68	19.21	19.21
Stack Diameter (m)	4.27	1.04	4.04	1.27	1.27
Stack Exit Velocity (m/s)	33.22	21.34	32.45	18.26	18.26
Stack Exit Temperature (K)	403.0	355	403.0	355	355

(a) Source: Correspondence from A. Nawaz, Bechtel to G. Harkness, ENSR, 11/6/92

TABLE 2-7

Design Parameters for New SK Package Boilers - Maximum Steam Capacity (375,000 lb/hr)

Parameter	Units	No. 2 Fuel Oil (per boiler)	Natural Gas (per boiler)
Steam Flow	lb/hr	125,000	125,000
Heat Input	MMBtu/hr	164.5	174.7
Exhaust Gas:			
Temperature	°K	447	439
Common Stack[a]			
Diameter	m	2.43	2.43
Velocity	m/sec	16.18	16.23
Height	m	60.96	60.96
UTM East	km	441.919	
UTM North	km	3365.538	

[a]All three boilers will exhaust into a common stack. Velocity shown is total all three boilers.
Source: SKC permit application

TABLE 2-8

Design Parameters for New SK Package Boilers - 260,000 lb/hr Total Steam Generation

Parameter	Units	No. 2 Fuel Oil (per boiler)	Natural Gas (per boiler)
Steam Flow	lb/hr	86,663	86,663
Heat Input	MMBtu/hr	113.93	121.46
Exhaust Gas: Temperature	°K	435	431
Common Stack[a]			
Diameter	m	2.43	2.43
Velocity	m/sec	10.90	11.10
Height	m	60.96	60.96

[a]All three boilers will exhaust into a common stack. Velocity shown is total all three boilers.
Source: ENSR 1993

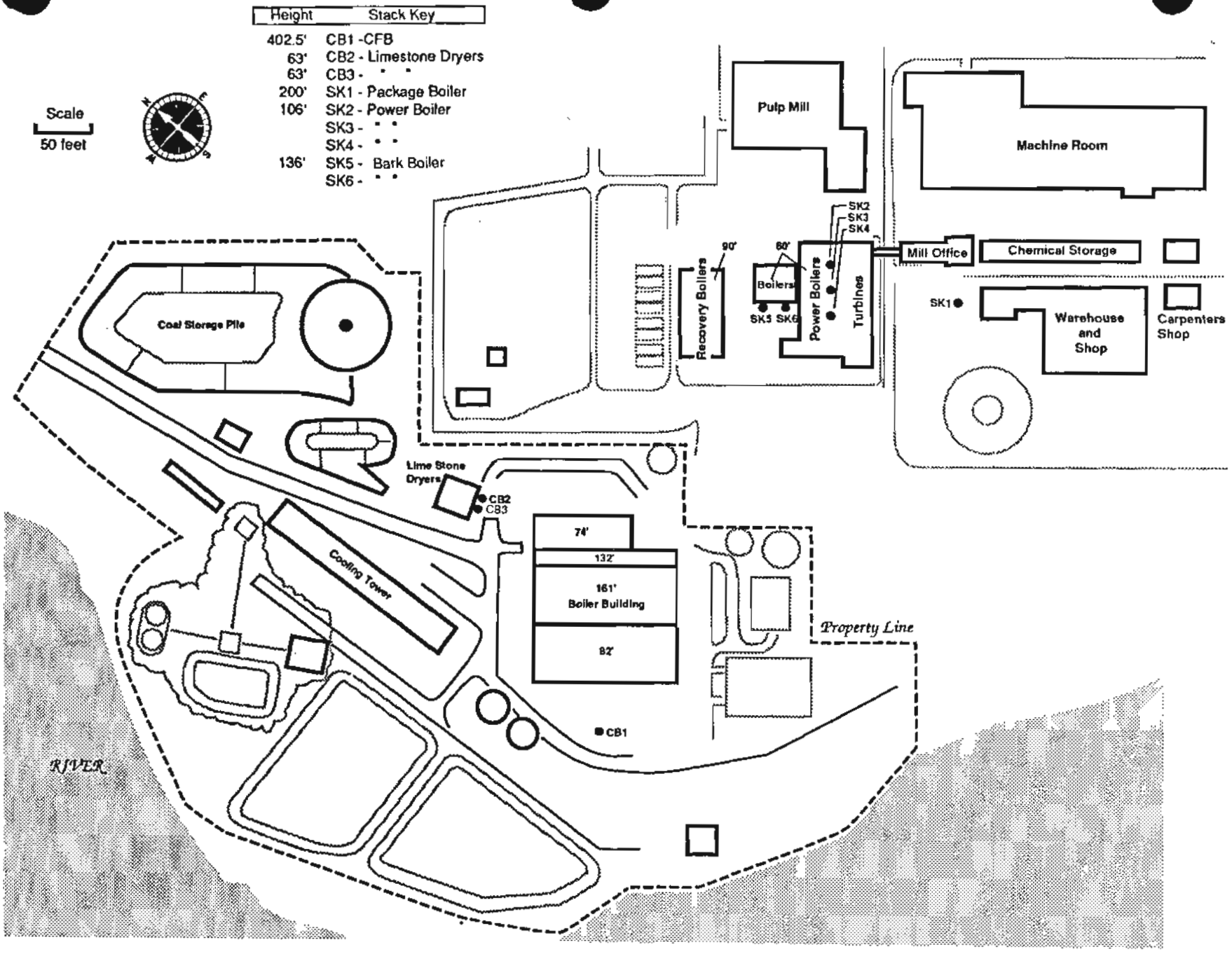

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FIGURE 2-1
STACK AND BUILDING CONFIGURATION

while the annual emissions are based on the 0.31 lb/MMBtu limit. For the CFB as modified case, short-term SO_2 emissions are based on 0.24 lb/MMBtu and annual emissions are based on 0.20 lb/MMBtu. For the limestone dryers in the CBCP as proposed to be modified case, emission rates for averaging periods of 8-hours or less use the maximum hourly emissions, while the emission rates for 24-hours or more use the annual average rate. This is due to the fact that they will only operate 8 hours per day, the maximum hourly emissions being three times the 24-hour average or annual average rate. For SKC's package boilers, the hourly SO_2 emission rate used to model 3- and 24-hour concentrations is based on the proposed maximum hourly emission rate of 0.5 lb/MMBtu, while the annual rate is based on a proposed 0.3 lb/MMBtu annual average used in calculating annual emissions. For trace metal and trace organic emissions from coal-firing in the CBCP CFBs, estimates of maximum short-term emissions, based on the variability of these substances in coal, were developed by Bechtel for use in modeling short-term impacts. Since the ISCST2 model requires all emissions data to be input as grams per second (g/sec), a full summary of emission rates in units of g/sec as used in the Section 2 modeling analyses for each combustion source and averaging period is provided in Appendix C.

The source configurations and exhaust parameters for the CBCP cooling tower cells are listed in Table 2-9. These are identical for both the as certified and as proposed to be modified cases. The source parameters and emission rates for the aggregate material handling operation for the CBCP as proposed to be modified are presented in Tables 2-10 and 2-11. Table 2-10 lists the fugitive dust sources which were modeled as area sources. Table 2-11 lists the sources controlled by dust collection which were modeled as point sources. Only those point sources with vertical exhausts were given an exit velocity and diameter. The PM-10 and TSP emission rates for the sources listed in the above tables are documented in Appendix B. The source parameters and TSP/PM-10 emission rates for the aggregate materials handling and storage operations for the CBCP as certified are listed in Table 2-12. These were obtained from Black and Veatch in the form of an ISCST2 model input file.

2.5 Findings

The findings for Assessment A, the CBCP with improvements and the package boilers (Case 4) vs the CBCP as certified (Case 2), are displayed in Tables 2-13 and 2-14, for SKC's package boilers in Case 4 on fuel oil and natural gas, respectively. For each emission and averaging period and for each meteorological year modeled, four numbers are provided. The first is the maximum modeled concentration over all receptors for Case 2, the CBCP as certified. The next number is the maximum modeled concentration over all receptors for Case 4, the CBCP as proposed to be modified plus SKC's proposed package boilers. The third number demonstrates the "net air quality effect" of Case 4's replacing Case 2; that is, the sum of the increases in maximum modeled concentrations at each receptor subtracted from the sum of the absolute

TABLE 2-9

Cedar Bay Cooling Tower Modeling Parameters[a]

Cell #	UTM Coordinates (km)		Height (m)	Diameter (m)	Exit Temperature (°K)	Exit Velocity (m/s)
	East	North				
1	441.593	3365.746	14.94	9.75	316.3	8.96
2	441.593	3365.729	14.94	9.75	316.3	8.96
3	441.593	3365.713	14.94	9.75	316.3	8.96
4	441.594	3365.696	14.94	9.75	316.3	8.96
5	441.594	3365.680	14.94	9.75	316.3	8.96
6	441.595	3365.663	14.94	9.75	316.3	8.96
7	441.595	3365.647	14.94	9.75	316.3	8.96

[a]Source: CBCP plot plan and Telephone Conversation between J. Yuhas, ENSR and A. Nawaz, Bechtel on 11-5-92.

TABLE 2-10

Source Parameters and TSP/PM-10 Emission Rates for Aggregate Materials Handling and Storage Operations Modeled as Areas Sources at CBCP as Proposed to be Modified[a]

#	UTMs Coordinates of SW Corner of Area Source (km)		Height (m)	Length of Side of Square Area Source (m)	TSP Emission Rate[b] ($g/m^2/s$)		PM-10 Emission Rate[b] ($g/m^2/s$)		Sources Included
	East	North			Annual	24-Hour	Annual	24-Hour	
1	441.563	3365.744	1.52	153.7	5.85e-07	1.21e-06	1.63e-07	3.11e-07	Coal Reclaim by loader Limestone delivery Dumping from truck Reclaim by mobile loader
2	441.563	3365.744	3.05	153.7	3.36e-08	1.01e-07	1.62e-08	4.80e-08	Limestone dozer traps (mobile loader to conveyor) Wind erosion from limestone pile
3	441.563	3365.744	4.57	153.7	4.41e-07	5.87e-07	2.09e-07	2.77e-07	Mobile loader to Feeder 2 Feeder 2 to Conveyor 3
4	441.563	3365.744	6.10	153.7	1.97e-07	6.24e-07	9.50e-08	3.04e-07	Railcar to Feeder 1 Feeder 1 to Conveyor 1 Conveyor 1 to Conveyor 2
5	441.563	3365.744	9.14	153.7	6.58e-09	3.95e-07	3.17e-09	1.98e-07	Wind erosion from receiving pile Wind erosion from storage pile
6	441.563	3365.744	16.76	153.7	3.67e-07	1.17e-06	1.74e-07	5.55e-07	Conveyor 2 to Lowering Well
7	441.632	3365.633	43.28	9.98	5.23e-05	6.96e-05	2.48e-05	3.29e-05	Conveyor 4 to Conveyor 5

[a]Source: CBCP plot plan and design information

[b]Emission rates for individual operations listed under "Sources Included" are presented in Appendix B in units of TPY for long term and lb/hr for short term averaging periods.

TABLE 2-11

Source Parameters and TSP/PM_{10} Emission Rates For Aggregate Materials Handling Operations Modeled as Point Sources at CBCP As Proposed to be Modified(a)

Source	UTM Coordinates (km)		Height (m)	Exit Temperature[b] (°K)	Exit Velocity[b] (m/sec)	Diameter[b](m)	TSP/PM_{10} Emission Rates (g/s)	
	East	North					Annual	24-Hour
Coal Crushers	441.613	3365.804	3.66	293	0	0	1.49E-02	1.55E-02
Coal Silo Area	441.672	3365.614	43.28	293	0	0	2.41E-02	2.51E-02
Lime Pulverizer 1	441.660	3365.679	19.20	355	18.26	1.27	5.09E-02	5.29E-02
Lime Pulverizer 2	441.668	3365.682	19.20	355	18.26	1.27	5.09E-02	5.29E-02
Storage Bin Vent	441.667	3365.602	27.43	293	0	0	6.62E-03	6.93E-03
Bed Ash Hopper	441.651	3365.625	8.53	293	0	0	2.14E-03	2.14E-03
Exhauster	441.581	3365.596	10.67	293	0	0	9.32E-03	9.70E-03
Fly Ash Silo	441.581	3365.596	42.06	293	0	0	1.15E-02	1.20E-02
Bed Ash Silo	441.581	3365.573	31.70	293	0	0	5.61E-03	5.67E-03
Bed Ash Bin	441.541	3365.695	38.10	366	0	0	4.28E-03	4.28E-03
Fly Ash Bin	441.541	3365.695	39.01	366	0	0	4.03E-03	4.03E-03
Ash Recycle Tank	441.541	3365.695	36.58	297	0	0	1.10E-03	1.10E-03
Recycle Hopper	441.541	3365.695	35.05	297	0	0	5.42E-04	5.42E-04
Pelletizer #1 & 2	441.541	3365.695	9.14	311	19.3	0.68	1.59E-02	1.59E-02
Belt Conveyor Discharge	441.541	3365.695	4.57	297	0	0	1.10E-03	1.10E-03
Screen	441.521	3365.725	7.62	297	0	0	1.61E-02	1.61E-02
Curing Silo Outlet	441.521	3365.725	25.91	297	0	0	2.27E-03	2.27E-03
Hydrator	441.499	3365.764	33.53	373	19.3	0.65	1.46E-02	1.46E-02
Curing Silo	441.499	3365.764	25.91	297	19.3	0.43	6.43E-03	6.43E-03
Rail Discharge	441.576	3365.758	12.19	297	0	0	4.91E-03	4.91E-03

[a]Source: CBCP plot plan and Letter from A. Nawaz, Bechtel to G. Weidinger, U.S. Generating, 11-13-92.
[b]Only used for vertically discharging dust collectors. All horizontally discharging dust collectors were modeled with zero exit velocity and diameter to simulate no plume rise and stack tip downwash.

TABLE 2-12

Source Parameters and TSP\PM-10 Emission Rates For Aggregate Materials Handling and Storage Operations For the CBCP As Certified [a]

Description	Type	UTM Coordinates (km)		24-Hour Emission Rate (g/s)	Annual Emission Rate (g/s)
		East	North		
Limestone Dryers[b]	Point	441.639	3365.692	2.50e-02	5.65e-02
Coal Pile and Associated Activities	Area	441.648	3365.899	2.32e-02	0
Coal Crusher	Point	441.721	3365.847	5.04e-03	4.32e-03
Coal Conveying	Area	441.700	3365.676	3.23e-02	1.62e-02
Limestone Pile	Area	441.751	3365.774	8.36e-03	8.36e-03
Limestone Fabric Filters	Point	441.761	3365.737	4.79e-02	3.45e-02
Limestone Hopper	Point	441.764	3365.640	4.79e-02	3.45e-02
Fly Ash Mechanical Collector	Point	441.695	3365.695	1.71e-02	1.50e-02
Bed Ash Mechanical Collector	Point	441.693	3365.681	2.14e-03	1.87e-03
Coal Pile and Associated Activities[c]	Area	441.648	3365.899	2.32e-02	0

[a]Source: A. Carlson of Black & Veatch transmittal of ISCST2 Input File to J. Yuhas, ENSR on 10/6/92
[b]emission rate is for limestone pulverizer dust only
[c]listed twice to represent different settling velocities

TABLE 2-13

Findings for Comparison No. 2, Assessment A, Net Air Quality Effect of Case 4: CBCP as Proposed to be Modified with SKC Package Boilers at 375 k lb/hr Steam Firing Fuel Oil vs. Case 2: Cedar Bay as Certified

Pollutant	Averaging Period	Meteorological Year	Maximum Predicted Impacts ($\mu g/m^3$)		Case 4 Net Air Quality Effect ($\mu g/m^3$)	Case 4 Number of Receptors Improved
			Case 2	Case 4		
SO_2	3 hr	1983	165.60	443.11	5.71	831
		1984	173.48	232.14	6.95	829
		1985	236.12	299.64	9.75	841
		1986	210.39	260.70	7.04	808
		1987	173.15	267.90	6.11	845
	24 hr	1983	60.99	112.51	3.12	742
		1984	89.88	68.84	4.23	766
		1985	70.75	83.23	3.71	809
		1986	81.04	65.46	3.59	768
		1987	72.54	86.35	3.37	750
	Annual	1983	9.33	3.74	0.47	468
		1984	9.84	2.81	0.50	477
		1985	9.82	3.71	0.49	483
		1986	12.39	2.64	0.51	497
		1987	10.10	3.42	0.47	460
PM-10	24 hr	1983	35.91	20.43	0.55	755
		1984	33.00	19.52	0.53	653
		1985	33.73	20.07	0.50	738
		1986	32.91	24.89	0.45	736
		1987	33.77	19.31	0.45	676
	Annual	1983	3.97	3.04	-0.009	369
		1984	4.75	3.49	-0.014	308
		1985	3.71	3.39	-0.013	337
		1986	4.31	3.70	-0.017	310
		1987	3.85	2.89	-0.005	383

TABLE 2-13 (Cont'd)

Findings for Comparison No. 2, Assessment A, Net Air Quality Effect of Case 4: CBCP as Proposed to be Modified with SKC Package Boilers at 375 k lb/hr Steam Firing Fuel Oil vs. Case 2: Cedar Bay as Certified

Pollutant	Averaging Period	Meteorological Year	Maximum Predicted Impacts ($\mu g/m^3$)		Case 4 Net Air Quality Effect ($\mu g/m^3$)	Case 4 Number of Receptors Improved
			Case 2	Case 4		
CO	1 hr	1983	47.38	367.00	-15.84	87
		1984	57.94	356.02	-15.38	91
		1985	60.60	366.01	-15.41	90
		1986	69.07	365.43	-15.37	95
		1987	52.69	369.33	-15.20	96
	8 hr	1983	14.17	147.08	-5.36	117
		1984	16.84	96.23	-5.26	115
		1985	16.86	131.09	-5.41	113
		1986	16.39	132.16	-5.28	114
		1987	15.58	111.10	-5.23	115
NO_2	Annual	1983	4.47	2.48	0.20	446
		1984	4.72	1.86	0.22	555
		1985	4.70	2.46	0.22	506
		1986	5.94	1.73	0.23	544
		1987	4.83	2.24	0.21	535
Pb	Monthly	1983	1.9e-02	3.2e-04	0.006	977
		1984	1.8e-02	2.4e-04	0.006	976
		1985	1.9e-02	3.5e-04	0.006	978
		1986	2.9e-02	3.6e-04	0.007	978
		1987	2.1e-02	3.8e-04	0.006	976
	Annual	1983	6.2e-03	1.1e-04	0.002	976
		1984	7.0e-03	1.0e-04	0.002	976
		1985	6.3e-03	1.1e-04	0.002	976
		1986	7.6e-03	1.1e-04	0.002	978
		1987	7.9e-03	1.1e-04	0.002	977

TABLE 2-13 (Cont'd)

Findings for Comparison No. 2, Assessment A, Net Air Quality Effect of Case 4: CBCP as Proposed to be Modified with SKC Package Boilers at 375 k lb/hr Steam Firing Fuel Oil vs. Case 2: Cedar Bay as Certified

Pollutant	Averaging Period	Meteorological Year	Maximum Predicted Impacts ($\mu g/m^3$)		Case 4 Net Air Quality Effect ($\mu g/m^3$)	Case 4 Number of Receptors Improved
			Case 2	Case 4		
Total Air Toxics	8 hr	1983	9.71	9.36	1.94	966
		1984	11.54	11.02	2.10	964
		1985	11.55	9.51	2.25	965
		1986	11.23	9.27	1.96	966
		1987	10.67	8.66	1.96	966
	24 hr	1983	5.02	3.95	0.99	964
		1984	7.39	2.44	1.12	968
		1985	5.82	2.95	1.12	965
		1986	6.66	2.31	1.01	972
		1987	5.96	3.04	1.02	967
	Annual	1983	0.77	0.22	0.07	963
		1984	0.81	0.19	0.08	964
		1985	0.81	0.22	0.08	962
		1986	1.02	0.18	0.08	971
		1987	0.83	0.21	0.07	966

[a] Out of a total of 1008

values of the decreases in maximum modeled concentrations at each receptor, divided by the total number of receptors. If this value is positive, a net benefit of using the CBCP and the package boilers instead of the CBCP as certified is demonstrated. If this value is negative a net degradation is demonstrated. The fourth number is the total number of receptors at which Case 4 improves ambient air quality with regard to Case 2, based on a comparison of modeled maximum concentrations.

Referring to Table 2-13, with the exception of some short-term averaging times for SO_2 and CO the maximum predicted impacts of Case 4, the CBCP as proposed to be modified plus the SKC package boilers, are lower than those of Case 2, CBCP as certified. For SO_2, due to downwash of the package boiler emissions, the maximum predicted impacts for Case 4 are higher for some of the short-term averaging periods for some of the meteorological years modeled. The average net regional SO_2 air quality effect of Case 4, although positive for all averaging periods and meteorological years, is not significant, demonstrating a small net SO_2 improvement with Case 4 over Case 2. This is due to the fact that maximum SO_2 impacts are lower for Case 4 at the majority of receptors. For all other substances except CO and annual average PM_{10}, the average net regional air quality effect of Case 4, although not significant, is also positive.

For CO, due to higher total CO emissions and SKC's package boilers' downwashing, the maximum impacts are higher for Case 4 and the calculated average net air quality effects are negative, with a minority of receptors showing improvement. However, it is important to note that the maximum CO impacts for both cases are much less than Florida's and EPA's Significant Impact Levels (SILs) for 1-hour CO (2000 $\mu g/m^3$) and 8-hour CO (500 $\mu g/m^3$). The SILs are used to determine if a source has a significant impact and/or contributes to a violation of an ambient air quality standard or PSD increment. The SILs for CO are 5 percent of the AAQS. In this case, a comparison as to a benefit in air quality is not meaningful, since impacts are insignificant in both cases.

For annual average PM-10 concentrations, although the maximum concentrations are lower, the net air quality effect on a regional basis is negative. This is due to particulate emissions from SKC's package boilers, which downwash. As shown in the table, the average net effects are quite small, however, and much less than the annual PM-10 SIL of 1.0 $\mu g/m^3$. Thus, the net effect is insignificant. As will be shown in Section 3, the CBCP as proposed to be modified will be well within the AAQS for PM-10.

Table 2-14 displays the findings for Assessment A for SKC's package boilers firing natural gas. Results are shown for CO and NO_2 only, since these are the only emissions that increase in Case 4, due to the package boilers' firing natural gas. For CO, the same conclusions can be drawn as in the oil-firing case. Impacts, although higher for Case 4, are insignificant. For Case 4, NO_2

TABLE 2-14

Findings for Comparison No. 2, Assessment A, Net Air Quality Effect of Case 4: CBCP as Proposed to be Modified with SKC Package Boilers at 375 k lb/hr Steam Firing Natural Gas vs. Case 2: Cedar Bay as Certified

Pollutant	Averaging Period	Meteorological Year	Maximum Predicted Impacts ($\mu g/m^3$)		Case 4 Net Air Quality Effect ($\mu g/m^3$)	Case 4 Number of Receptors Improved[a]
			Case 2	Case 4		
CO	1 hr	1983	47.38	375.86	-16.55	85
		1984	57.94	364.04	-16.10	86
		1985	60.60	374.80	-16.12	90
		1986	69.07	374.28	-16.14	93
		1987	52.69	378.33	-15.92	94
	8 hr	1983	14.17	150.53	-5.62	113
		1984	16.84	98.48	-5.52	114
		1985	16.86	135.03	-5.67	110
		1986	16.39	135.45	-5.54	112
		1987	15.58	113.46	-5.49	112
NO_2	Annual	1983	4.47	2.63	0.19	447
		1984	4.72	1.97	0.21	478
		1985	4.70	2.61	0.21	456
		1986	5.94	1.84	0.22	490
		1987	4.83	2.40	0.20	461

[a]Out of total of 1008

maximum impacts are again lower than Case 2, and a positive, although insignificant, average net air quality benefit is demonstrated.

The above results demonstrate that the CBCP, as proposed to be modified, meets the first criteria of Comparison No. 2. That is, on balance, the air quality impacts of the CBCP in terms of maximum impacts, as proposed to be modified, and the addition of any boilers on the SKC site at their permitted capacity will be less than the air quality impacts of the CBCP as certified, although net regional differences are small.

For Assessment B, Case 3 (the CBCP plus the three package boilers) vs. Case 1 (SKC's five existing boilers) all generating 640,000 lb/hr of steam, the findings are displayed in Tables 2-15 and 2-16 for SKC's package boilers in Case 3 on fuel oil and natural gas, respectively. For each emission and averaging period and for each meteorological year modeled, four numbers are provided. The first is the maximum modeled concentration over all receptors for Case 1, SKC's existing power and bark boilers producing 640,000 lb/hr of steam for the recycling operation. The next number is the maximum modeled concentration over all receptors for Case 3, the CBCP as proposed to be modified plus SKC's proposed package boilers providing 640,000 lb/hr of process steam for the recycling operation. The third number demonstrates the "net air quality effect" of Case 3 replacing Case 1; that is, the sum of the increases in maximum modeled concentrations at each receptor subtracted from the sum of the absolute values of the decreases in maximum modeled concentrations at each receptor, divided by the total number of receptors. If this value is positive, a net benefit of using the CBCP and the package boilers instead of SKC's existing boilers is demonstrated. If this value is negative a net degradation is demonstrated. The fourth number is the total number of receptors at which the modeled maximum concentration for Case 3 is lower than the modeled maximum concentration for Case 1.

Referring to Table 2-15, the maximum predicted concentrations for Case 3, the CBCP as proposed to be modified with SKC's Package Boilers on oil, are much lower than the corresponding Case 1 SKC recycling operation concentrations (without the CBCP) for each emission and averaging period with the exception of annual average PM_{10}. Maximum predicted annual average PM_{10} concentrations are slightly higher for Case 3, due to particulate emissions from aggregate material handling and cooling tower operations. These impacts are, however, very localized and for the most part constrained to the property of the CBCP and SKC. Furthermore, the regional net air quality effect of Case 3 is positive, although not significant for all pollutants, for each emission and averaging period, including PM_{10}, indicating an average small net benefit to air quality over the entire model receptor grid with the CBCP. For the vast majority of receptors, out of a total of 1008, the maximum predicted impacts of Case 3 show a small improvement over Case 1 for all emissions. As in assessment A, the modeled concentrations of CO and Pb and the net regional PM-10 effect are all insignificant.

TABLE 2-15

Findings for Comparison No. 2, Assessment B, Net Air Quality Effect of Case 3: CBCP as Proposed to be Modified Supplying 380 k lb/hr Steam to SKC with SKC Package Boilers at 260 k lb/hr Steam Firing Fuel Oil vs. Case 1: The Future Operation of the 3 Power Boilers and 2 Bark Boilers at 640 k lb/hr Steam for the SKC Recycling Operation

Pollutant	Averaging Period	Meteorological Year	Maximum Predicted Impacts ($\mu g/m^3$)		Case 3 Net Air Quality Effect ($\mu g/m^3$)	Case 3 Number of Receptors Improved[a]
			Case 1	Case 3		
SO_2	3 Hr	1983	666.45	421.76	80.92	991
		1984	631.77	259.34	67.77	1002
		1985	482.83	275.87	66.80	999
		1986	442.37	264.61	60.25	984
		1987	501.22	280.84	66.27	991
	24 Hr	1983	274.39	108.36	26.08	995
		1984	189.23	61.31	20.68	1004
		1985	246.53	70.01	19.07	999
		1986	174.78	68.99	20.42	990
		1987	162.97	93.54	20.84	991
	Annual	1983	5.79	3.99	1.40	1004
		1984	4.84	3.12	1.28	1003
		1985	5.78	3.88	1.33	1004
		1986	4.93	2.95	1.22	1004
		1987	8.95	3.46	1.42	1004
PM10	24 Hr	1983	41.24	20.43	5.26	996
		1984	35.33	19.52	4.77	989
		1985	49.38	20.07	4.59	988
		1986	42.41	24.89	4.63	998
		1987	39.17	19.31	4.86	1001
	Annual	1983	2.27	3.04	0.29	947
		1984	2.26	3.47	0.27	937
		1985	2.27	3.40	0.29	946
		1986	2.06	3.70	0.25	921
		1987	3.08	2.89	0.30	941

TABLE 2-15 (Cont'd)

Findings for Comparison No. 2, Assessment B, Net Air Quality Effect of Case 3: CBCP as Proposed to be Modified Supplying 380 k lb/hr Steam to SKC with SKC Package Boilers at 260 k lb/hr Steam Firing Fuel Oil vs. Case 1: The Future Operation of the 3 Power Boilers and 2 Bark Boilers at 640 k lb/hr Steam for the SKC Recycling Operation

Pollutant	Averaging Period	Meteorological Year	Maximum Predicted Impacts ($\mu g/m^3$)		Case 3 Net Air Quality Effect ($\mu g/m^3$)	Case 3 Number of Receptors Improved[a]
			Case 1	Case 3		
CO	1 Hr	1983	986.81	330.24	205.75	1004
		1984	947.32	336.40	207.05	1004
		1985	927.57	331.98	206.68	1004
		1986	913.88	334.01	209.02	1004
		1987	1036.09	331.82	212.23	1004
	8 Hr	1983	412.55	151.28	81.52	1004
		1984	368.58	95.31	79.82	1004
		1985	432.25	135.57	78.97	1004
		1986	367.64	136.10	75.91	1004
		1987	382.77	103.21	78.97	1004
NO_2	Annual	1983	5.28	2.64	1.27	1004
		1984	5.49	2.06	1.21	1004
		1985	5.44	2.57	1.25	1004
		1986	4.70	1.94	1.17	1004
		1987	7.79	2.27	1.29	1004
Pb	Monthly	1983	2.43e-03	3.0e-04	5.20e-04	941
		1984	3.02e-03	2.4e-04	4.91e-04	934
		1985	2.69e-03	3.1e-04	4.74e-04	944
		1986	2.08e-03	3.6e-04	5.05e-04	932
		1987	3.07e-03	3.9e-04	5.50e-04	935
	Annual	1983	9.8e-04	1.2e-04	2.24e-04	915
		1984	9.8e-04	9.0e-05	2.14e-04	916
		1985	9.8e-04	1.1e-04	2.22e-04	929
		1986	9.0e-04	1.1e-04	2.08e-04	931
		1987	1.33e-03	1.1e-04	2.27e-04	916

TABLE 2-15 (Cont'd)

Findings for Comparison No. 2, Assessment B, Net Air Quality Effect of Case 3: CBCP as Proposed to be Modified Supplying 380 k lb/hr Steam to SKC with SKC Package Boilers at 260 k lb/hr Steam Firing Fuel Oil vs. Case 1: The Future Operation of the 3 Power Boilers and 2 Bark Boilers at 640 k lb/hr Steam for the SKC Recycling Operation

Pollutant	Averaging Period	Meteorological Year	Maximum Predicted Impacts ($\mu g/m^3$)		Case 3 Net Air Quality Effect ($\mu g/m^3$)	Case 3 Number of Receptors Improved[a]
			Case 1	Case 3		
Total Air Toxics	8 Hr	1983	55.35	9.36	11.58	1004
		1984	48.72	11.02	11.22	1004
		1985	56.62	9.51	11.13	1004
		1986	53.22	9.27	10.70	1004
		1987	58.01	8.66	11.08	1004
	24 Hr	1983	33.76	3.78	6.52	1004
		1984	30.05	2.15	6.32	1004
		1985	39.23	2.45	6.00	1004
		1986	53.22	2.44	5.98	1004
		1987	31.88	3.28	6.21	1004
	Annual	1983	1.97	0.23	0.49	1004
		1984	2.01	0.19	0.48	1004
		1985	1.98	0.23	0.49	1004
		1986	1.85	0.18	0.46	1004
		1987	2.65	0.21	0.50	1004

[a]Out of a total of 1008

Table 2-16 presents the results of the same comparison with the SKC package boilers firing natural gas. The Case 3 results for the package boilers on fuel oil (Table 2-15) were discussed above. Since all emissions for Case 3 are lower, except CO and NO_x, than with SKC's package boilers firing oil, it stands to reason that there is no need to model emissions other than CO and NO_x for this comparison. Since CO and NO_x emissions increase, however, for Case 3 with the package boilers firing natural gas, results are presented in Table 2-16 for CO and NO_2 only for Case 3 with natural gas. Referring to Table 2-16, the "With the CBCP" case, Case 3, with natural gas still represents an improvement over Case 1 maximum impacts since Case 3 produces a positive, although small, net air quality benefit and lower maximum impacts over virtually all receptors.

The above results demonstrate that the CBCP as proposed to be modified meets the second criteria of Comparison No. 2. That is, on balance, the air quality impacts of the CBCP, as proposed to be modified, and the addition of the three proposed boilers on SKC's site necessary to provide 640,000 lb. of steam per hour for SKC's use will be less than the air quality impacts of SKC's future recycling operation using SKC's existing boilers without the CBCP.

The findings for Assessment C, Case 4 (with the CBCP and the package boilers) vs. Case 1a (without CBCP), are displayed in Tables 2-17 and 2-18, for SKC's package boilers in Case 4 on fuel oil and natural gas, respectively. Referring to Table 2-17, the maximum predicted concentrations for Case 4, the "With the CBCP plus SKC's package boilers on oil, are lower than the corresponding Case 1a concentrations for each emission and averaging period except PM-10 annual. In addition, the net air quality effect of Case 4 is positive for each emission and averaging period, although not significant for some pollutants, indicating an average net benefit to air quality, although small for some pollutants, over the entire model receptor grid. For the vast majority of receptors, out of a total of 1008, the maximum predicted impacts of Case 4 show an improvement over Case 1a for the individual emissions and total air toxics.

Table 2-18 presents the results of the same comparison but the "With the CBCP" case has SKC's package boilers firing natural gas instead of fuel oil. Since only CO and NO_x emissions increase from the package boilers firing natural gas, while emissions of all other substances decrease, results are presented in Table 2-18 for CO and NO_2 only. These results show that Case 4 with natural gas still represents an improvement over Case 1a maximum impacts, a positive net air quality benefit, although not significant for CO, and lower maximum impacts over the vast majority of receptors.

The above results demonstrate that the CBCP, as proposed to be modified, meets the third criteria of Comparison No. 2. That is, on balance, the air quality impacts of the CBCP, as

TABLE 2-16

Findings for Comparison No. 2, Assessment B, Net Air Quality Effect of Case 3: CBCP as Proposed to be Modified Supplying 380 k lb/hr Steam to SKC with SKC Package Boilers at 260 k lb/hr Steam Firing Natural Gas vs. Case 1: The Future Operation of the 3 Power Boilers and 2 Bark Boilers at 640 k lb/hr Steam for the SKC Recycling Operation

Pollutant	Averaging Period	Meteorological Year	Maximum Predicted Impacts ($\mu g/m^3$)		Case 3 Net Air Quality Effect ($\mu g/m^3$)	Case 3 Number of Receptors Improved(a)
			Case 1	Case 3		
CO	1 Hr	1983	986.81	339.81	205.14	1004
		1984	947.32	343.18	206.46	1004
		1985	927.57	340.70	206.08	1004
		1986	913.88	342.88	208.40	1004
		1987	1036.09	339.64	211.64	1004
	8 Hr	1983	412.55	154.82	81.30	1004
		1984	368.58	97.06	79.60	1004
		1985	432.25	139.31	78.75	1004
		1986	367.64	139.56	75.70	1004
		1987	382.77	106.09	78.76	1004
NO_2	Annual	1983	5.28	2.77	1.26	1004
		1984	5.49	2.16	1.20	1004
		1985	5.44	2.70	1.24	1004
		1986	4.70	2.04	1.16	1004
		1987	7.79	2.39	1.28	1004

(a) Out of a total of 1008

TABLE 2-17

Findings for Comparison No. 2, Assessment C, Net Air Quality Effect of Case 4: CBCP as Proposed to be Modified with SKC Package Boilers at 375k lb/hr Steam Firing Fuel Oil vs. Case 1a: The Future Operation of the 3 Power Boilers and 2 Bark Boilers at 745k lb/hr Steam for the SKC Recycling Operation

Pollutant	Averaging Period	Meteorological Year	Maximum Predicted Impacts ($\mu g/m^3$)		Case 4 Net Air Quality Effect ($\mu g/m^3$)	Case 4 Number of Receptors Improved[a]
			Case 1a	Case 4		
SO_2	3 hr	1983	677.67	443.11	85.35	989
		1984	637.65	232.14	72.60	1001
		1985	500.03	299.64	71.04	997
		1986	460.42	260.70	64.68	985
		1987	528.98	267.90	70.51	990
	24 hr	1983	281.03	112.51	27.51	997
		1984	189.90	68.84	22.18	1004
		1985	259.03	83.23	20.40	997
		1986	184.22	65.46	21.89	993
		1987	171.44	86.35	22.24	989
	Annual	1983	5.98	3.74	1.49	1004
		1984	4.88	2.81	1.37	1003
		1985	6.08	3.71	1.41	1004
		1986	5.01	2.64	1.30	1003
		1987	9.26	3.42	1.51	1004
CO	1 hr	1983	980.12	367.00	203.00	1004
		1984	943.78	356.02	204.44	1004
		1985	922.11	366.01	204.14	1004
		1986	910.40	365.43	206.40	1004
		1987	1036.23	369.33	209.60	1004
	8 hr	1983	410.77	147.08	80.64	1003
		1984	367.68	96.23	78.98	1003
		1985	431.98	131.09	78.03	1004
		1986	365.36	132.16	75.33	1004
		1987	380.01	111.10	78.12	1004

TABLE 2-17 (Cont'd)

Findings for Comparison No. 2, Assessment C, Net Air Quality Effect of Case 4: CBCP as Proposed to be Modified with SKC Package Boilers at 375k lb/hr Steam Firing Fuel Oil vs. Case 1a: The Future Operation of the 3 Power Boilers and 2 Bark Boilers at 745k lb/hr Steam for the SKC Recycling Operation

Pollutant	Averaging Period	Meteorological Year	Maximum Predicted Impacts ($\mu g/m^3$)		Case 4 Net Air Quality Effect ($\mu g/m^3$)	Case 4 Number of Receptors Improved[(a)]
			Case 1a	Case 4		
NO_2	Annual	1983	5.75	2.48	1.40	1004
		1984	5.55	1.86	1.33	1004
		1985	5.85	2.46	1.37	1004
		1986	5.00	1.73	1.28	1004
		1987	8.21	2.24	1.42	1004
PM-10	24 hr	1983	39.80	20.43	4.94	994
		1984	32.56	19.52	4.49	988
		1985	46.21	20.07	4.34	986
		1986	39.24	24.89	4.37	991
		1987	36.26	19.31	4.56	992
	Annual	1983	2.14	3.04	0.28	942
		1984	2.18	3.49	0.25	931
		1985	2.16	3.39	0.28	943
		1986	1.99	3.70	0.24	914
		1987	2.93	2.89	0.28	935
Pb	Monthly	1983	2.27e-03	3.2e-04	5.01e-04	945
		1984	2.83e-03	2.4e-04	4.75e-04	936
		1985	2.52e-03	3.5e-04	4.59e-04	950
		1986	2.00e-03	3.6e-04	4.91e-04	934
		1987	2.88e-03	3.8e-04	5.31e-04	939
	Annual	1983	9.3e-04	1.1e-04	2.18e-04	922
		1984	9.5e-04	1.0e-04	2.09e-04	921
		1985	9.4e-04	1.1e-04	2.16e-04	933
		1986	8.7e-04	1.1e-04	2.02e-04	927
		1987	1.27e-03	1.1e-04	2.21e-04	923

TABLE 2-17 (Cont'd)

Findings for Comparison No. 2, Assessment C, Net Air Quality Effect of Case 4: CBCP as Proposed to be Modified with SKC Package Boilers at 375k lb/hr Steam Firing Fuel Oil vs. Case 1a: The Future Operation of the 3 Power Boilers and 2 Bark Boilers at 745k lb/hr Steam for the SKC Recycling Operation

Pollutant	Averaging Period	Meteorological Year	Maximum Predicted Impacts ($\mu g/m^3$)		Case 4 Net Air Quality Effect ($\mu g/m^3$)	Case 4 Number of Receptors Improved[(a)]
			Case 1a	Case 4		
Total Air Toxics	8 hr	1983	55.14	9.36	11.48	1004
		1984	49.30	11.02	11.16	1004
		1985	57.45	9.51	11.08	1004
		1986	51.50	9.27	10.68	1004
		1987	55.28	8.66	11.03	1004
	24 hr	1983	33.06	3.95	6.46	1004
		1984	28.93	2.44	6.30	1004
		1985	37.31	2.95	5.99	1004
		1986	34.68	2.31	5.96	1004
		1987	30.52	3.04	6.18	1004
	Annual	1983	1.95	0.22	0.49	1004
		1984	2.04	0.19	0.48	1004
		1985	1.97	0.22	0.50	1004
		1986	1.87	0.18	0.47	1004
		1987	2.63	0.21	0.50	1004

[(a)]Out of a total of 1008.

TABLE 2-18

Findings for Comparison No. 2, Assessment C, Net Air Quality Effect of Case 4: CBCP as Proposed to be Modified with SKC Package Boilers at 375k lb/hr Steam Firing Natural Gas vs. Case 1a: The Future Operation of the 3 Power Boilers and 2 Bark Boilers at 745k lb/hr Steam for the SKC Recycling Operation

Pollutant	Averaging Period	Meteorological Year	Maximum Predicted Impacts ($\mu g/m^3$)		Case 4 Net. Air Quality Effect ($\mu g/m^3$)	Case 4 Number of Receptors Improved[a]
			Case 1a	Case 4		
CO	1 hr	1983	980.12	375.86	202.29	1004
		1984	943.78	364.04	203.73	1004
		1985	922.11	374.80	203.43	1004
		1986	910.40	374.28	205.63	1004
		1987	1036.23	378.33	208.88	1004
	8 hr	1983	410.77	150.53	80.37	1003
		1984	367.68	98.48	78.71	1003
		1985	431.98	135.03	77.77	1004
		1986	365.36	135.45	75.06	1004
		1987	380.01	113.46	77.85	1004
NO_x	Annual	1983	5.75	2.63	1.39	1004
		1984	5.55	1.97	1.32	1004
		1985	5.85	2.61	1.36	1004
		1986	5.00	1.84	1.27	1004
		1987	8.21	2.40	1.41	1004

[a]Out of a total of 1008.

proposed to be modified, and the addition of the boilers or the SKC site at their maximum allowable emission rates will be less than the air quality impacts of the maximum allowable emissions of SKC's recycling operation with power and bark boilers.

3.0 COMPARISON NO 3: THE CBCP'S COMPLIANCE WITH AMBIENT AIR QUALITY STANDARDS (AAQS) AND PREVENTION OF SIGNIFICANT DETERIORATION (PSD) INCREMENTS, AND COMPARISON TO DRAFT AIR TOXICS NO THREAT LEVELS (NTLS)

3.1 Introduction

The objective of the information presented in this section is to provide data useful for assessing whether the CBCP, as proposed to be modified, and SKC's proposed package boilers would satisfy all non-procedural air quality requirements with focus on whether the CBCP would either cause or contribute to a violation of an ambient air quality standard (AAQS) or cause or contribute to a violation of the allowable PSD increments, in either the region surrounding the facility (a PSD Class II area) or the two distant PSD Class I areas. The two PSD Class I areas are the Okefenokee and Wolf Island Wilderness Areas in Georgia. In addition, information is presented to provide data useful for assessing whether the CBCP would produce air toxics concentrations above the Draft Florida No Threat Levels (NTLs). For annual average estimates of impacts, the CBCP's CFB boilers are assumed to operate consistent with the long term emission rates in Table 1-7, which are to update the conditions of certification in response to the Siting Board's June 16, 1992 Order.

The national and Florida AAQS are listed in Table 3-1. The PSD increments are listed in Table 3-2. Also listed are the "significant impact levels" (SIL) established by EPA for these pollutants. The Draft NTLs for air toxics being modeled are listed in Table 3-3. These were selected from the entire list of NTLs as those air toxics emitted by the CBCP.

The modeling for AAQS purposes considers the impacts of other major existing and permitted sources in Duval County (including SKC's proposed package boilers) and other major sources in the surrounding county thought necessary to conservatively model the impacts of the CBCP as well as background concentrations of the AAQS pollutants.

For PSD increment consumption calculations, SO_2, NO_x, and TSP increment consuming and increment expanding sources in this inventory are considered. This inventory includes increment consuming sources permitted since baseline dates, along with the CBCP, as well as the increment consumption from SKC's proposed package boilers and increment expansions resulting from the shutdown of the 3 power boilers, 2 bark boilers, 3 recovery boilers, 3 lime kilns, and 3 smelt dissolving tanks at SKC's facility to the extent that they affect ambient air.

TABLE 3-1

National and Florida Ambient Air Quality Standards ($\mu g/m^3$) For Pollutants Being Modeled

Pollutant	Averaging Period	NAAQS Standards		Florida State Standards	EPA Significant Impact Level[a]
		Primary	Secondary		
SO_2	Annual	80	--	60	1
	24-hour	365	--	260	5
	3-hour	--	1,300	1,300	25
NO_2	Annual	100	100	100	1
PM_{10}	Annual	50	50	50	1
	24-hour	150	150	150	5
CO	8-hour	10,000	--	10,000	500
	1-hour	40,000	--	40,000	2,000
Lead (Pb)	Calendar Quarter	1.5	1.5	1.5	0.03[b]

[a] 40 CFR 51.165(b)(2)
[b] Florida Administration Code, 17-212.100(63)(e)

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TABLE 3-2

Federal and Florida PSD Increments

Pollutant	Averaging Period	PSD Area Classification		PSD Class II Significant Impact Levels
		Class I	Class II	
SO_2	3-hour	25	512	25
	24-hour	5	91	5
	Annual	2	20	1
TSP	24-hour	10	37	5
	Annual	5	19	1
NO_2	Annual	2.5	25	1

TABLE 3-3

Draft No Threat Levels (NTLs) For Air Toxics Being Modeled[a]

Pollutant	No Threat Levels ($\mu g/m^3$)		
	8 hr	24 hr	Annual
acetaldehyde	1800	432	4.5E-01
acetic acid	250	60	
antimony compounds	5	1.2	3.0E-01
arsenic	2	0.48	2.3E-04
barium	5	1.2	5.0E+01
beryllium	0.02	0.0048	4.2E-04
bromine	6.6	1.584	
cadmium	0.5	0.12	5.6E-04
chromium VI compounds	0.5	0.12	8.3E-05
cobalt	0.5	0.12	1.0E+00
copper	10	2.4	
fluorides (as F)	25	6	
formaldehyde	12	2.88	7.7E-02
hydrogen chloride (hydrochloric acid)	75	18	7.0E+00
indium compounds (as In)	1	0.24	
lead	0.5	0.12	9.0E-02
manganese (as Mn)	50	12	4.0E-01
mercury (as Hg) alkyl compounds	0.1	0.024	
molybdenum, soluble compounds, (as Mo)	50	12	
nickel, soluble compounds, (as Ni)	1	0.24	
phenol	190	45.6	3.0E+01
phosphorus	1	0.24	
pyridine	160	38.4	
selenium	2	0.48	
sulfuric acid (H_2SO_4)	10	2.4	
tin	1	0.24	
vanadium (as V_2O_5)	0.5	0.12	2.0E+01

(a)There are no Draft NTLs listed for POM or radionuclides.

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The following are the applicable baseline dates:

PSD Pollutant	Minor Source Baseline Date	Major Source Baseline Date
SO_2	December 27, 1977	January 6, 1975
TSP	December 27, 1977	January 6, 1975
NO_2	March 28, 1988	February 8, 1988

3.2 Methodology

The modeling methodology employed, the model being applied, the pollutants being modeled, and the meteorological data are identical to that employed in addressing Comparison No. 2: Net Air Quality Impacts with a few exceptions. Since the maximum impacts of the CBCP, by itself, occur in the near field and the facility has predicted air quality impacts below the significant impact levels beyond 4.5 km for the criteria pollutants, the receptor grid for Comparison No. 3 extends to 5 km only. Receptors are added at the two PSD Class I areas for the PSD analysis, and facility boundary receptors are added for the PSD and AAQS analyses. For the AAQS analysis, SKC sources' impacts on SKC property are counted, even through EPA policy allows their exclusion. To avoid having all of the shutdowns of SKC's sources (and the increment expansions associated with them) over-shadow the contribution of the CBCP's new sources to increment consumption, however, the effect of SKC's retiring and proposed package boilers was not considered on SKC's site. This results in conservative impacts at those receptors located on SKC property for both analyses.

The facility boundary and Class I area receptor locations are presented in Tables 3-4 and 3-5, respectively.

Cavity Analysis

In addition to the application of the ISCST model, EPA's SCREEN model 1.1 (version dated 88300) was applied to calculate concentration in the building cavity created by the CFB boiler building from emission of the two short limestone dryer stacks at the CBCP. A cavity-affected short stack is one that is less than one and one-half times the controlling building height. The limestone dryer stacks are only 63 feet high above grade, and the controlling building (the CFB building) is 161 feet above stack base. For short stacks, effluent may become entrained within

TABLE 3-4

Cedar Bay Property Line Receptors*

Distance (m)	Azimuth (deg.)
372	0
373	2
372	7
353	11
333	15
183	19
315	20
200	22
216	24
172	25
297	25
232	25
280	26
250	27
262	29
273	30
161	34
153	43
152	51
155	59
164	67
142	70
121	74
136	86
157	96
136	106
123	118
149	122
174	125
168	135

TABLE 3-4 (Cont'd)

Cedar Bay Property Line Receptors*

Distance (m)	Azimuth (deg.)
166	143
155	151
142	162
109	181
96	200
83	221
110	243
129	270
145	284
161	293
186	301
212	307
227	314
235	320
247	326
264	332
269	337
261	343
247	346
271	347
298	349
322	349
349	350
370	351
372	356

*Distance and direction from CFB stack

TABLE 3-5

Class I Area Receptors*

Class I Area	Distance (km)	Azimuth (deg.)
Wolf Island	97.8	17
Okefenokee Swamp	72.2	315
Okefenokee Swamp	68.1	311
Okefenokee Swamp	60.4	305
Okefenokee Swamp	59.4	300
Okefenokee Swamp	56.2	296
Okefenokee Swamp	54.8	290
Okefenokee Swamp	60.9	286
Okefenokee Swamp	65.7	285
Okefenokee Swamp	69.8	284
Okefenokee Swamp	73.7	284

*Distance and direction from CFB stack.

the cavity of the controlling building and highest pollutant concentrations may exist there rather than further downwind in the wake region modeled by ISCST.

The downwind extent of the CFB buildings' cavity region, which extends beyond the CBCP property line was calculated by the SCREEN model to be 78 meters. The cavity was determined to extend beyond the CBCP property line to the north-northeast through northeast of the CFB building (azimuth angles 20°-50° as centered on the CFB stack). The cavity area which extends beyond the CBCP property line lies entirely on SKC property.

The ISCST2 model does not calculate impacts from point sources within the cavity region. Consequently, to assure compliance with the AAQS and PSD increments in the cavity region, the ISCST2 model was executed for all other sources, as previously described, for the 5-year period with receptors placed within that portion of the cavity region which extended off CBCP property. Impacts calculated by the SCREEN model from the limestone dryers within the cavity region were then summed with the ISCST2 results for other sources and monitored background concentrations (for the AAQS) to assess compliance.

The maximum normalized (based on 1 g/sec emission rate) 1-hour SCREEN-predicted impact for each limestone dryer was 158 $\mu g/m^3$ which produced a total of 316 $\mu g/m^3$. Pollutant-specific cavity concentrations were determined by scaling the normalized cavity concentrations by the limestone dryer emissions, in grams per second, as presented in Appendix C. To determine normalized cavity region concentrations applicable to other averaging periods, the one-hour normalized concentration was scaled by the following factors as recommended in EPA's "Screening Procedures for Estimating the Air Quality Impacts of Stationary Sources" and also recommended by the FDER:

Averaging Period	Scaling Factor
3-hour	0.9
8-hour	0.7
24-hour	0.4
Annual	0.1 (FDER recommended scale factor)

3.2.1 AAQS Analysis

The first step in the modeling of the AAQS pollutants was to examine the emissions of the CBCP alone. Pollutants for which the maximum modeled concentrations are less than the SILs for the applicable averaging periods are eliminated from further consideration. The concept here is that, if these impacts are not significant, then they can neither cause nor contribute to a violation, as promulgated by EPA at 40 CFR 51.165(b)(2). For pollutants for which the CBCP is modeled to have a significant impact, multi-source modeling is performed with the existing and permitted source inventories.

Background concentrations of those pollutants are then added to modeled impacts to determine total pollutant concentrations for comparison to the AAQS.

3.2.2 PSD Analysis

PSD pollutants for which maximum modeled concentrations in the PSD Class II area around the facility, due to the CBCP alone, are less than the SILs are eliminated from further consideration.

The concept here is that, if these impacts are not significant, then the facility will neither cause nor contribute to a violation of a PSD Class II increment (U.S. EPA Memorandum, G. Emison, OAQPS to T. Maslany, AMD, 7/5/88). For PSD pollutants for which the CBCP is modeled to have a significant impact, multi-source modeling is performed with the PSD source inventories for the compliance evaluations. Multi-source PSD increment modeling is also performed for receptors in the PSD Class I areas.

3.2.3 NTL Comparison

The modeled maximum ground-level concentration of each draft air toxic pollutant for averaging periods consistent with the draft NTLs is identified. These concentrations are then compared to the draft NTLs. This analysis is performed for the CBCP alone, since the draft NTLs are intended as source-specific screening levels.

3.3 Source Data and Assumptions

3.3.1 CBCP Emissions and Exhaust Parameters

The emissions and exhaust parameters used in the PSD, AAQS, and NTL modeling for the CBCP as proposed to be modified are the same as those used in the net air quality impacts modeling and discussed in Sections 1 and 2. Exhaust parameters used are presented in Section 2, while the g/sec emission rates are provided in Appendix C.

3.3.2 Background Source Inventories

The emissions and exhaust parameters for SKC's proposed package boilers used in the PSD and AAQS modeling are the same as the design parameters discussed in Sections 1 and 2 and used in the net air quality impacts modeling. Section 2 contains the stack exhaust parameters and Appendix C the g/sec emission rates. The PSD emissions and exhaust parameters for SKC's Power Boilers, Bark Boilers, Recovery Boilers, Smelt Dissolving Tanks, and Lime Kilns, to be shut down, representative of the respective baseline years are given in Tables 3-6 through 3-10. SO_2 data were taken from the proposed representative baseline data submitted for review and approval by the DER as part of SKC's air permit application for its proposed SKC Package Boilers. TSP and NO_x data were derived from DER records and SKC operating reports and related data.

The inventories of other sources used in the PSD and AAQS modeling, along with emissions and exhaust parameters, are presented in Tables 3-11 through 3-13. The tables note where a source is either a PSD increment consuming (CON) or increment expanding (EXP) source. These sources were the only other sources employed in the PSD modeling. All other sources are assumed to be unaltered baseline sources and were included along with increment consuming sources in the modeling for AAQS. As noted above, for conservatism, SKC's sources were not modeled for receptors on SKC's site for increment consumption (or expansion) though the CBCP's impacts were modeled there.

SO_2 Inventory

After consultation with DER, the SO_2 source data were taken from the permit application for SKC's proposed SKC package boilers. According to the application, the SO_2 source inventory (Table 3-11) was derived from an initial inventory of all SO_2 sources within 50 km of the SKC and CBCP site and the application of a DER recommended source elimination technique. This initial inventory, presented in Table 3-14, includes all SO_2 facilities initially considered in the modeling analysis. The following paragraphs describe how SKC selected SO_2 sources, according to the description given in SKC's permit application.

DER recommends a technique for eliminating facilities from the modeling analysis if the facility's emissions do not meet an emission criteria. The technique is the "Screening Threshold" method, developed by the North Carolina Department of Natural Resources and Community Development, and approved by EPA. The method is designed to objectively eliminate from the emission inventory those sources which are not likely to have a significant interaction with the source undergoing evaluation. In general, facilities that should be considered in the modeling analyses are those with emissions greater than Q (in TPY) which is calculated by the following criteria:

$$Q = 20 \times D$$

TABLE 3-6

SO_2 and TSP PSD Baseline Stack and Operating Data for the Seminole Kraft[a] Facility in Jacksonville, Florida

Unit Description	Stack Height (m)	Stack Diameter (m)	Velocity (m/s)	Temperature (deg K)
Bark Boiler No. 1	41.45[b]	2.46[c]	13.01[c]	332[c]
Bark Boiler No. 2	41.45[b]	2.46[c]	13.01[c]	332[c]
Power Boiler No. 1	32.31[b]	1.83[d]	15.82[e]	450[e]
Power Boiler No. 2	32.31[b]	2.13[f]	18.35[f]	487[f]
Power Boiler No. 3	32.31[b]	2.13[f]	17.22[f]	462[f]
Recovery Boiler No. 1	38.40[b]	2.59[f]	15.67[f]	345[f]
Recovery Boiler No. 2	38.40[b]	2.74[f]	18.41[f]	340[f]
Recovery Boiler No. 3	38.40[b]	2.74[d]	12.80[d]	339[d]
Smelt Dissolving Tank No. 1[b]	32.00	1.07	7.01	350
Smelt Dissolving Tank No. 2[b]	32.92	1.22	7.59	350
Smelt Dissolving Tank No. 3[b]	32.92	1.22	7.59	350
Lime Kiln No. 1	21.03[b]	1.77[b]	5.19[g]	344[d]
Lime Kiln No. 2	22.86[b]	1.42[b]	10.30[d]	347[d]
Lime Kiln No. 3	22.86[b]	1.12[b]	13.72[g]	333[d]

[a] Formerly St. Regis Paper Company
[b] Data from 1974 St. Regis Stack and Operating Data Reports
[c] Data from 1991 SKC Stack Data
[d] Data from 1974 St. Regis Stack Tests
[e] Data from 1974 and 1975 St. Regis Stack Tests (Averaged)
[f] Data from 1975 St. Regis Stack Tests
[g] Calculated from 1974 Stack Test Flow Rate and current stack diameter

TABLE 3-7

PSD Baseline SO_2 Emission Data for the Seminole Kraft[a] Facility in Jacksonville, Florida

Unit Description	Fuel Usage	Fuel Type	% Sulfur in Fuel Oil	Hours of Operation	SO_2 Emissions			
					Annual (tons/yr)	Short Term (lb/hr)[b]	Annual (g/s)	Short Term (g/s)
Bark Boiler No. 1	1,394,774 121,520	Fuel Oil (gal) Bark (tons)	2.27	8,712	272.8	458.7[c]	7.85	57.80
Bark Boiler No. 2	1,696,627 112,480	Fuel Oil (gal) Bark (tons)	2.27	8,064	324.8	458.7[c]	9.34	57.80
Power Boiler No. 1	7,935,037	Fuel Oil (gal)	2.27	8,472	1,414.0	333.8	40.68	42.06
Power Boiler No. 2	11,610,539	Fuel Oil (gal)	2.27	8,472	2,069.0	488.4	59.52	61.54
Power Boiler No. 3	11,569,935	Fuel Oil (gal)	2.27	8,496	2,062.0	485.4	59.32	61.16
Recovery Boiler No. 1	54,439	Fuel Oil (gal)	2.27	8,304	425.6	102.5	12.24	12.92
Recovery Boiler No. 2	51,100	Fuel Oil (gal)	2.27	8,328	545.8	131.1	15.70	16.52
Recovery Boiler No. 3	76,520	Fuel Oil (gal)	2.27	8,448	553.6	131.1	15.92	16.51
Smelt Dissolving Tank No. 1	N/A	N/A	N/A	8,304	12.2	2.9	0.35	0.37
Smelt Dissolving Tank No. 2	N/A	N/A	N/A	8,328	15.6	3.7	0.45	0.47
Smelt Dissolving Tank No. 3	N/A	N/A	N/A	8,448	15.8	3.7	0.46	0.47
Lime Kiln No. 1	1,817,632	Fuel Oil (gal)	2.27	5,976	19.3	6.5	0.55	0.81
Lime Kiln No. 2	2,197,217	Fuel Oil (gal)	2.27	7,224	23.3	6.5	0.67	0.81
Lime Kiln No. 3	2,146,119	Fuel Oil (gal)	2.27	7,056	22.8	6.5	0.66	0.81

Source: 1976/1977 Annual Operating Report submitted to FDER.
[a]Formerly St. Regis Paper Company
[b]Based on total annual hours of operation and annual emissions, unless otherwise indicated.
[c]Maximum short-term emissions for Bark Boilers 1 and 2 are based on 100-percent fuel oil usage at 1,287 gallons/hour.

TABLE 3-8

PSD Baseline PM Emission Data for the Seminole Kraft[a] Facility in Jacksonville, Florida

Unit Description	Basis	Hours of Operation	PM Emissions			
			Annual (TPY)	Short Term (lb/hr)[b]	Annual (g/s)	Short Term (g/s)
Bark Boiler No. 1	1977 PM stack test and operating hours	8,712	58.8	13.50	1.69	1.70
Bark Boiler No. 2	1977 PM stack test and operating hours	8,064	44.4	11.01	1.28	1.39
Power Boiler No. 1	7,935,637 gal fuel oil; 25.7 lb/1000 gal based on AP-42	8,472	102.0	24.08	2.93	3.03
Power Boiler No. 2	11,610,539 gal fuel oil; 25.7 lb/1000 gal based on AP-42	8,472	149.2	35.22	4.29	4.44
Power Boiler No. 3	11,569,935 gal fuel oil; 25.7 lb/1000 gal based on AP-42	8,496	148.7	35.00	4.28	4.41
Recovery Boiler No. 1	1977 PM stack test and operating hours	8,304	152.8	36.80	4.40	4.64
Recovery Boiler No. 2	1977 PM stack test and operating hours	8,328	94.5	22.69	2.72	2.86
Recovery Boiler No. 3	1977 PM stack test and operating hours	8,448	128.0	30.30	3.68	3.82
Smelt Dissolving Tank No. 1	1977 PM stack test and operating hours	8,304	27.4	6.60	0.79	0.83
Smelt Dissolving Tank No. 2	1977 PM stack test and operating hours	8,328	65.0	15.61	1.90	1.97
Smelt Dissolving Tank No. 3	1977 PM stack test and operating hours	8,448	63.7	15.08	1.83	1.90
Lime Kiln No. 1	1977 PM stack test and operating hours	5,976	28.4	9.50	0.82	1.20
Lime Kiln No. 2	1977 PM stack test and operating hours	7,224	30.3	8.39	0.87	1.06
Lime Kiln No. 3	1977 PM stack test and operating hours	7,056	32.1	9.10	0.92	1.15

[a] Formerly St Regis Paper Company
[b] Based on total annual hours of operation and annual emissions, unless otherwise indicated.

TABLE 3-9

NO_x PSD Baseline Stack and Operating Data for the Seminole Kraft[a] Facility in Jacksonville, Florida

Unit Description	Stack Height (m)	Stack Diameter (m)	Velocity (m/s)	Temperature (K)	Basis
Bark Boiler No. 1	41.45	2.46	13.01	332	1991 stack test data
Bark Boiler No. 2	41.45	2.46	13.01	332	1991 stack test data
Power Boiler No. 1	32.31	1.83	14.02	455	1991 stack test data
Power Boiler No. 2	32.31	2.13	14.51	439	1991 stack test data
Power Boiler No. 3	32.31	2.13	14.51	439	1991 stack test data
Recovery Boiler No. 1	38.40	2.59	15.97	341	1991 stack test data
Recovery Boiler No. 2	38.40	2.74	15.61	345	1991 stack test data
Recovery Boiler No. 3	38.40	2.74	14.60	344	1991 stack test data
Lime Kiln No. 1	21.03	1.77	3.11	343	Various stack test data
Lime Kiln No. 2	22.86	1.42	6.52	336	Various stack test data
Lime Kiln No. 3	22.86	1.12	8.17	336	Various stack test data

[a]Formerly St. Regis Paper Company

TABLE 3-10

PSD Baseline NO_x Emission Data for the Seminole Kraft[a] Facility in Jacksonville, Florida

Unit Description	Basis	1989-1990 Hours of Operation	Annual Baseline NO_x Emissions	
			tons/yr	g/s
Bark Boiler No. 1	74.1 lb/hr, 1991 stack test	8,169	302.7	8.71
Bark Boiler No. 2	45.9 lb/hr, 1991 stack test	7,877	180.8	5.20
Power Boiler No. 1	8,129,846 gal/yr, 67 lb/1000 gal[b]	8,255	272.3	7.83
Power Boiler No. 2	8,581,041 gal/yr, 67 lb/1000 gal[b]	8,472	287.5	8.27
Power Boiler No. 3	8,723,551 gal/yr, 67 lb/1000 gal[b]	8,489	292.2	8.41
Recovery Boiler No. 1	28.8 lb/hr, 1991 stack test	8,203	118.1	3.40
Recovery Boiler No. 2	31.8 lb/hr, 1991 stack test	8,023	127.6	3.67
Recovery Boiler No. 3	34.3 lb/hr, 1991 stack test	8,019	137.5	3.96
Lime Kiln No. 1	15.3 lb/hr, 1991 stack test	1,781	13.6	0.39
Lime Kiln No. 2	10.7 lb/hr, 1991 stack test	7,284	39.0	1.12
Lime Kiln No. 3	14.1 lb/hr, 1991 stack test	7,460	52.6	1.51

Source: 1989/1990 Annual Operating Reports submitted to FDER and stack tests.
[a]Formerly St. Regis Paper Company
[b]Input to AP-42 Emission Factor

Table 3-11

SO_2 Source Data Used in the Modeling Analysis

APIS Number/Facility	Source Description	APIS Source Number	Stack Data (m)		Operating Data		SO_2 Emissions		SO_2 PSD Source (EXP/CON)	UTM (km)	
			Height	Diameter	Temperature (K)	Velocity (m/sec)	(g/s)	(TPY)		East	North
31DVL160202 Celotex	Gypsum Crushing System	01	7 6	0 49	321.9	18.90	0 26	9	-	446 4	3362 6
	Calcinizing Kettle #1 - #3	07, 11, 12	22.9	0 91	727 4	4 88	0 83	30	-		
	Wallboard Drying Kilns	08, 13, 14	15.2	0 94	435.8	7 32	20.16	701	-		
31DVL160213 U S Naval Station - Mayport	Boiler #1 - #3, Bldg. 1241	01, 02, 03	12.2	0 91	544.1	14 33	16.33	544	-	460.4	3362 8
	Boiler #1 - #2, Bldg.250	04, 08	14 0	1 22	560 8	7 92	10 53	351	-		
	Carbonaceous Fuel Boiler, Hot Water Boiler	07, 11	18.3	1 52	533 0	7 01	0 62	22	-		
31DVL160005 Anchor Hocking Glass	Glass Melt Furnace #1	01	17 4	0 91	511.3	19.51	2 05	68	-	431 5	3357 5
	Glass Melt Furnace #2	02	17 4	0 82	522 4	14 02	2 41	84	-		
	Glass Melt Furnace #3	03	33.2	1 71	429 7	11 58	10 40	361	-		
	Glass Melt Furnace #4	04	35 7	1 58	510.8	11 89	3 75	131	-		
31DVL160006 Anheuser Busch	Boiler #1 - #4	01 - 04	30 5	1 07	483 0	17 37	72 58	2120	-	437 9	3366 8
	Grain Dryer #1, 2	05, 06	21 3	1 68	322 0	9 00	19.78	655	CON		
	Anerobic & Bio Gas Flare	31,32	6 1	2 20	1000.0	15 00	5 66	54	CON		
31DVL160039 SCM Glidco Organics	Boiler #3 (Retired)	03	12 2	1 10	658 0	10 06	8 49	295	EXP	435 6	3360 7
	Boiler #4	04	12.2	1 10	405.2	14 02	19 91	692	-		
	Boiler #5	05	15.2	1 10	535.8	12 80	20.92	728	-		
	Boiler #6	06	15 2	1 22	513 6	10 36	24.44	850	-		
	Boiler #7	11	13 7	1 22	449 7	5 49	4 01	139	CON		
31DVL160042 Duval Asphalt Products *	Asphalt Batch Plant	01,02	11 6	0 98	376.3	31 09	36 54	1270	-	428 7	3361 4
31DVL160001 JEA - SJRPP	Units #1 & #2	01, 04	194 2	10 12	328 0	18.29	1175 96	40904	CON	446 9	3366 3

Table 3-11 (Cont'd)

SO_2 Source Data Used in the Modeling Analysis

APIS Number/Facility	Source Description	APIS Source Number	Stack Data (m)		Operating Data		SO_2 Emissions		SO_2 PSD Source (EXP/CON)	UTM (km)	
			Height	Diameter	Temperature (K)	Velocity (m/sec)	(g/s)	(TPY)		East	North
31DVL160045 JEA - Northside	Steam Generator #1	01	73.2	5.03	400.8	23.16	690.35	23998	-	446.9	3364.8
	Steam Generator #2	02	88.4	5.12	394.1	13.11	586.78	20398	-		
	Steam Generator #3	03	103.6	7.01	438.6	19.20	1255.59	43647	-		
	Combustion Turbines #3 - #6	06 - 09	10.1	6.55	779.7	18.29	231.60	8050	-		
	Auxiliary Boiler A	14	73.2	5.03	671.9	1.22	28.60	20	CON		
	Auxiliary Boiler B	13	76.2	5.03	588.6	0.30	8.47	294	CON		
31DVL160046 JEA - Southside	Steam Generator #1 & #2	01, 02	40.8	2.44	433.0	11.58	105.34	3,664	-	437.7	3353.9
	Steam Generator #3	03	40.8	3.05	406.9	10.36	79.76	2,773	-		
	Steam Generator #4	04	43.9	3.35	421.9	11.89	110.25	3,833	-		
	Steam Generator #5	05	44.2	3.05	416.9	13.72	207.90	7,227	-		
	Auxiliary Boiler	10	6.7	0.49	493.6	17.68	1.31	46	-		
31DVL160047 JEA - Kennedy	Combustion Turbine #3 - #6	03 - 06	13.7	2.77	651.9	8.84	191.14	6,646	-	440.0	3359.2
	Steam Generator #8	07	45.7	3.20	394.1	7.92	74.98	2,607	EXP		
	Steam Generator #9	08	45.7	3.20	398.0	7.92	74.98	2,607	-		
	Steam Generator #10	09	41.5	2.74	410.8	15.54	198.95	6,918	-		
	Auxiliary Boiler	13	10.1	0.49	493.6	17.68	1.22	42	CON		
31JAX450003 Container Corporation of Amer	Power Boiler #7	15	103.6	4.42	489.1	13.52	154.40	5,367	CON	456.2	3394.2
	Power Boiler #5	06	78.3	3.35	454.1	15.35	190.40	6,619	CON		
	Recovery Boiler #4	07	75.9	3.76	513.0	16.55	35.10	1,220	CON		
	Recovery Boiler #5	11	87.8	2.74	495.8	14.36	31.20	1,084	CON		
	Lime Kiln #4	21	31.1	1.45	435.8	21.07	3.38	117	CON		

Table 3-11 (Cont'd)

SO_2 Source Data Used in the Modeling Analysis

APIS Number/Facility	Source Description	APIS Source Number	Stack Data (m)		Operating Data		SO_2 Emissions		SO_2 PSD Source (EXP/CON)	UTM (km)	
			Height	Diameter	Temperature (K)	Velocity (m/sec)	(g/s)	(TPY)		East	North
31JAX450003 Container Corporation of Amer. (cont'd)	Smelt Dissolving Tank #4	14	75.9	1 83	339 7	5.16	0 71	25	CON		
	Smelt Dissolving Tank #5	14	87 8	1 22	345 0	16 77	0 71	25	CON		
	Power Boiler #3 & #4	05	69.2	2.44	483 0	16 86	144 70	5,030	EXP		
	Power Boiler #5	06	69 2	3 35	479.7	16.25	169 97	5,910	EXP		
	Recovery Boiler #4	07	75 9	3.51	493.0	18 78	35.10	1,220	EXP		
	Recovery Boiler #3	??	40.8	2 74	389 7	13 26	10 50	365	EXP		
	Lime Kiln #2	??	13 4	1 07	360.8	12.25	1.30	45	EXP		
	Lime Kiln #3	??	13 4	1 37	359 7	17 59	1 30	45	EXP		
	Smelt Dissolving Tank #4	??	69 5	1 83	349 7	5.21	0 20	7	EXP		
	Smelt Dissolving Tank #3	??	33.2	0.61	359.7	5 82	0 70	24	EXP		
31DVL160003 Jefferson Smurfit	Power Boiler #10	11	61.0	3.05	341.5	9 70	36.48	1 265	CON	439.9	3359 3
	Recovery Boiler #9	05	53.3	3.20	409.8	22.86	5.52	834	CON		
	Smelt Dissolving Tank #9	04	53.3	1 65	362 0	4.32	0 48	17	-		
	Lime Kiln #1, 2	06 07	15 8	1 45	347.0	6.7	0 68	34	EXP		
	Lime Kiln #3	23	60 7	1 37	340.2	12 22	1 31	37	CON		
	Power Boilers	??	76.2	3 75	455.4	8.04	36.48	1,268	EXP		
	Recovery Boiler #9	05	53.3	3 20	389.8	11 56	16 81	584	EXP		
31DVL160069 Georgia Pacific	Boiler	01	11.6	0 61	477 4	9 14	2 58	90	-	440 1	3368 3
	Boiler	02	4.9	0 61	505.2	6 40	3.36	117	-		
31DVL160072 U S Gypsum	Wallboard Kiln #2	33	13.7	1 07	421 9	28 96	12 60	416	-	438.9	3361 2
	Calcining Kettles #1 - #7	36	28.3	1 07	505 2	0 91	18 38	607	-		
	Dowtherm Heater	41	20 7	0 91	733.0	6 40	1 22	40	-		

Table 3-11 (Cont'd)

SO_2 Source Data Used in the Modeling Analysis

APIS Number/Facility	Source Description	APIS Source Number	Stack Data (m)		Operating Data		SO_2 Emissions		SO_2 PSD Source (EXP/CON)	UTM (km)	
			Height	Diameter	Temperature (K)	Velocity (m/sec)	(g/s)	(TPY)		East	North
31DVL160072 U S Gypsum (cont'd)	Rotary Kiln	48	26 8	0.49	339.1	59 13	4.08	137	-		
31DVL160148 Occidental Chemical	Bulk Ship Loading Conveyor, Phosphate Railcar Unloading	01, 02	3.7	0 91	298.0	52 12	4.38	152	-	439 3	3359 8
	Hot Water Boiler #1 & #2	03, 04	6 1	0 30	355.2	11 89	4 23	148	-		
	Steam Boilers	05	18.3	0 91	427.4	10 06	3 86	134	-		
31DVL160146 J W. Swisher	Boilers #1 - #3	01	18 3	1.22	505 2	0 61	4 26	148	-	437 9	3357 9
	Boiler #4 - 6	02, 03, 04	9 1	0 30	477 4	7 01	4.21	144	-		
31DVL160010 Baptist Medical Center	Turbines, Reciprocative Engine	03, 05, 06, 07, 08, 12	15 2	1 07	435 8	24 69	13 89	483	-	435 4	3352.0
31DVL160004 Maxwell House	Boiler #1	03	45 7	0 98	606.9	0.61	3 96	138	-	439.7	3350 0
	Boiler #2	04	45 7	0.43	396 9	67 97	7.52	261	-		
	Boiler #2 (Retired)	13	15 2	0 91	402.4	20 73	2 44	85	EXP		
31DVL160155 Gulf Life Insurance	Boilers #1 & #2	01	18.3	0 91	421 9	2 74	7 82	91	-	436 2	3354.1
	Duel Fuel Engine	02	18.3	0 30	852 4	56 08	0 97	12	-		
31DVL160043 Duval Asphalt Products	Asphalt Batch Plant	01	11 6	0 98	376.3	31 09	11 06	384	-	443.2	3344 0
31DVL450004 ITT Rayonier	Power Boilers #1 - #3	01 - 03	55.0	3 05	329.0	9 75	173.88	5,532	CON	454 7	3392 2
	Recovery Boiler	06	76 2	2 29	324 7	17 37	40 60	1 352	-		
	Power Boilers #1 - #3	01 - 03	37.2	3 05	329 0	9 75	173.88	1,383	EXP		
31DVL160071 Union Camp	Waste Product Incinerator	01	18.2	1 07	699 7	9 45	9 69	337	-	427 6	3357 3
	Boilers, Myrcene Units	03, 04 05, 06, 07, 14, 26	20 1	1 22	585 8	11 58	8 03	278	-		
31DVL160198 E S Metals		02	25 6	0 91	324 7	15 24	18 77	651	EXP	431 8	3358 3
		03	24 4	1 22	355 2	3 96	5 38	187	EXP		

Table 3-11 (Cont'd)

SO_2 Source Data Used in the Modeling Analysis

APIS Number/Facility	Source Description	APIS Source Number	Stack Data (m)		Operating Data		SO_2 Emissions		SO_2 PSD Source (EXP/CON)	UTM (km)	
			Height	Diameter	Temperature (K)	Velocity (m/sec)	(g/s)	(TPY)		East	North
GA Gilman Paper Company	Power Boiler No 3		83.8	4 30	450 2	2.92	87.29	3034	CON	448.2	3401 3
	Coal Fired Boiler		45 7	3 05	326 3	7.77	88.75	3085	CON		
	Recovery Boiler No 2, 3		54 9	2 13	424 7	16 76	15 20	528	CON		
	Recovery Boiler No 4		76.2	2.59	410.8	12.19	15.80	549	CON		
	Lime Kiln		30 5	1 52	350.2	11.64	2.13	74	CON		
	Power Boilers No. 1 - 3		83.8	4.30	449.7	7.28	281.01	9768	EXP		
	Power Boiler No. 4		36.6	1 80	699.7	19 99	59.90	2082	EXP		
	Recovery Boiler No. 2		47 2	2 30	425.8	13 11	7 60	264	EXP		
	Recovery Boiler No 3		53.3	1 60	394 1	25.21	7.60	264	EXP		
	Recovery Boiler No. 4		76.2	2 60	427 4	22.10	15 80	549	EXP		

[a] Formerly Wiley Jackson Company

TABLE 3-12

TSP/PM-10 Source Data Used in the Modeling Analysis

APIS Number/Facility	Source Description	APIS Source Number	Stack Data (m)		Operating Data		PM Emissions		PM PSD Source (EXP/CON)	UTM (km)	
			Height	Diameter	Temperature (K)	Velocity (m/sec)	(g/s)	(TPY)		East	North
31DVL160202 Celotex	Gypsum Crushing System	01	7.6	0 49	321 9	18 90	0 63	21	-	446 4	3362 6
	Calcinizing Kettle #1 - #3	07, 11, 12	22 9	0 91	727 4	4 88	0.42	14	-		
	Wallboard Drying Kilns	08, 13, 14	15.2	0 94	435 8	7 32	0 32	11	-		
	Calcining Kettle	03	27 4	1.00	344 2	24 69	4 96	172	-		
	Material Equipment Storage	04	11.3	0 21	294 2	132 0	0 63	22	-		
	Wallboard End Trim System	05	18.3	0.49	294 2	26 8	0.63	21	-		
31DVL160005 Anchor Hocking Glass	Glass Melt Furnace #1	01	17 4	0 91	511 3	19 51	1 28	45		431 5	3357 5
	Glass Melt Furnace #2	02	17 4	0 82	522 4	14 02	1.32	46	-		
	Glass Melt Furnace #3	03	33.2	1 71	429 7	11 58	2 04	71	-		
	Glass Melt Furnace #4	04	35 7	1 58	510 8	11 89	1 83	64	-		
31DVL160039 SCM Glidco Organics	Boiler #3 (Retired)	03	12 2	1 10	658 0	10 06	0.31	18	EXP	435.6	3360.7
	Boiler #4	04	12.2	1 10	405.2	14 02	1 22	42	-		
	Boiler #5	05	15 2	1 10	535 8	12 80	1 27	44	-		
	Boiler #6	06	15.2	1 22	513 6	10 36	1 50	52	-		
	Boiler #7	11	13 7	1 22	449 7	5 49	0 78	10	CON		
	Dryer	07	12 5	1 22	310 9	2 74	0 12	1	-		
	Sodium Acetate Dryer #1	08	12.2	1 22	314 2	6 70	0 12	11	-		
	Sodium Acetate Dryer #2	09	12 5	1 22	310 9	2 44	0 12	11	-		
31DVL160001 JEA - SJRPP	Units #1 & #2	01, 04	194 2	10 12	328 0	18 29	46.44	1615	CON	446 9	3366 3
31DVL160045 JEA - Northside	Steam Generator #1	01	73.2	5 03	400 8	23 16	34 86	1061	-	446 9	3364 8
	Steam Generator #2	02	88 4	5 12	394 1	13 11	29 64	901	-		
	Steam Generator #3	03	103 6	7 01	438 6	19 20	190.24	827	-		
	Combustion Turbines #3 - #6	06 - 09	10 1	6 55	779 7	18.29	9.02	572	-		

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TABLE 3-12 (Cont'd)

TSP/PM-10 Source Data Used in the Modeling Analysis (cont'd)

APIS Number/Facility	Source Description	APIS Source Number	Stack Data (m)		Operating Data		PM Emissions		PM PSD Source (EXP/CON)	UTM (km)	
			Height	Diameter	Temperature (K)	Velocity (m/sec)	(g/s)	(TPY)		East	North
	Auxiliary Boiler A	14	73.2	5.03	671.9	1.22	1.46	1	CON		
	Auxiliary Boiler B	13	76.2	5.03	588.6	0.30	0.44	15	CON		
31DVL160046 JEA - Southside	Steam Generator #1 & #2	01, 02	40.8	2.44	433.0	11.58	9.58	414	-	437.7	3353.9
	Steam Generator #3	03	40.8	3.05	406.9	10.36	7.26	315	-		
	Steam Generator #4	04	43.9	3.35	421.9	11.89	10.03	305	-		
	Steam Generator #5	05	44.2	3.05	416.9	13.72	18.90	821	-		
	Auxiliary Boiler	10	6.7	0.49	493.6	17.68	0.04	1	-		
31DVL160047 JEA - Kennedy	Combustion Turbine #4	04	13.7	2.60	651.9	8.84	9.37	326*	-	440.0	3359.2
	Steam Generator #8	07	45.7	3.20	394.1	7.92	6.82	296	EXP		
	Steam Generator #9	08	45.7	3.20	398.0	7.92	6.82	296	-		
	Steam Generator #10	09	41.5	2.74	410.8	15.54	16.82	731	-		
	Auxiliary Boiler	13	10.1	0.49	493.6	17.68	0.04	1	CON		
31DVL160003 Jefferson Smurfit	Power Boiler #10	11	61.0	3.05	341.5	9.70	5.56	152	CON	439.9	3359.3
	Recovery Boiler #9	05	53.3	3.20	409.8	22.86	15.12	526	-		
	Smelt Dissolving Tank #9	04	53.3	1.65	362.0	4.32	4.59	160	-		
	Lime Kiln #1	06	15.8	1.45	347.0	6.70	2.65	92	EXP		
	Lime Kiln #2	07	15.8	1.45	347.0	6.70	2.65	93	EXP		
	Lime Kiln #3	23	60.7	1.37	340.2	12.22	2.65	92	CON		
	Coal Bark Boiler #1	12	53.3	1.65	366.5	3.96	4.59	160	-		
	Coal Bark Boiler #2	13	61.0	3.05	334.8	10.67	5.56	152	-		
	Coal Handling Silo #1 #2	21, 22, 20	32.9	0.30	298.1	7.01	0.14	4	-		
	Lime Storage Silo	24	27.4	0.52	338.7	2.13	0.02	0.66	-		

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TABLE 3-12 (Cont'd)

TSP/PM-10 Source Data Used in the Modeling Analysis (cont'd)

APIS Number/Facility	Source Description	APIS Source Number	Stack Data (m)		Operating Data		PM Emissions		PM PSD Source (EXP/CON)	UTM (km)	
			Height	Diameter	Temperature (K)	Velocity (m/sec)	(g/s)	(TPY)		East	North
31DVL160072 U S Gypsum	Wallboard Kiln #2	33	13.7	1 07	421 9	28 96	0 77	25	-	439 9	3361 2
	Calcining Kettles #1 - #7	36	28 3	1.07	505 2	0 91	1 47	46	-		
	Dowtherm Heater	41	20 7	0 91	733 0	6 40	0.23	8	-		
	Rotary Kiln	48	26.8	0 49	339 1	59.13	0 20	6	-		
	Combustion Turbine #1 - #2	58 69	36 6	1 01	346.9	24 99	0 15	6	-		
	Ambient Vents #1	5, 36, 40, 73, 78	3.0	1 06	298 1	11 89	0 34	10	-		
	Ambient Vents #2	34, 35, 42, 70, 71, 72	6 1	0 70	294 2	8.84	1 40	29	-		
	Ambient Vents #3	37, 44, 54, 62, 63, 64, 65, 66	0 9	0 61	316 5	8 23	1 17	39	-		
	Stucco Bin No 3 & No 4	6, 7	18 3	0 46	344 2	8 53	0 08	6	-		
	Stucco & Feed Bin	8, 9	21 9	0 30	344.2	19 20	0 07	4	-		
	Kettles	39, 46, 47, 55	22 9	1 22	363 7	3 05	1.18	40	-		
	Storage Bins	43, 58	26 5	0 61	310.4	7 92	0 37	12	-		
	Tube Mill Discharge	45	20 7	0 24	298 7	72.20	0 03**	1 0	-		
	#5 Raymond Mill	60	26 8	0 15	331 5	49 68	0 05	2	-		
	Additive Feed System	61	28.9	0 46	344.2	4 27	0 05	2	-		
	Calcium Carbonate Storage	67	10 1	0 15	305 4	15 24	7.56×10^{-3}	0 2	-		
31DVL160004 Maxwell House	Agglom Process	1, 10 30, 31	14 6	1 0	374 8	15 55	1 14	40	-	439 7	3350 0
	Scrap Paper Cyclone	26, 27 28, 29	21 3	0 03	298	0 61	0 22	8	-		
	Thermalo Afterburner	60 61	27 4	0 49	793	18 98	0 14	5	-		
	Powder Airveyor	21, 22, 18, 20, 52	27 4	0 61	298 1	0 91	0 13	4	-		
	Continuous Roaster	5, D4, 12 16	27 4	0 61	311.5	19 81	0 58	20	-		
	Boiler #2	4	45 7	0 43	396 9	67 97	0 72	25	-		

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TABLE 3-12 (Cont'd)

TSP/PM-10 Source Data Used in the Modeling Analysis (cont'd)

APIS Number/Facility	Source Description	APIS Source Number	Stack Data (m)		Operating Data		PM Emissions		PM PSD Source (EXP/CON)	UTM (km)	
			Height	Diameter	Temperature (K)	Velocity (m/sec)	(g/s)	(TPY)		East	North
	Green Coffee Silo	F0, F1, F2, F3, F4, F5, 53, 55, 56, 57, 58, 59, 23, 24, 25, 54	27 4	0 31	306 5	14 33	0 40	14	-		
	Cooling Carts	32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51	30.5	0.18	310 9	18.29	1 84	64	-		
	Thermalo Roaster #1	7	45.7	0 79	844.2	9 75	0.75	26	-		
	Roaster Afterburner	D3	27 4	2 29	811 5	3.66	0.31	11	-		
	Soluble Coffee Spray Dryer	6, 8, 9	47 2	1 07	383 7	18.59	2.20	76	-		
	Dryer	D5, D6, D7, D8, E0, E1, D2, 14, 15, 17	23.2	1 49	327 6	7 93	0 64	22	-		
	Boiler #1	D1, 98, 2, 3	45.7	0 98	606 9	0 61	0 42	14	-		
	Probat Afterburners	E2, E3, E4, E5, 77, 78, 79, 80, 81, 82, 83, 84, 85 86	27 4	1 0	737 6	7 93	1 24	43	-		
	Thermalo Stoner Cyclone	64, 65, 62, 63, 66, 87, 89, 90, 88, Z9, E6, E7, E8, E9, 97, B1, B2, B3, B4-B9, C1-C9, 67-76, 91-96, D9, F6, A1, A2, A3 A4, A5, A7, A8, A9	27.4	0 61	308 1	7.93	4.46	156	-		

* Calculated based on allowable lb/hr of particulates permitted
** Annual TPY allowable were given, calculated lb/hr

TABLE 3-13

NO_x Source Data Used in the Modeling Analysis

APIS Number/Facility	Source Description	APIS Source Number	Stack Data (m)		Operating Data		NO_x Emissions		NO_x PSD Source (EXP/CON)	UTM (km)	
			Height	Diameter	Temperature (K)	Velocity (m/sec)	(g/s)	(TPY)		East	North
31DVL160213 U S. Naval Station - Mayport	Boiler #1 - #3, Bldg 1241	01, 02, 03	12.2	0.91	544 1	14 33	9.67	336	-	460.4	3362 8
	Boiler #1 - #2, Bldg 250	04, 08	14 0	1 22	560 8	7 92	5 58	194	-		
	Hot Water Boiler B-1	11	15 5	0 24	477 4	7.32	9 69 x 10 $^{-3}$	337	-		
31DVL160005 Anchor Hocking Glass	Glass Melt Furnace #2	02	17.4	0 82	522 4	14.02	5 00	174	-	431 5	3357 5
	Glass Melt Furnace #3	03	33 2	1 71	429 7	11.58	8 91	310	-		
	Glass Melt Furnace #4	04	35 7	1.58	510 8	11 89	6 84	238	-		
31DVL160006 Anheuser Busch	Boiler #1 - #4	01 - 04	30.5	1 07	483 0	17 37	9 78	340	-	437 9	3366.8
	Grain Dryers #1 & #2	05, 06	21 3	1.68	322 0	9 00	3 59	125	-		
	Wastewater Boiler	30	12 19	0 52	477.6	5 49	0 15	5,3	-		
	Anerobic & Bio Gas Flare	31,32	6 1	2 20	1000 0	15 00	1.20	41.6	-		
31DVL160039 SCM Glidco Organics	Boiler #4	04	12.2	1 10	405 2	14 02	1 64	57 (P)	-	435.6	3360 7
	Boiler #7	11	13 7	1.22	449 7	5.49	0 92	32	-		
31DVL160045 JEA - Northside	Steam Generator #1	01	73.2	5 03	400 8	23 16	187 10	6504 (P)	-	446.9	3364.8
	Steam Generator #2	02	88 4	5 12	394 1	13 11	130 86	4549 (P)	-		
	Steam Generator #3	03	103 6	7 01	438 6	19.20	190.24	6613	-		
	Combustion Turbines #3 - #6	06 - 09	10 1	6,55	779 7	18.29	72 17	2509 (A)	-		
	Auxiliary Boiler A	14	73.2	5 03	671 9	1 22	8.26	287 (P)	-		
	Auxiliary Boiler B	13	76 2	5 03	588 6	0 30	0 58	20 (P)	-		
31DVL16001 JEA - SJRPP	Units #1 & #2	01 04	194 2	10 12	328 0	18 29	928.97	32293	-	446.9	3366 3
31DVL160046 JEA - Southside	Auxiliary Boiler	10	6 7	0.49	493.6	17 68	0 09	3	-	437 7	3353 9
31DVL160047 JEA - Kennedy	Combustion Turbines #3 - #6	03 - 06	13 7	2 77	651 9	8 84	5 81	202 (A)	-	440 0	3359 2
	Steam Generator #10	09	41 5	2 74	410.8	15 54	115 63	4019 5 (A)	-		
	Auxiliary Boiler	13	10 1	0 49	493 6	17 68	0 34	11 78 (P)	-		

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TABLE 3-13 (Cont'd)

NO_x Source Data Used in the Modeling Analysis

APIS Number/Facility	Source Description	APIS Source Number	Stack Data (m)		Operating Data		NO_x Emissions		NO_x PSD Source (EXP/CON)	UTM (km)	
			Height	Diameter	Temperature (K)	Velocity (m/sec)	(g/s)	(TPY)		East	North
31DVL160003 Jefferson Smurfit	Power Boiler #10	11	61.0	3.05	341.5	9.70	38.89	1352	-	439.9	3359.3
	Recovery Boiler #9	05	53.3	3.20	409.8	22.86	4.32	150	-		
	Bark/Coal Boiler	13	60.96	3.05	334.8	10.67	38.89	1352	-		
31DVL160072 U.S. Gypsum	Wallboard Kiln #2	33	13.7	1.07	421.9	28.96	0.98	34 (P)	-	438.9	3361.2
	Calcining Kettles #1 - #7	36	28.3	1.07	505.2	0.91	4.43	154	-		
	Dowtherm Heater	41	20.7	0.91	733.0	6.40	0.29	10 (P)	-		
	Rotary Kiln	48	26.8	0.49	339.1	59.13	0.98	34	-		
	Wall Board Kiln #3	59	29.0	2.04	369.1	1.52	2.70	94	-		
	Combustion Turbine #1 - #2	68,69	36.6	1.01	346.9	24.99	3.05	106	-		
31DVL160215 Naval Air Station - Roosevelt	Bldg #104 Boiler	01	13.72	1.40	505.4	11.58	4.11	143	-	434.2	3342.8
	Power Plant #2 Boilers	02	39.62	2.13	505.4	3.66	0.76	26.3 (P)	-		
	Power Plant #3 Boilers	05	13.72	1.37	505.4	8.23	0.35	11.6 (P)	-		
	Enoine Test Cells 7, 8, 9	07	3.66	3.81	310.9	6.10	0.18	6.26 (P)	-		
	Enoine Test Cells 11 & 12	10	7.62	4.82	505.4	17.07	5.24	182	-		

(P) Denotes potential emissions used when allowable were not available.
(Δ) Denotes calculated tons per year from lb/hr data.

TABLE 3-14

SO2 Facilities Other Than SKC and CBCP Originally Considered in the Modeling Analysis

APIS#	Source Name	UTM (km)		Location Relative To Seminole Kraft (km)		Distance (km)	Direction (deg)	Q, Emission Threshold (Dist-SIA X 20)	SO_2 Emissions (TPY)	Included in Modeling Analysis
		East	North	X	Y					
31DVL160025	Atlantic Coast Asphalt	440.0	3364.1	-1.8	-1.5	2.3	230	SIA	73	NO
31DVL160069	Georgia Pacific	440.1	3368.3	-1.7	2.7	3.2	328	SIA	207	YES
31DVL160113	Sears Catalog Cntr	438.2	3365.9	-3.6	0.3	3.6	275	SIA	2	NO
31DVL160006	Anheuser Busch	437.9	3366.8	-3.9	1.2	4.1	287	SIA	2,848	YES
31DVL160045	JEA-Northside	446.9	3364.8	5.1	-0.8	5.1	97	SIA	96,407	YES
31JAX160001	JEA-SJPP	446.9	3366.3	5.1	0.7	5.1	82	SIA	40,904	YES
31DVL160072	U.S. Gypsum	438.9	3361.2	-2.9	-4.4	5.3	213	SIA	1,201	YES
31DVL160202	Celotex	446.4	3362.6	4.6	-3	5.5	123	SIA	740	YES
31DVL160028	Steuart Petrol. Comp.[a]	438.5	3360.5	-3.3	-5.1	6.1	213	SIA	63	NO
31DVL160228	Oxce Fuel Company[d]	438.5	3360.5	-3.3	-5.1	6.1	213	SIA	0	NO
31DVL160148	Occidental Chemical	439.3	3359.8	-2.5	-5.8	6.3	203	SIA	434	YES
31DVL160003	Jefferson Smurfit	439.9	3359.3	-1.9	-6.3	6.6	197	SIA	2,187	YES
31DVL160047	JEA-Kennedy	440.0	3359.2	-1.8	-6.4	6.7	195	SIA	18,820	YES
31DVL160188	Coastal Fuels Marketing	439.7	3358.7	-2.1	-6.9	7.2	197	SIA	64	NO
31DVL160039	SCM Glidco Organics	435.6	3360.7	-6.2	-4.9	7.9	232	SIA	2,409	YES
31DVL160280	B.F. Goodrich	450.0	3365.5	8.2	-0.1	8.2	91	SIA	58	NO
31DVL160146	J.W. Swisher	437.9	3357.9	-3.9	-7.7	8.6	207	SIA	292	YES

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TABLE 3-14 (Cont'd)

SO2 Facilities Other Than SKC and CBCP Originally Considered in the Modeling Analysis

APIS#	Source Name	UTM (km) East	UTM (km) North	Location Relative To Seminole Kraft (km) X	Location Relative To Seminole Kraft (km) Y	Distance (km)	Direction (deg)	Q_c Emission Threshold (Dist-SIA X 20)	SO_2 Emissions (TPY)	Included in Modeling Analysis
31DVL160142	Jax Univ. Hospital	436.5	3357.2	-5.3	-8.4	9.9	212	SIA	1	NO
31DVL160184	Rinker Materials	439.5	3355.6	-2.3	-10	10.3	193	SIA	5	NO
31DVL160246	Environmental Tech.	439.4	3355.0	-2.4	-10.6	10.9	193	SIA	10	NO
31DVL160015	Cathedral Towers	437.1	3355.4	-4.7	-10.2	11.2	205	SIA	0.3	NO
31DVL160154	Jax Shipyards	438.5	3354.5	-3.3	-11.1	11.6	197	SIA	5	NO
31DVL160198	ES Metals[c]	431.8	3358.3	-10	-7.3	12.4	234	SIA	-838	YES
31DVL160046	JEA-Southside	437.7	3353.9	-4.1	-11.7	12.5	200	SIA	17,543	YES
31DVL160155	Gulf Life Insurance	436.2	3354.1	-5.6	-11.5	12.8	206	SIA	103	YES
31DVL160199	National Linen Service	434.9	3354.8	-6.9	-10.8	12.8	213	SIA	50	NO
31DVL160005	Anchor Glass	431.5	3357.5	-10.3	-8.1	13.1	232	SIA	644	YES
31DVL160074	Atlantic Coast Asphalt	429.5	3359.7	-12.3	-5.9	13.6	244	SIA	73	NO
31DVL160042	Duval Asphalt Products[b]	428.7	3361.4	-13.1	-4.2	13.8	252	SIA	1,270	YES
31DVL160104	Memorial Hospital	442.2	3351.0	0.4	-14.6	14.6	178	SIA	1	NO
31DVL160068	St. Vincents Med. Cntr.	433.9	3353.0	-7.9	-12.6	14.9	212	SIA	1	NO
31DVL160010	Baptist Medical Cntr.	435.4	3352.0	-6.4	-13.6	15.0	205	0.6	483	YES
31DVL160004	Maxwell House	439.7	3350.0	-2.1	-15.6	15.7	188	14.8	399	YES
31DVL160097	Anheuser Busch	428.4	3356.4	-13.4	-9.2	16.3	236	25.1	2	NO
31DVL160061	Union Camp	427.6	3357.3	-14.2	-8.3	16.4	240	29.0	615	YES

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TABLE 3-14 (Cont'd)

SO2 Facilities Other Than SKC and CBCP Originally Considered in the Modeling Analysis

APIS#	Source Name	UTM (km) East	UTM (km) North	Location Relative To Seminole Kraft (km) X	Location Relative To Seminole Kraft (km) Y	Distance (km)	Direction (deg)	Q, Emission Threshold (Dist-SIA X 20)	SO_2 Emissions (TPY)	Included in Modeling Analysis
31DVL160232	Duval Asphalt Products	427.0	3357.7	-14.8	-7.9	16.8	242	35.5	22	NO
31DVL160213	U.S. Naval Station - Mayport	460.4	3362.8	18.6	-2.8	18.8	99	76.2	917	YES
31DVL160235	University of N. Florida	451.2	3348.5	9.4	-17.1	19.5	151	90.3	45	NO
31DVL160282	Sloan Construction	439.6	3346.0	-2.2	-19.6	19.7	186	94.5	37	NO
31DVL160043	Duval Asphalt Products	443.2	3344.0	1.4	-21.6	21.6	176	132.9	384	YES
31DVL160215	Naval Air Station - Roosevelt	434.2	3342.8	-7.6	-22.8	24.0	198	180.7	1	NO
31JAX450003	Container Corp.	456.2	3394.2	14.4	28.6	32.0	27	198.8	16,032	YES
31DVL160026	Atlantic Coast Asphalt	445.3	3339.6	3.5	-26	26.2	172	224.7	73	NO
31JAX450004	ITT Rayonier	454.7	3392.2	12.9	26.6	29.6	26	291.3	6,884	YES
31DVL160270	Columbia Paving	448.2	3336.6	6.4	-29	29.7	168	294.0	46	NO
31DVL160218	Naval Air Station - Cecil	415.2	3344.5	-26.6	-21.1	34.0	232	379.0	80	NO
31DVL160157	Florida Steel - Baldwin	405.9	3350.2	-35.9	-15.4	39.1	247	481.3	84	NO
	Gilman Paper	448.2	3401.3	6.4	35.7	36.3	10	425.4	7,271	YES

Note: SIA = The facility is within the significant impact area and therefore is included in the modeling analysis unles emissions are less than 100 TPY.
Dist-SIA = The distance from Seminole Kraft to the given facility minus the SKC package boiler significant impact distance of 15 km.
a) Formerly Eastern Seaboard.
b) Formerly Wiley Jackson Company.
c) Baseline source that shut down. All emissions are increment expanding.
d) PSD source that shut down in 1989.

where D is:

1. The distance (km) from SKC and CBCP to the source undergoing evaluation for short-term analysis, or

2. The distance (km) from SKC's significant impact area (SIA) (15 km for SO_2) to the source undergoing evaluation for long-term analysis.

For this analysis, the long-term criteria were used since fewer facilities would be eliminated than with the short-term criteria and would thus result in a more conservative approach. Facilities that were within SKC's SIA (15 km) were eliminated from the analysis based on their total emissions being less than 100 TPY. Beyond the SKC SIA, facilities were excluded only by the North Carolina technique's long-term criteria.

All stack, SO_2 emissions, and operating information, presented in Table 3-11, were obtained from the Air Pollutant Information System (APIS) for the year 1991. The stack, emission, and operation data presented for Container Corporation and Gilman Paper were available from prior PSD applications and modeling analyses. Some corrections to the Anheuser Busch APIS source inventory were provided by Anheuser Busch. Both current and baseline source data for Jefferson Smurfit were obtained from operating permits and a previous PSD permit application. Data for ES Metals were obtained from a prior PSD application submitted by Jefferson Smurfit Corporation.

For the AAQS analysis, sources within one facility were sometimes combined if their stack heights were the same and the sources had similar operating parameters. Some small sources were combined with larger sources (emissions were simply added together).

Two modeling SO_2 emission inventories were prepared for the modeling effort: one that includes all current SO_2 emissions to be used for the total source impact assessment (AAQS analysis) and a second containing only PSD increment expanding and consuming sources, to be used for the PSD increment consumption analysis (for both PSD Class I and II).

PM and NO_x Inventories

Background source inventories for both NO_x and particulate matter were developed by ENSR using information from DER's Air Program Information System (APIS). The inventory development procedure included obtaining a listing of all sources in Duval County, determining which were considered major sources, and identifying corresponding source parameters.

Facility Emission Reports from APIS for the years 1975 through 1991 were obtained from DER for Duval County. The first step in the inventory development was the identification of major

sources (i.e., potential to emit 100 tons per year or more). The Facility Emission Reports list potential, allowable, and estimated emission rates. Using guidance provided by DER (T. Rogers communication with J. Yuhas (ENSR), 10/21/92) allowable emission rates were used in determining if a source would be considered a major source. Following this guidance, a listing of major sources, for both NO_x and particulate matter, was developed for Duval County.

APIS Master Detail Reports also provided by DER, were used to identify corresponding stack parameters for the previously identified major sources. Sources were combined, following DER guidance (T. Rogers and J. Yuhas, 10/21/92) using conservative procedures to target those sources that needed to be included in the model run.

Finally, based on the SO_2 background source inventory (Table 3-11), sources appearing in the particulate matter and NO_x inventories that were identified as either increment consuming or expanding sources in the SO_2 inventory were similarly considered as either increment consuming or expanding sources. The Jacksonville DER office has confirmed that the identified sources are indeed either PSD increment consuming or expanding sources (A. Kutyna and S. Cullen (DER) communication with A. Hallquist (ENSR), 1/15/93 and 1/27/93). The PM and NO_x inventories are presented in Tables 3-12 and 3-13, respectively. In addition, as a conservative measure, and since sources outside Duval County were not considered, the North Carolina "Screening Threshold" method was not applied in the development of the particulate matter and NO_x inventories. Consequently, all identified major sources were modeled in the analysis.

Building Dimension Parameters

For many sources included in the SO_2, PM, and NO_x inventories (Tables 3-11 through 3-13), the City of Jacksonville provided ENSR with applicable building dimension data. These data, as presented in Table 3-15, represent worst case building dimensions appropriate for conservatively assessing the effects of building downwash and were incorporated into the modeling analysis.

3.4 Background SO_2, PM_{10}, NO_2, and Lead Concentrations

For comparison of total ambient concentrations to the AAQS, background concentrations are estimated to account for sources that are not explicitly included in the atmospheric dispersion modeling analysis.

Background concentrations of AAQS criteria pollutants are typically estimated by examining monitoring data in the region of the sources being modeled. In the absence of representative existing monitoring data, the PSD program has a provision for requiring the applicant to conduct pre-application monitoring. This provision is triggered when the proposed source's modeled impacts exceed certain "significant monitoring concentrations". A comparison of the CBCP impacts to the significant monitoring concentrations is presented in Table 3-16. Predicted impacts

TABLE 3-15

Background Source Building Dimensions[a]

Facility Name	Distance from Cedar Bay (km)	Building Dimensions		
		Stack	Height (m)	MPW* (m)
Anheuser Busch	3.92	Boilers #1-4	28.65	67.97
US Gypsum	5.12	Cal. Kettles #1-7	6.98	110.00**
		Board Kiln #2	6.98	110.00**
		Rotary Rock Dryer	6.98	110.00**
		Dowtherm Heater	6.98	110.00**
JEA-Northside	5.32	#1,2,&3 Steam Generators	31.70	176.80
JEA-SJRPP	5.34	Steam Gen #1&2	81.20	32.00
Celotex	5.62	Wallboard Drying Kiln	9.14	259.08
		Cal. Kettle Burners #1-3	15.24	49.94
Jefferson Smurfit	6.47	#9 Smelt Dissolving Tank	32.00	28.40
		#10 Bark/Coal Boiler	48.50	24.90
		Recovery Boiler	32.00	28.40
JEA-Kennedy	6.64	Boilers #8,9,10A & 10B	22.60	101.80**
SCM Glidco	7.72	Boilers #4-7	9.14	39.93
JEA-Southside	12.41	Boilers #3,4,5A & 5B, Aux Boiler #1	25.00	157.10**
Union Camp	16.25	Boilers #2 & 3, Incinerator	7.37	28.65
US Naval Station-Mayport	18.99	Boilers #1 & 2, Bldg 250	7.62	21.95
		Boilers #1,2 & 3, Bldg 1241	8.23	29.57
		Carbonaceous Fuel Boiler	13.41	54.86

*Maximum projected width
**Calculated from building length and width provided by the City of Jacksonville
a) Provided by City of Jacksonville RESD Air Quality Division (AQD). Fax from Lori Tilly (AQD) to J. Yuhas (ENSR), 12/4/92

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TABLE 3-16

Impacts of the CBCP (as proposed to be modified) Compared to Significant Monitoring Concentrations of Criteria Air Pollutants

Pollutant	Averaging Period	Significant Monitoring Concentration ($\mu g/m^3$)	Maximum CBCP Concentration ($\mu g/m^3$)
CO	8-hour	575	22.1
NO_2	Annual	14	3.16
SO_2	24-hour	13	33.4
PM-10	24-hour	10	29.8
Ozone[a]		100 tpy (VOC)	179.3 tpy (VOC)
Lead	3-month	0.1	0.00081

(a)No specific concentration for ozone is prescribed. Exemptions granted for VOC emissions less than 100 tpy.

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are above the significant monitoring concentrations for SO_2 and PM-10, while maximum annual VOC emissions are above the ozone related VOC significant monitoring emission rate.

Air quality data for each of these pollutants is readily available from state operated monitors in Duval County. The following paragraphs describe the monitors and the data reviewed to develop reasonable estimates of background concentrations for use in the AAQS compliance analysis.

In order to estimate reasonable background SO_2 concentrations, a review of recent, available SO_2 monitoring data in Duval County was performed. Table 3-17 lists all of the continuous SO_2 monitors currently in operation in Duval County and their respective location relative to Cedar Bay. Annual average, and second-highest 24-hour and 3-hour concentrations for SO_2 for each monitor are shown in the table. The Ft. Caroline STP monitor ceased operation in March, 1990. All of the other five monitors' data recoveries exceeded 95 percent for that year. All stations except Kooker Park reported the lowest annual average SO_2 concentrations in 1990.

Highest short-term and annual average concentrations measured at these stations could have significant contributions from major SO_2 point sources. Use of the highest short-term and annual average SO_2 concentrations from any of these stations could over-estimate the actual background SO_2 concentrations, since major sources of SO_2 (>100 tpy) are explicitly included in the dispersion modeling analysis, and their impacts could be double counted.

Therefore, it is reasonable to select the lowest of the second-highest short-term and annual average concentrations reported at any of the monitoring stations as the SO_2 background concentrations to be used in the compliance analysis. Referring to Table 3-17, these concentrations are 68 $\mu g/m^3$, 3-hour; 28 $\mu g/m^3$, 24-hour; and 5 $\mu g/m^3$, annual average. These were all measured at the Minerva Street monitoring station.

Available data for PM_{10} and NO_2 are shown in Tables 3-18 and 3-19, respectively. The same reasoning applies to these data in terms of major source influences and potential double counting of source impacts being modeled. Therefore, the lowest of the second-highest short-term and annual average concentrations are selected for use in the compliance analyses. Note that the concentrations are well below the applicable AAQS.

Lead concentrations were also measured at two sites in Jacksonville, Kooker Park and Roselle & Copeland. All quarterly lead concentrations at these two sites for the three year period 1989-1991 were reported as 0.0 $\mu g/m^3$. Therefore, lead background concentrations of 0.0 were included in the impact evaluation.

TABLE 3-17

Summary of Continuous SO_2 Air Quality Data in Duval County, 1989 - 1991

SAROAD Site No. (Distance Away)	Location	Monitoring Method	Period	No. of Obs.	Percent Data Recovery	SO_2 Concentration (µg/m³)		
						3-Hour[a]	24-Hour[a]	Annual Average
1960-081-HO2 (1.4 km)	Cedar Bay STP	Continuous	1989	8410	96.0	122	38	8
			1990	8517	97.2	140	42	7
			1991	8315	94.9	187	41	7
1960-094-HO2 (3.5 km)	9501 August Rd.	Continuous	1989	8186	93.4	211	58	8
			1990	8388	95.8	198	54	7
			1991	8060	92.0	169	55	7
1960-079-HO2 (5.6 km)	Ft. Caroline STP	Continuous	1989	8071	92.1	167	71	8
			1990[b]	1689	19.3	86	34	6
			1991					
1960-094-HO2 (7.3 km)	5060 Cedar Pt. Rd.	Continuous	1989	6776	77.4	225	70	10
			1990	8547	97.6	137	38	6
			1991	8181	93.4	206	45	5
1960-032-HO2 (7.9 km)	Kooker Park	Continuous	1989	7586	86.6	129	33	6
			1990	8401	95.9	107	35	8
			1991	8172	93.3	108	32	7
1960-080-HO2 (13.4 km)	1605 Minerva St.	Continuous	1989	7536	86.0	107	35	7
			1990	8439	96.3	68	28	5
			1991	8372	95.6	83	30	6

Note
km = kilometers.
No. of Obs. = number of observations
SO_2 = sulfur dioxide
µg/m³ = micrograms per cubic meter.

[a]Second-highest concentrations for calendar year are shown.
[b]Ceased operations 3/90

Source: Florida DER, 1989, 1990, 1991.

TABLE 3-18

Summary of PM-10 Air Quality Data in Duval County, 1989-1991

					PM10 Concentration (µg/m^3)	
SAROAD Site	Location	Monitoring Method	Period	No. of Obs.	24-Hr[(a)]	Annual
1960-004	1070 E. Adams St	64	1989	32	57	38
			1990	60	56	34
			1991	60	53	28
1960-053	Sewage Treatment Plant 2221 Buckmans	64	1989	3	32	32
			1990	61	61	32
			1991	60	50	31
1960-084	Roselle & Copeland	64	1989	59	58	35
			1990	61	60	32
			1991	60	59	32

[(a)]Second-highest for calendar year.

TABLE 3-19

Summary of NO_2 Air Quality Data

SAROAD Site No.	Location	Monitoring Method	Period	No. of Obs.	Percent Data Recovery	NO_2 Concentration ($\mu g/m^3$) Annual
1960-032	Kooker Park	Continuous	1989 1990 1991	7815 8169 8055	89.2 93.3 91.9	29 28 25

Table 3-20 summarizes all of the background concentrations selected. These are added to the modeled impacts of major sources and the totals compared to the applicable AAQS.

As discussed in the following section, no significant impact on ozone concentrations is expected from the CBCP due to offsetting VOC emissions from SKC. However, for completeness with regard to pre-application monitoring provisions, the observed concentrations of ozone at Duval County monitors are summarized in Table 3-21. The 1-hour maxima are presented for each of the three years investigated. All of the concentrations are less than the 0.12 ppm AAQS.

3.5 AAQS and PSD Class II Increment Compliance Evaluation for Receptors in the CFB Boiler Building Cavity Region

As discussed earlier, impacts of the CBCP Limestone Dryer emissions in the cavity region of the CFB boiler building were calculated for use in the compliance evaluation. Tables 3-22 and 3-23 present the results of the analysis of all applicable sources for comparison to the AAQS and PSD increments, respectively. For the AAQS compliance evaluation, Table 3-22 lists the modeled total impact from all sources, other than the limestone dryers, at the receptors within the cavity region, the impact from the limestone dryers as calculated by the SCREEN model, the background concentration and the total ambient concentration for comparison to the AAQS. As shown in the table, the total predicted ambient concentrations are less than the AAQS. Impacts for CO and Pb are not listed since the CBCP's impacts of these pollutants are insignificant, as will be shown in the following section. For the PSD increment compliance evaluation, Table 3-23 lists the modeled total increment consumption in the cavity region from PSD increment consuming and expanding sources, other than the limestone dryers, the impact from the limestone dryers as calculated by the SCREEN model and the total increment consumption for comparison to the allowable PSD increments. As shown in the table, the predicted total increment consumption is below the allowable increments for each pollutant and averaging period.

The following two sections present the findings for the AAQS compliance evaluations for all ambient air receptors.

3.6 Findings for the AAQS Compliance Evaluation

The results of the modeling for the CBCP alone, as proposed to be modified, are presented in Tables 3-24 through 3-28 for the pollutants CO, NO_2, PM-10, Pb, and SO_2. Each table lists the maximum predicted impact of the CBCP and the location of the model receptor at which the impact is predicted for each applicable AAQS averaging period and each year of meteorological data modeled. The significant impact (SIL) level is also listed for the applicable pollutant and

TABLE 3-20

Background Concentrations Used in the AAQS Compliance Evaluation

Site	Location	Pollutant	Period	Concentration ($\mu g/m^3$)
1960-080	1605 Minerva St.	SO_2	3H 24H Annual	68 28 5
1960-032	Kooker Park	NO_2	Annual	25
1960-053 1960-004	Sewage Treatment Plant 1070 E. Adams St.	PM_{10}	24H Annual	32 28

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TABLE 3-21

Summary of Continuous Ozone Air Quality Area in Duval County, 1989-1991

Saroad Site No.	Location	Period	Percent Data Recovery	1-Hour Ozone Maxima (ppm)
1960-070-H01	Jacksonville Naval Air Station	1989	82.1	0.119
		1990	85.6	0 113
		1991	95.0	0.095
1960-070-H03	Sheffield School 13333 Lanier Road Jacksonville	1989	93.6	0.107
		1990	94.3	0.111
		1991	96.8	0.084

TABLE 3-22

AAQS Compliance Evaluation For Impacts in CFB Boiler Housing Cavity Region

			Predicted Concentrations ($\mu g/m^3$)				
			Modeled Total[(a)(b)]	Limestone Dryers Impact	Background	Total	AAQS
SO_2	3-hr	1983	406.0	179.2	68	653.2	1300
		1984	406.2			653.4	
		1985	528.4			775.6	
		1986	330.5			577.7	
		1987	349.0			596.2	
	24-hr	1983	122.7	26.5	28	177.2	260
		1984	132.3			186.8	
		1985	132.0			186.5	
		1986	110.5			165.0	
		1987	140.1			194.6	
	Annual	1983	32.0	6.64	5	43.6	60
		1984	31.5			43.1	
		1985	34.7			46.3	
		1986	31.1			42.7	
		1987	29.4			41.0	
PM_{10}	24-hr	1983	18.3	8.01	32	58.3	150
		1984	20.8			60.8	
		1985	21.1			61.1	
		1986	18.9			58.9	
		1987	17.2			57.2	
	Annual	1983	5.38	1.94	28	35.3	50
		1984	5.53			35.5	
		1985	6.03			36.0	
		1986	5.87			35.8	
		1987	5.42			35.4	

TABLE 3-22 (Cont'd)

AAQS Compliance Evaluation For Impacts in CFB Boiler Housing Cavity Region

			Predicted Concentrations ($\mu g/m^3$)				
			Modeled Total[a][b]	Limestone Dryers Impact	Background	Total	AAQS
NO_2	Annual	1983	6.53	3.16	25	34.7	100
		1984	6.41			34.6	
		1985	7.01			35.2	
		1986	5.93			34.1	
		1987	5.74			33.9	

[a]Highest Second-High for 3- and 24-hour, Highest Annual
[b]From all sources other than CBCP Limestone Dryers

TABLE 3-23

PSD Increment Compliance Evaluation for Impacts in CFB Boiler Housing Cavity Region

			Predicted Concentrations ($\mu g/m^3$)			
			Modeled Total Increment Consumption[a][b]	Limestone Dryers Impact	Total	Allowable PSD Class II Increment
SO_2	3-hr	1983	105.5	179.2	284.7	512
		1984	112.5		291.7	
		1985	99.2		278.4	
		1986	106.6		283.8	
		1987	116.7		295.9	
	24-hr	1983	29.4	26.5	55.9	91
		1984	27.8		54.3	
		1985	29.2		55.7	
		1986	26.1		52.6	
		1987	25.9		52.4	
	Annual	1983	2.23	6.64	8.87	20
		1984	1.64		8.28	
		1985	2.19		8.83	
		1986	1.42		8.06	
		1987	1.82		8.46	
TSP	24-hr	1983	17.2	8.01	25.2	37
		1984	19.0		27.0	
		1985	21.1		29.1	
		1986	17.7		25.7	
		1987	17.4		25.4	
	Annual	1983	3.86	1.94	5.80	19
		1984	3.59		5.53	
		1985	3.92		5.86	
		1986	3.98		5.92	
		1987	3.92		5.86	

TABLE 3-23 (Cont'd)

PSD Increment Compliance Evaluation for Impacts in CFB Boiler Housing Cavity Region

			Predicted Concentrations ($\mu g/m^3$)			
			Modeled Total Increment Consumption[a][b]	Limestone Dryers Impact	Total	Allowable PSD Class II Increment
NO_x	Annual	1983	3.16	3.16	3.16	25
		1984	3.16		3.16	
		1985	3.16		3.16	
		1986	3.16		3.16	
		1987	3.16		3.16	

[a]Highest Second-High for 3, 24-hour, Highest Annual
[b]From all PSD sources other than CBCP Limestone Dryers and SKC Sources (Cavity on SKC Property)

TABLE 3-24

Maximum Predicted CO Impacts Due To The CBCP As Proposed to be Modified

Averaging Period	Meteorological Year	Concentration ($\mu g/m^3$)	Location[a]		SIL ($\mu g/m^3$)
			Distance (km)	Azimuth (deg)	
1-Hour	1983	54.9	1.25	270	2000
	1984	54.6	1.0	180	
	1985	65.6	1.0	70	
	1986	64.5	1.0	240	
	1987	55.0	1.25	50	
8-Hour	1983	22.1	0.155	59	500
	1984	20.5	0.155	59	
	1985	16.7	[b]	[b]	
	1986	16.7	[b]	[b]	
	1987	19.7	0.152	51	

[a] Relative to the CFB Boilers Stack
[b] Impact falls within CFB building cavity region

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TABLE 3-25

Maximum Predicted Annual Average NO_2 Impacts Due To The CBCP As Proposed to be Modified

Meteorological Year	Concentration ($\mu g/m^3$)	Location[a]		SIL ($\mu g/m^3$)	Significant Impact Distance[b] (km)
		Distance (km)	Azimuth (deg)		
1983	3.16	[c]	[c]	1.0	0.2
1984	3.16	[c]	[c]	1.0	0.2
1985	3.16	[c]	[c]	1.0	0.2
1986	3.16	[c]	[c]	1.0	0.2
1987	3.16	[c]	[c]	1.0	0.2

[a]Relative to the CFB Boilers Stack
[b]Furthest Distance Beyond Which Impacts Are Less Than SILs
[c]Impact falls within CFB Building cavity region

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TABLE 3-26

Maximum Predicted PM-10 Impacts Due To The CBCP As Proposed to be Modified

Averaging Period	Meteorological Year	Concentration ($\mu g/m^3$)	Location[a]		SIL ($\mu g/m^3$)	Significant Impact Distance[b] (km)
			Distance (km)	Azimuth (deg)		
24-Hour	1983	26.4	[c]	[c]	5.0	1.00
	1984	26.6	[c]	[c]		1.25
	1985	29.8	[c]	[c]		1.00
	1986	27.0	0.370	351		1.00
	1987	24.6	[c]	[c]		0.90
Annual	1983	5.08	[c]	[c]	1.0	0.50
	1984	4.81	[c]	[c]		0.50
	1985	5.23	[c]	[c]		0.50
	1986	5.13	[c]	[c]		0.50
	1987	5.14	[c]	[c]		0.50

[a]Relative to CFB Boiler Stack
[b]Furthest Distance Beyond Which Impacts Are Less Than SILs
[c]Impact falls within CFB Building cavity region

TABLE 3-27

Maximum Quarterly Predicted Pb Impacts Due To The CBCP As Proposed to be Modified

Meteorological Year	Concentration ($\mu g/m^3$)	Location[a]		SIL ($\mu g/m^3$)
		Distance (km)	Azimuth (deg)	
1983	8.1e-04[b]	[c]	[c]	0.03
1984	8.1e-04[b]	[c]	[c]	
1985	8.1e-04[b]	[c]	[c]	
1986	8.1e-04[b]	[c]	[c]	
1987	8.1e-04[b]	[c]	[c]	

AAQS = 1.5 $\mu g/m^3$ on a 3-month average. Background is below detectable
[a]Relative to the CFB Boilers Stack
[b]24-hour impact for conservatism
[c]Impact falls within CFB Building cavity region

TABLE 3-28

Maximum Predicted SO_2 Impacts Due To The CBCP As Proposed to be Modified

Averaging Period	Meteorological Year	Concentration ($\mu g/m^3$)	Location[a]		SIL ($\mu g/m^3$)	Significant Impact Distance[b] (km)
			Distance (km)	Azimuth (deg)		
3-Hour	1983	204.8	0.155	59	25.0	1.5
	1984	228.0	0.152	51		1.75
	1985	179.2	[c]	[c]		2.5
	1986	184.6	0.152	51		2.5
	1987	298.1	0.152	51		2.5
24-Hour	1983	31.6	0.155	59	5.0	3.5
	1984	27.1	0.152	51		4.0
	1985	26.5	[c]	[c]		4.5
	1986	26.5	[c]	[c]		4.5
	1987	33.4	0.152	51		4.5
Annual	1983	6.64	[c]	[c]	1.0	0.3
	1984	6.64	[c]	[c]		0.3
	1985	6.64	[c]	[c]		0.4
	1986	6.64	[c]	[c]		0.4
	1987	6.64	[c]	[c]		0.3

[a]Relative to CFB Boiler Stack
[b]Furthest Distance Beyond Which Impacts Are Less Than SILs
[c]Impact falls within CFB Building cavity region

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averaging period. Although no SIL for Pb has yet been promulgated by EPA, the Florida SIL is listed for comparison. See Florida Administrative Code, 17.212.100 (63)(e).

The results for CO are all well below the SILs. For this reason, CO was eliminated from further consideration since the CBCP can neither cause nor contribute to an AAQS violation of CO.

The maximum predicted quarterly concentrations of Pb shown in Table 3-27 are on the order of 0.1% of the 3-month AAQS and less than the Florida SIL. Given this very low predicted impact and the fact that state monitoring has not detected measurable ambient Pb concentrations, it is concluded that Pb impacts are insignificant and therefore could neither cause nor contribute to a violation of the AAQS.

The modeling results for SO_2 are presented in Table 3-28. The CBCP is predicted to have maximum impacts above the SILs. These maximum impacts are predicted to occur at short distances. Table 3-28 also lists the distance beyond which the CBCP impacts are below the SILs. The maximum of these distances defines the facility's significant impact area (SIA) for SO_2 concentrations. The SIA extends 4.5 kilometers from the CFB boilers' stack.

Since significant SO_2 concentrations were predicted for the CBCP, a multi-source modeling analysis was performed for the areas of significant impact. All of the existing and permitted SO_2 sources in the inventory presented in Table 3-11 were modeled along with the CBCP and SKC's package boilers. The background SO_2 concentrations from Table 3-20 were added to the modeled concentrations to represent the reference value for SO_2 concentrations for comparison to the AAQS. Consistent with EPA's and DER's rules for the 3 and 24-hour averages, the highest second-high (H2H) predicted total concentrations over the year were then scanned to identify the reference values for the ambient SO_2 concentrations to which the CBCP contributes an impact above the SILs for comparison to the standards. The maximum yearly concentration is used for the annual standards. If these reference concentrations do not exceed the AAQS, then it can be concluded that the CBCP will neither cause nor contribute to a violation. If these reference concentrations exceed the AAQS, then an analysis was performed to determine if the CBCP has a significant contribution to the total ambient concentration. If the CBCP does not have a significant contribution to the reference concentration then the next highest value to which the CBCP does have a significant contribution was identified. This value was then compared to the AAQS. The results of this analysis are summarized in Table 3-29. This table shows that the next highest value, excluding the highest for the short term averaging period to which the CBCP does have a significant contribution, is below the standard for the short-term averaging periods and the annual averages. Thus, it can be concluded that the CBCP, as proposed to be modified, would neither cause nor contribute to a violation of the SO_2 AAQS.

TABLE 3-29

Findings For The AAQS Compliance Evaluation Predicted Total Ambient SO_2 Concentrations To Which CBCP As Proposed to be Modified Contributes An Impact Above The SILs

Averaging Period	Meteorological Year	Maximum Concentration to Which CBCP Contributes Significantly ($\mu g/m^3$)	AAQS ($\mu g/m^3$)	Cedar Bay Contribution ($\mu g/m^3$)
3-Hour	1983	653.2*	1300	179.2
	1984	653.4*		179.2
	1985	775.6*		179.2
	1986	577.7*		179.2
	1987	596.2*		179.2
24-Hour	1983	177.2*	260	26.5
	1984	186.8*		26.5
	1985	186.5*		26.5
	1986	165.0*		26.5
	1987	194.6*		26.5
Annual	1983	43.6*	60	6.64
	1984	43.1*		6.64
	1985	46.3*		6.64
	1986	42.7*		6.64
	1987	41.0*		6.64

*Impact falls within the CFB building cavity region.
(a)Excluding the highest total concentration for 3, 24-hour averages.

In addition to the ambient reference values of SO_2 concentrations to which the CBCP as proposed to be modified contributes a significant impact, overall total impacts were also evaluated. Over the 5-year modeling period, a total of 458 3-hour values, 987 24-hour values, and 34 annual values were higher than the numerical value of the respective AAQS for the receptor grid modeled. However, which of these short-term values are H2H or peaks remains to be seen. In any event, the CBCP was found to contribute significantly to only one of these 24-hour values that, since it was a peak and not a H2H, does not represent a significant contribution to an exceedance of a standard. The CBCP's contribution to all predicted values higher than the numerical value of a standard whether it is an exceedance of the standard or not is presented in Appendix D.

The modeling results for PM-10 are presented in Table 3-26. The CBCP as proposed to be modified is predicted to have maximum impacts above the SILs. The maximum impacts, due mainly to the emissions from the cooling tower and aggregate materials handling, are predicted to occur at very short distances, at or near the property boundary. The significant impact area extends no farther than 1.25 km from the CFB boilers' stack. Beyond this distance, PM-10 impacts are insignificant.

Since significant PM-10 impacts were predicted for the CBCP, a multi-source modeling analysis was performed. All of the existing and permitted PM-10 sources in the inventory presented in Table 3-12 were modeled along with the CBCP and SKC's package boilers. The background PM-10 concentrations from Table 3-20 were added to the modeled concentrations to represent total PM-10 concentrations for comparison to the AAQS. Consistent with EPA's and DER's rules for 24-hour averages, the H2H predicted total concentrations over the year were then scanned to identify the reference values for the ambient PM-10 concentrations to which the CBCP contributes an impact above the SILs for comparison to the short-term standards. The maximum yearly concentration is used for the annual standard. If these reference concentrations do not exceed the AAQS, then it can be concluded that the CBCP will neither cause nor contribute to a violation. If these reference concentrations exceed the AAQS, then an analysis was performed to determine if the CBCP has a significant contribution to the total ambient concentration. If the CBCP does not have a significant contribution to the reference concentration then the next highest value to which the CBCP does have a significant contribution was identified. This value was then compared to the AAQS. Table 3-30 presents the results of this analysis. For each averaging period and meteorological year modeled, this table presents the reference value ambient PM-10 concentration for comparison to the standard and to which the CBCP contributes a significant impact. These are compared to the AAQS. Also listed is the CBCP's contribution to the 24 hour concentration and the total annual concentration. None of the total concentrations exceeds the AAQS. Thus, it can be concluded that the CBCP, as proposed to be modified, would neither cause nor contribute to a violation of the PM-10 AAQS.

TABLE 3-30

Findings For The AAQS Compliance Evaluation Predicted Total Ambient PM-10 Concentrations To Which CBCP As Proposed to be Modified Contributes An Impact Above The SILs

Averaging Period	Meteorological Year	Maximum Concentration to Which CBCP Contributes Significantly[a] ($\mu g/m^3$)	AAQS ($\mu g/m^3$)	Cedar Bay Contribution ($\mu g/m^3$)
24-Hour	1983	60.7	150	12.2
	1984	62.8		14.8
	1985	61.9		14.3
	1986	58.9*		11.2
	1987	58.6		15.1
Annual	1983	35.3*	50	5.08
	1984	35.5*		4.81
	1985	36.0*		5.23
	1986	35.8*		5.13
	1987	35.4*		5.14

[a]Excluding the highest total concentration for 24-hour average.
*Impact occurs within the CFB building cavity region.

In addition to the reference value ambient PM_{10} concentrations to which the CBCP as proposed to be modified contributes a significant impact, overall total impacts were also evaluated. Over the 5-year modeling period, a total of 48 24-hour values and 5 annual values were predicted to be higher than the numerical value of the respective standard. However, the CBCP was found not to contribute significantly to any of these values. A summary of CBCP's contribution to all predicted values higher than the numerical value of a standard is presented in Appendix D.

The modeling results for NO_2 are presented in Table 3-25. The CBCP as proposed to be modified is predicted to have maximum impacts above the SILs but at very short distances, within the cavity region of the CFB building. Table 3-25 also lists the distance beyond which the CBCP's impacts are below the SILs.

Since significant NO_2 impacts were predicted for the CBCP at some property boundary receptors, and within the cavity region of the CFB building, a multi-source modeling analysis was performed. All of the existing and permitted NO_2 sources in the inventory presented in Table 3-13 were modeled along with the CBCP and SKC's package boilers. The background NO_2 concentrations from Table 3-20 were added to the modeled concentrations to represent the reference value for NO_2 concentrations for comparison to the AAQS. Table 3-31 presents the results of this analysis. For each meteorological year modeled, this table presents the reference value for ambient NO_2 concentrations for comparison to the standard to which the CBCP contributes a significant impact. These are compared to the AAQS. Also listed is the CBCP's contribution to the total concentration. None of the total concentrations exceeds the AAQS. Thus, it can be concluded that the CBCP, as proposed to be modified, would neither cause nor contribute to a violation of the NO_2 AAQS. In fact, no violations of the NO_2 AAQS were predicted in the modeling analysis.

The CBCP also emits volatile organic compounds (VOC), which can be precursors to ozone formation. However, no single source modeling can sufficiently characterize that source's impact on the photochemical process and ozone concentrations, which are regional phenomena. Accordingly, no single source modeling is required by either EPA or DER. However, qualitative statements can be made about ozone air quality in light of a comparison of emissions of VOCs between the time before the CBCP begins operation and after it starts up. The annual emission limitation of VOCs for the CBCP is 195 TPY, and SKC's five boilers that will be contemporaneously shutdown had 212 TPY of actual emissions for the four years prior to 1992. With these offsetting emissions, one can expect a net air quality benefit in the immediate area of the CBCP with respect to VOC emissions. Moreover, since the VOC emissions of the CBCP will be more than offset by shutdown of the SKC Power and Bark Boilers, no significant impact on ozone concentrations from the CBCP is expected.

TABLE 3-31

Findings For The AAQS Compliance Evaluation Predicted Total Ambient NO_2 Concentrations To Which CBCP As Proposed to be Modified Contributes An Impact Above The SILs

Averaging Period	Meteorological Year	Maximum Concentration to Which CBCP Contributes Significantly ($\mu g/m^3$)	AAQS ($\mu g/m^3$)	Cedar Bay Contribution ($\mu g/m^3$)
Annual	1983	34.69*	100	3.16
	1984	34.57*		3.16
	1985	35.17*		3.16
	1986	34.09*		3.16
	1987	33.90*		3.16

*Impact falls within the CFB building cavity region.

Based on all of the foregoing results, it can be concluded that the CBCP, as proposed to be modified, would neither cause nor contribute to a violation of an ambient air quality standard.

3.7 Findings for the PSD Increment Compliance Evaluations

The SILs are the same for AAQS and PSD Class II increments, the SIL for TSP being equal to those for PM-10. Since SO_2 impacts are above the Class II SILs, a PSD Class II increment compliance evaluation was performed. Since PM-10 impacts are above the Class II SILs, it was assumed that TSP were as well, and a PSD Class II increment compliance evaluation was performed for TSP. Since NO_2 impacts are above the Class II SILs, a PSD Class II increment compliance evaluation was performed for NO_2. A PSD Class I increment compliance evaluation was performed for SO_2, TSP, and NO_2.

3.7.1 SO2 PSD Increment Compliance Evaluation

The first step in the SO_2 PSD increment compliance evaluation was to determine the maximum predicted Class II and Class I SO_2 increment consumed by the CBCP itself. These results are summarized in Table 3-32. For each averaging period and meteorological year, the maximum SO_2 impact of the CBCP is presented for the Class II and Class I areas. The respective allowable increments are also listed. As shown in the table, the maximum SO_2 impacts of the CBCP by itself exceed neither the Class II nor Class I allowable increments. Next, an analysis was performed to identify the maximum total Class II increment consumption by all PSD increment consuming and expanding sources (including SKC's package boilers as increment consuming sources) to which the CBCP would contribute an impact above the Class II SILs. The results of this analysis are summarized in Table 3-33. Consistent with EPA's rules, for each averaging period and meteorological year, the predicted total Class II increment consumption (the highest consumption for annual averages and the H2H, or next highest, for 3- and 24-hour average impacts) to which the CBCP contributes an impact above the SILs is listed, along with the CBCP's contribution. As shown in this table, none of the total concentrations exceed the Class II PSD increments. Thus, it can be concluded that the CBCP, as proposed to be modified, would neither cause nor contribute to a violation of the PSD Class II SO_2 increments.

In addition to the maximum total Class II SO_2 increment consumption to which the CBCP would contribute significantly, overall increment consumption was also evaluated. A total of 17 values that were higher than the numerical value of the 24-hour SO_2 Class II increment were predicted. However, the CBCP was found not to contribute significantly to any of these exceedances. A summary of the CBCP's contributions to all predicted values in excess of the numerical value of the increments is presented in Appendix D.

TABLE 3-32

Maximum Predicted PSD SO_2 Increment Consumed By The CBCP As Proposed to be Modified

Averaging Period	Meteorological Year	PSD Class II Area		PSD Class I Areas		
				Concentration ($\mu g/m^3$)		Allowable Increment ($\mu g/m^3$)
		Concentration ($\mu g/m^3$)	Allowable Increment	Okefenokee	Wolf Island	
3-Hour	1983	204.8	512	2.97	1.50	25
	1984	228.0		3.93	1.82	
	1985	179.2*		3.11	2.97	
	1986	184.6		2.95	1.50	
	1987	298.1		4.10	1.55	
24-Hour	1983	31.6	91	0.98	0.30	5
	1984	27.1		0.85	0.46	
	1985	26.5*		1.12	0.60	
	1986	26.5*		1.12	0.25	
	1987	33.4		1.01	0.41	
Annual	1983	6.64*	20	0.03	0.02	2
	1984	6.64*		0.04	0.02	
	1985	6.64*		0.04	0.02	
	1986	6.64*		0.04	0.02	
	1987	6.64*		0.04	0.02	

*Impact falls within CFB Building cavity region

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TABLE 3-33

Findings For The PSD Increment Compliance Evaluation Maximum Predicted Total PSD Class II SO2 Increment Consumption To Which CBCP As Proposed to be Modified Contributes An Impact Above The SILs

Averaging Period	Meteorological Year	Maximum Increment Consumption to Which CBCP Contributes Significantly[a] ($\mu g/m^3$)	Class II Increment	Cedar Bay Contribution ($\mu g/m^3$)
3-Hour	1983	284.7*	512	179.2
	1984	291.7*		179.2
	1985	278.4*		179.2
	1986	283.8*		179.2
	1987	295.9*		179.2
24-Hour	1983	55.9*	91	26.5
	1984	54.3*		26.5
	1985	55.7*		26.5
	1986	52.6*		26.5
	1987	52.4*		26.5
Annual	1983	8.87*	20	6.64
	1984	8.28*		6.64
	1985	8.83*		6.64
	1986	8.06*		6.64
	1987	8.46*		6.64

*Impact occurs within the CFB Building cavity region.
[a]Excluding the highest total concentration for 3, 24-hour average.

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For the Class I areas, the total SO_2 increment consumption due to all increment consuming and expanding sources was identified for each averaging period and meteorological year. These results are summarized in Table 3-34. For the 3- and 24-hour averaging periods, the H2H concentrations are listed for each of the Class I areas. For the annual average period, the highest concentration is listed. Also listed are the contribution of the CBCP to these impacts. No contributions of the CBCP were deleted from this exercise. (In other words, a zero SIL was used for this analysis.) As shown in the table, none of the concentrations exceeds allowable increments. In fact, the results for the Wolf Island Wilderness Area indicate that the annual average SO_2 Class I increment is being expanded. The negative concentrations result from the impacts of increment expanding sources exceeding those of increment consuming sources. Based on these results, it can be concluded that the CBCP, as proposed to be modified, would neither cause nor contribute to a violation of the PSD Class I SO_2 increments.

3.7.2 TSP PSD Increment Compliance Evaluation

First, the maximum predicted Class II and Class I TSP increment consumed by the CBCP itself was determined. These results are summarized in Table 3-35. For each averaging period and meteorological year, the maximum TSP impact of the CBCP is presented for the Class II and Class I areas. The respective allowable increments are also listed. As shown in the table, the maximum TSP impacts of the CBCP by itself exceed neither the Class II nor Class I allowable increments. Next, an analysis was performed to identify the maximum total Class II increment consumption by all PSD increment consuming and expanding sources (including SKC's package boilers as increment consuming sources) to which CBCP would contribute an impact above the Class II SILs. The results of this analysis are summarized in Table 3-36. Consistent with EPA's rules, for each averaging period and meteorological year, the predicted total Class II increment consumption (maximum concentration for the annual average and H2H, or next highest, for the 24-hour averaging period) to which the CBCP contributes an impact above the SILs is listed, along with the CBCP's contribution. As shown in this table, none of the total concentrations exceed the Class II PSD increments. Thus, it can be concluded that the CBCP, as proposed to be modified, would neither cause nor contribute to a violation of the PSD Class II TSP increments. In fact, no violation of the PSD Class II TSP increments were predicted to occur.

For the Class I areas, the maximum total TSP increment consumption due to all increment consuming and expanding sources was identified for each averaging period and meteorological year. These results are summarized in Table 3-37. For the 24-hour averaging period, the H2H concentrations are listed for each of the Class I areas. For the annual averaging period, the highest concentration is listed. Also listed are the contribution of the CBCP to these impacts. As shown in the table, none of the concentrations exceeds allowable increments. Based on these

TABLE 3-34

Findings For The PSD Increment Compliance Evaluation Total PSD Class I SO_2 Increment Consumption In The Okefenokee and Wolf Island Wilderness Areas

Averaging Period	Meteorological Year	Allowable Increment (µg/m³)	Okefenokee Concentrations (µg/m³) for Compliance Evaluation		Wolf Island Concentrations (µg/m³) for Compliance Evaluation	
			Concentration for Compliance Evaluation	Cedar Bay Contribution	Concentration for Compliance Evaluation	Cedar Bay Contribution
3-Hour	1983	25	13.2	1.2	10.6	0.29
	1984		15.9	0.9	9.1	0.45
	1985		16.8	0.7	12.3	0.94
	1986		16.7	1.6	7.8	0.63
	1987		14.5	0.2	9.7	0.42
24-Hour	1983	5	3.4	0.3	1.8	0.04
	1984		3.3	0.6	1.8	0.06
	1985		3.4	0.3	2.1	0.17
	1986		3.5	0.3	1.5	0.04
	1987		2.8	0.4	2.2	0.06
Annual	1983	2	-0.02	0.02	-0.07	0.02
	1984		-0.01	0.04	-0.12	0.02
	1985		-0.02	0.04	-0.12	0.02
	1986		-0.03	0.04	-0.06	0.02
	1987		0.003	0.04	-0.09	0.02

TABLE 3-35

Maximum Predicted PSD TSP Increment Consumed By The CBCP As Proposed to be Modified

Averaging Period	Meteorological Year	PSD Class II Area		PSD Class I Areas		
				Concentration ($\mu g/m^3$)		
		Concentration ($\mu g/m^3$)	Allowable Increment ($\mu g/m^3$)	Okefenokee	Wolf Island	Allowable Increment ($\mu g/m^3$)
24-Hour	1983	28.1*	37	0.10	0.06	10
	1984	30.9		0.10	0.06	
	1985	29.8*		0.14	0.07	
	1986	36.6		0.12	0.04	
	1987	26.7*		0.11	0.07	
Annual	1983	5.85*	19	0.005	0.002	5
	1984	5.63*		0.006	0.003	
	1985	5.95*		0.005	0.003	
	1986	5.96*		0.005	0.002	
	1987	5.93*		0.006	0.003	

*Impact falls within CFB Building cavity region

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TABLE 3-36

Findings For The PSD Increment Compliance Evaluation Predicted Total PSD Class II TSP Increment Consumption To Which CBCP As Proposed to be Modified Contributes An Impact Above The SILs

Averaging Period	Meteorological Year	Maximum Increment Consumption to Which CBCP Contributes Significantly[a] ($\mu g/m^3$)	Class II Increment	Cedar Bay Contribution ($\mu g/m^3$)
24-Hour	1983	25.2*	37	8.0
	1984	27.0*		8.0
	1985	29.1*		8.0
	1986	33.1		33.1
	1987	25.4*		8.0
Annual	1983	5.80*	19	1.94
	1984	5.53*		1.94
	1985	5.86*		1.94
	1986	5.92*		1.94
	1987	5.86*		1.94

*Impact occurs within CFB Building cavity region.
[a]Excluding the highest total conentration for 24-hour averages.

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TABLE 3-37

Findings For The PSD Increment Compliance Evaluation
Total PSD Class I TSP Increment Consumption
In the Okefenokee and Wolf Island Wilderness Areas

Averaging Period	Meteorological Year	Allowable Increment ($\mu g/m^3$)	Okefenokee Concentrations ($\mu g/m^3$) for Compliance Evaluation		Wolf Island Concentrations ($\mu g/m^3$) for Compliance Evaluation	
			Concentration for Compliance Evaluation	Cedar Bay Contribution	Concentration for Compliance Evaluation	Cedar Bay Contribution
24-Hour	1983	10	0.06	0.006	0.05	0.003
	1984		0.07	0.012	0.05	0.008
	1985		0.07	0.003	0.05	0.002
	1986		0.05	0.006	0.04	0.006
	1987		0.07	0.011	0.08	0.004
Annual	1983	5	-0.012	0.003	-0.01	0.002
	1984		-0.009	0.002	-0.02	0.003
	1985		-0.015	0.003	-0.02	0.003
	1986		-0.008	0.002	-0.02	0.002
	1987		-0.01	0.003	-0.02	0.003

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results, it can be concluded that the CBCP, as proposed to be modified, would neither cause nor contribute to a violation of the PSD Class I TSP increments.

3.7.3 NO_2 PSD Increment Compliance Evaluation

For the NO_2 PSD increment compliance evaluation, first the maximum predicted Class II and Class I NO_2 increment consumed by the CBCP itself was determined. These results are summarized in Table 3-38. For each meteorological year, the maximum NO_2 impact of the CBCP is presented for the Class II and Class I areas. The respective allowable increments are also listed. As shown in the table, the maximum NO_2 impacts of the CBCP by itself exceed neither the Class II nor Class I allowable increments. Next, an analysis was performed to identify the maximum total Class II increment consumption by all PSD increment consuming and expanding sources (including SKC's package boilers as increment consuming sources) to which the CBCP would contribute an impact above the Class II SILs. The results of this analysis are summarized in Table 3-39. Consistent with EPA's rules, for each meteorological year the predicted total Class II increment consumption (maximum annual) to which CBCP contributes an impact above the SILs is listed, along with the CBCP contribution. As shown in this table, none of the total concentrations exceed the Class II PSD increments. Thus, it can be concluded that the CBCP, as proposed to be modified, would neither cause nor contribute to a violation of the PSD Class II NO_2 increments. In fact, no violations of the PSD Class II NO_2 increments were predicted to occur.

For the Class I areas, the maximum total NO_2 increment consumption due to all increment consuming and expanding sources was identified for each meteorological year. These results are summarized in Table 3-40. For the annual averaging period, the highest concentration is listed. Also listed are the contributions of the CBCP to these impacts. As shown in the table, none of the concentrations exceed allowable increments. Based on these results, it can be concluded that the CBCP, as proposed to be modified, would neither cause nor contribute to a violation of the PSD Class I NO_2 increments.

3.8 Findings for the Draft Air Toxics No Threat Levels (NTL) Evaluation

The air toxics emissions from the CBCP, by itself, as proposed to be modified, were modeled to determine the maximum impact of each pollutant for each averaging period for which a draft NTL has been proposed. The results are summarized in Table 3-41. For each pollutant and averaging period the maximum predicted concentration due to the CBCP, as proposed to be modified, is presented and compared to the applicable draft NTL. A thorough review of the results for each pollutant demonstrates that in each case the impacts are below the draft No Threat Levels.

TABLE 3-38

Maximum Predicted PSD NO_2 Increment Consumed By The CBCP As Proposed to be Modified

Averaging Period	Meteorological Year	PSD Class II Area		PSD Class I Areas		
				Concentration ($\mu g/m^3$)		Allowable Increment ($\mu g/m^3$)
		Concentration ($\mu g/m^3$)	Allowable Increment	Okefenokee	Wolf Island	
Annual	1983	3.16*	25	0.028	0.013	2.5
	1984	3.16*		0.036	0.016	
	1985	3.16*		0.034	0.020	
	1986	3.16*		0.033	0.014	
	1987	3.16*		0.033	0.013	

*Impact falls within CFB Building cavity region

TABLE 3-39

Findings For The PSD Increment Compliance Evaluation Predicted Total PSD Class II NO_2 Increment Consumption To Which CBCP As Proposed to be Modified Contributes An Impact Above The SILs

Averaging Period	Meteorological Year	Maximum Increment Consumption to Which CBCP Contributes Significantly ($\mu g/m^3$)	Class II Increment	Cedar Bay Contribution ($\mu g/m^3$)
Annual	1983	3.16*	25	3.16
	1984	3.16*		3.16
	1985	3.16*		3.16
	1986	3.16*		3.16
	1987	3.16*		3.16

*Impact falls with CFB building cavity region.

TABLE 3-40

Findings For The PSD Increment Compliance Evaluation
Total PSD Class I Annual Average NO_2 Increment Consumption

Meteorological Year	Allowable Increment ($\mu g/m^3$)	Okefenokee Concentrations ($\mu g/m^3$)		Wolf Island Concentrations ($\mu g/m^3$)	
		Highest	Cedar Bay Contribution To Highest	Highest	Cedar Bay Contribution To Highest
1983	2.5	-0.009	0.024	-0.015	0.013
1984		-0.007	0.017	-0.027	0.016
1985		-0.012	0.018	-0.020	0.020
1986		-0.006	0.013	-0.017	0.014
1987		-0.007	0.022	-0.020	0.013

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TABLE 3-41

Maximum Cedar Bay Air Toxics Impacts ($\mu g/m^3$)

Pollutant	Averaging Period	Year	Cedar Bay	Draft No Threat Levels
Acetaldehyde	8-hour	1983	0.52	1800
		1984	0.63	1800
		1985	0.76	1800
		1986	0.64	1800
		1987	0.72	1800
	24-hour	1983	0.22	432
		1984	0.24	432
		1985	0.27	432
		1986	0.23	432
		1987	0.26	432
	Annual	1983	0.010	0.45
		1984	0.012	0.45
		1985	0.010	0.45
		1986	0.012	0.45
		1987	0.013	0.45

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TABLE 3-41 (Cont'd)

Maximum Cedar Bay Air Toxics Impacts ($\mu g/m^3$)

Pollutant	Averaging Period	Year	Cedar Bay	Draft No Threat Levels
Acetic Acid	8-hour	1983	6.25	250
		1984	5.80	250
		1985	3.52	250
		1986	4.60	250
		1987	5.58	250
	24-hour	1983	1.07	60
		1984	0.92	60
		1985	0.55	60
		1986	0.69	60
		1987	1.14	60

TABLE 3-41 (Cont'd)

Maximum Cedar Bay Air Toxics Impacts ($\mu g/m^3$)

Pollutant	Averaging Period	Year	Cedar Bay	Draft No Threat Levels
Antimony Compounds	8-hour	1983	2.5e-03	5
		1984	2.3e-03	5
		1985	1.4e-03	5
		1986	1.9e-03	5
		1987	2.2e-03	5
	24-hour	1983	4.3e-04	1.2
		1984	3.9e-04	1.2
		1985	4.4e-04	1.2
		1986	3.6e-04	1.2
		1987	4.5e-04	1.2
	Annual	1983	3.0e-05	3.0e-01
		1984	3.0e-05	3.0e-01
		1985	2.0e-05	3.0e-01
		1986	3.0e-05	3.0e-01
		1987	4.0e-05	3.0e-01
		Cavity Region	9.04e-05	3.0e-01

TABLE 3-41 (Cont'd)

Maximum Cedar Bay Air Toxics Impacts ($\mu g/m^3$)

Pollutant	Averaging Period	Year	Cedar Bay	Draft No Threat Levels
Arsenic	8-hour	1983	0.012	2
		1984	0.015	2
		1985	0.018	2
		1986	0.015	2
		1987	0.025	2
	24-hour	1983	5.2e-03	0.48
		1984	5.7e-03	0.48
		1985	6.4e-03	0.48
		1986	5.4e-03	0.48
		1987	9.0e-03	0.48
	Annual	1983	1.5e-04	2.3e-04
		1984	1.7e-04	2.3e-04
		1985	1.5e-04	2.3e-04
		1986	1.8e-04	2.3e-04
		1987	1.9e-04	2.3e-04

TABLE 3-41 (Cont'd)

Maximum Cedar Bay Air Toxics Impacts ($\mu g/m^3$)

Pollutant	Averaging Period	Year	Cedar Bay	Draft No Threat Levels
Barium	8-hour	1983	0.048	5
		1984	0.059	5
		1985	0.071	5
		1986	0.060	5
		1987	0.068	5
	24-hour	1983	0.020	1.2
		1984	0.023	1.2
		1985	0.025	1.2
		1986	0.021	1.2
		1987	0.024	1.2
	Annual	1983	6.3e-04	5.0e+01
		1984	7.1e-04	5.0e+01
		1985	6.3e-04	5.0e+01
		1986	7.6e-04	5.0e+01
		1987	8.1e-04	5.0e+01

TABLE 3-41 (Cont'd)

Maximum Cedar Bay Air Toxics Impacts ($\mu g/m^3$)

Pollutant	Averaging Period	Year	Cedar Bay	Draft No Threat Levels
Beryllium	8-hour	1983	1.6e-03	0.02
		1984	1.5e-03	0.02
		1985	9.5e-04	0.02
		1986	1.2e-03	0.02
		1987	1.4e-03	0.02
	24-hour	1983	2.8e-04	0.0048
		1984	3.1e-04	0.0048
		1985	3.5e-04	0.0048
		1986	2.9e-04	0.0048
		1987	3.2e-04	0.0048
	Annual	1983	2.0e-05	4.2e-04
		1984	2.0e-05	4.2e-04
		1985	2.0e-05	4.2e-04
		1986	2.0e-05	4.2e-04
		1987	2.0e-05	4.2e-04
		Cavity Region	5.66e-05	4.2e-04

TABLE 3-41 (Cont'd)

Maximum Cedar Bay Air Toxics Impacts (µg/m^3)

Pollutant	Averaging Period	Year	Cedar Bay	Draft No Threat Levels
Bromine	8-hour	1983	4.4e-03	6.6
		1984	4.1e-03	6.6
		1985	2.5e-03	6.6
		1986	3.2e-03	6.6
		1987	3.9e-03	6.6
	24-hour	1983	7.5e-04	1.584
		1984	6.5e-04	1.584
		1985	3.9e-04	1.584
		1986	4.9e-04	1.584
		1987	8.0e-04	1.584

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TABLE 3-41 (Cont'd)

Maximum Cedar Bay Air Toxics Impacts ($\mu g/m^3$)

Pollutant	Averaging Period	Year	Cedar Bay	Draft No Threat Levels
Cadmium	8-hour	1983	6.6e-03	0.5
		1984	6.1e-03	0.5
		1985	4.2e-03	0.5
		1986	4.9e-03	0.5
		1987	5.9e-03	0.5
	24-hour	1983	1.2e-03	0.12
		1984	1.4e-03	0.12
		1985	1.5e-03	0.12
		1986	1.3e-03	0.12
		1987	1.4e-03	0.12
	Annual	1983	8.0e-05	5.6e-04
		1984	8.0e-05	5.6e-04
		1985	6.0e-05	5.6e-04
		1986	7.0e-05	5.6e-04
		1987	1.0e-04	5.6e-04
		Cavity Region	2.38e-04	5.6e-04

TABLE 3-41 (Cont'd)

Maximum Cedar Bay Air Toxics Impacts (µg/m^3)

Pollutant	Averaging Period	Year	Cedar Bay	Draft No Threat Levels
Chromium VI Compounds	8-hour	1983	1.3e-4	0.5
		1984	1.2e-04	0.5
		1985	1.3e-04	0.5
		1986	1.1e-04	0.5
		1987	1.2e-04	0.5
	24-hour	1983	4.0e-05	0.12
		1984	4.0e-05	0.12
		1985	5.0e-05	0.12
		1986	4.0e-05	0.12
		1987	4.0e-05	0.12
	Annual	1983	<1.0e-05	8.3e-05
		1984	<1.0e-05	8.3e-05
		1985	<1.0e-05	8.3e-05
		1986	<1.0e-05	8.3e-05
		1987	<1.0e-05	8.3e-05
		Cavity Region	4.52e-06	8.3e-05

TABLE 3-41 (Cont'd)

Maximum Cedar Bay Air Toxics Impacts ($\mu g/m^3$)

Pollutant	Averaging Period	Year	Cedar Bay	Draft No Threat Levels
Cobalt	8-hour	1983	0.039	0.5
		1984	0.037	0.5
		1985	0.022	0.5
		1986	0.029	0.5
		1987	0.035	0.5
	24-hour	1983	6.8e-03	0.12
		1984	5.8e-03	0.12
		1985	3.5e-03	0.12
		1986	4.4e-03	0.12
		1987	7.1e-03	0.12

TABLE 3-41 (Cont'd)

Maximum Cedar Bay Air Toxics Impacts ($\mu g/m^3$)

Pollutant	Averaging Period	Year	Cedar Bay	Draft No Threat Levels
Copper	8-hour	1983	0.18	10
		1984	0.16	10
		1985	0.099	10
		1986	0.13	10
		1987	0.16	10
	24-hour	1983	0.030	2.4
		1984	0.026	2.4
		1985	0.015	2.4
		1986	0.019	2.4
		1987	0.032	2.4

TABLE 3-41 (Cont'd)

Maximum Cedar Bay Air Toxics Impacts ($\mu g/m^3$)

Pollutant	Averaging Period	Year	Cedar Bay	Draft No Threat Levels
Fluorides (as F)	8-hour	1983	0.044	25
		1984	0.054	25
		1985	0.065	25
		1986	0.054	25
		1987	0.062	25
	24-hour	1983	0.019	6
		1984	0.021	6
		1985	0.023	6
		1986	0.020	6
		1987	0.022	6

TABLE 3-41 (Cont'd)

Maximum Cedar Bay Air Toxics Impacts ($\mu g/m^3$)

Pollutant	Averaging Period	Year	Cedar Bay	Draft No Threat Levels
Formaldehyde	8-hour	1983	0.25	12
		1984	0.24	12
		1985	0.14	12
		1986	0.19	12
		1987	0.23	12
	24-hour	1983	0.044	2.88
		1984	0.037	2.88
		1985	0.022	2.88
		1986	0.028	2.88
		1987	0.046	2.88
	Annual	1983	3.2e-03	7.7e-02
		1984	3.2e-03	7.7e-02
		1985	2.5e-03	7.7e-02
		1986	2.5e-03	7.7e-02
		1987	4.0e-03	7.7e-02
		Cavity Region	9.16e-03	7.7e-02

TABLE 3-41 (Cont'd)

Maximum Cedar Bay Air Toxics Impacts (µg/m^3)

Pollutant	Averaging Period	Year	Cedar Bay	Draft No Threat Levels
Hydrogen Chloride	8-hour	1983	0.415	75
		1984	0.385	75
		1985	0.234	75
		1986	0.305	75
		1987	0.370	75
	24-hour	1983	0.071	18
		1984	0.061	18
		1985	0.051	18
		1986	0.046	18
		1987	0.075	18
	Annual	1983	5.3e-03	7.0e+00
		1984	5.1e-03	7.0e+00
		1985	4.1e-03	7.0e+00
		1986	4.1e-03	7.0e+00
		1987	6.5e-03	7.0e+00
		Cavity Region	1.49e-02	7.0e+00

TABLE 3-41 (Cont'd)

Maximum Cedar Bay Air Toxics Impacts ($\mu g/m^3$)

Pollutant	Averaging Period	Year	Cedar Bay	Draft No Threat Levels
Indium Compounds	8-hour	1983	1.0e-5	1
		1984	1.0e-5	1
		1985	2.0e-5	1
		1986	1.0e-5	1
		1987	2.0e-5	1
	24-hour	1983	<1.0e-05	0.24
		1984	1.0e-05	0.24
		1985	1.0e-05	0.24
		1986	<1.0e-05	0.24
		1987	1.0e-05	0.24

TABLE 3-41 (Cont'd)

Maximum Cedar Bay Air Toxics Impacts ($\mu g/m^3$)

Pollutant	Averaging Period	Year	Cedar Bay	Draft No Threat Levels
Lead Compounds	8-hour	1983	5.6e-03	0.5
		1984	5.2e-03	0.5
		1985	4.9e-03	0.5
		1986	4.1e-03	0.5
		1987	5.0e-03	0.5
	24-hour	1983	1.4e-03	0.12
		1984	1.6e-03	0.12
		1985	1.8e-03	0.12
		1986	1.5e-03	0.12
		1987	1.7e-03	0.12
	Annual	1983	7.0e-05	9.0e-02
		1984	7.0e-05	9.0e-02
		1985	6.0e-05	9.0e-02
		1986	8.0e-05	9.0e-02
		1987	9.0e-05	9.0e-02
		Cavity Region	2.02e-04	9.0e-02

TABLE 3-41 (Cont'd)

Maximum Cedar Bay Air Toxics Impacts ($\mu g/m^3$)

Pollutant	Averaging Period	Year	Cedar Bay	Draft No Threat Levels
Manganese	8-hour	1983	0.039	50
		1984	0.048	50
		1985	0.058	50
		1986	0.048	50
		1987	0.055	50
	24-hour	1983	0.017	12
		1984	0.019	12
		1985	0.021	12
		1986	0.017	12
		1987	0.019	12
	Annual	1983	5.2e-04	4.0e-01
		1984	5.8e-04	4.0e-01
		1985	5.2e-04	4.0e-01
		1986	6.2e-04	4.0e-01
		1987	6.7e-04	4.0e-01

TABLE 3-41 (Cont'd)

Maximum Cedar Bay Air Toxics Impacts ($\mu g/m^3$)

Pollutant	Averaging Period	Year	Cedar Bay	Draft No Threat Levels
Mercury Alkyl Compounds	8-hour	1983	2.4e-3	0.1
		1984	3.0e-03	0.1
		1985	3.6e-03	0.1
		1986	3.0e-03	0.1
		1987	3.4e-03	0.1
	24-hour	1983	1.0e-03	0.024
		1984	1.2e-03	0.024
		1985	1.3e-03	0.024
		1986	1.1e-03	0.024
		1987	1.2e-03	0.024

TABLE 3-41 (Cont'd)

Maximum Cedar Bay Air Toxics Impacts ($\mu g/m^3$)

Pollutant	Averaging Period	Year	Cedar Bay	Draft No Threat Levels
Molybdenum	8-hour	1983	0.031	50
		1984	0.028	50
		1985	0.017	50
		1986	0.023	50
		1987	0.027	50
	24-hour	1983	5.3e-03	12
		1984	4.5e-03	12
		1985	4.4e-03	12
		1986	3.6e-03	12
		1987	5.6e-03	12

TABLE 3-41 (Cont'd)

Maximum Cedar Bay Air Toxics Impacts ($\mu g/m^3$)

Pollutant	Averaging Period	Year	Cedar Bay	Draft No Threat Levels
Nickel	8-hour	1983	0.11	1
		1984	0.099	1
		1985	0.060	1
		1986	0.078	1
		1987	0.095	1
	24-hour	1983	0.018	0.24
		1984	0.016	0.24
		1985	9.4e-03	0.24
		1986	0.012	0.24
		1987	0.019	0.24

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TABLE 3-41 (Cont'd)

Maximum Cedar Bay Air Toxics Impacts ($\mu g/m^3$)

Pollutant	Averaging Period	Year	Cedar Bay	Draft No Threat Levels
Phenol	8-hour	1983	6.25	190
		1984	5.80	190
		1985	3.52	190
		1986	4.60	190
		1987	5.58	190
	24-hour	1983	1.07	45.6
		1984	0.92	45.6
		1985	0.55	45.6
		1986	0.69	45.6
		1987	1.14	45.6
	Annual	1983	0.080	30
		1984	0.078	30
		1985	0.061	30
		1986	0.063	30
		1987	0.099	30
		Cavity Region	0.23	30

TABLE 3-41 (Cont'd)

Maximum Cedar Bay Air Toxics Impacts ($\mu g/m^3$)

Pollutant	Averaging Period	Year	Cedar Bay	Draft No Threat Levels
Phosphorous	8-hour	1983	0.067	1
		1984	0.062	1
		1985	0.039	1
		1986	0.049	1
		1987	0.059	1
	24-hour	1983	0.011	0.24
		1984	0.013	0.24
		1985	0.014	0.24
		1986	0.012	0.24
		1987	0.013	0.24

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TABLE 3-41 (Cont'd)

Maximum Cedar Bay Air Toxics Impacts ($\mu g/m^3$)

Pollutant	Averaging Period	Year	Cedar Bay	Draft No Threat Levels
Pyridine	8-hour	1983	6.25	160
		1984	5.80	160
		1985	3.52	160
		1986	4.60	160
		1987	5.58	160
	24-hour	1983	1.07	38.4
		1984	0.92	38.4
		1985	0.55	38.4
		1986	0.69	38.4
		1987	1.14	38.4
	Annual	1983	0.080	1
		1984	0.078	1
		1985	0.061	1
		1986	0.063	1
		1987	0.099	1
		Cavity Region	0.23	1

TABLE 3-41 (Cont'd)

Maximum Cedar Bay Air Toxics Impacts ($\mu g/m^3$)

Pollutant	Averaging Period	Year	Cedar Bay	Draft No Threat Levels
Selenium	8-hour	1983	7.1e-03	2
		1984	6.6e-03	2
		1985	4.0e-03	2
		1986	5.2e-03	2
		1987	6.3e-03	2
	24-hour	1983	1.2e-03	0.48
		1984	1.0e-03	0.48
		1985	6.3e-04	0.48
		1986	7.9e-04	0.48
		1987	1.3e-03	0.48
Sulfuric Acid Mist (H_2SO_4)	8-hour	1983	7.36	10
		1984	6.82	10
		1985	4.15	10
		1986	5.42	10
		1987	6.57	10
	24-hour	1983	1.26	2.4
		1984	1.08	2.4
		1985	0.65	2.4
		1986	0.82	2.4
		1987	1.34	2.4

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TABLE 3-41 (Cont'd)

Maximum Cedar Bay Air Toxics Impacts ($\mu g/m^3$)

Pollutant	Averaging Period	Year	Cedar Bay	Draft No Threat Levels
Tin	8-hour	1983	0.21	1
		1984	0.19	1
		1985	0.12	1
		1986	0.15	1
		1987	0.18	1
	24-hour	1983	0.035	0.24
		1984	0.030	0.24
		1985	0.018	0.24
		1986	0.023	0.24
		1987	0.038	0.24

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TABLE 3-41 (Cont'd)

Maximum Cedar Bay Air Toxics Impacts ($\mu g/m^3$)

Pollutant	Averaging Period	Year	Cedar Bay	Draft No Threat Levels
Vanadium	8-hour	1983	0.47	0.5
		1984	0.44	0.5
		1985	0.27	0.5
		1986	0.35	0.5
		1987	0.42	0.5
	24-hour	1983	0.081	0.12
		1984	0.069	0.12
		1985	0.041	0.12
		1986	0.052	0.12
		1987	0.085	0.12
	Annual	1983	6.0e-03	2.0e+01
		1984	5.9e-03	2.0e+01
		1985	4.6e-03	2.0e+01
		1986	4.7e-03	2.0e+01
		1987	7.4e-03	2.0e+01
		Cavity Region	1.70e-02	2.0e+01

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As stated in the Florida draft policy, the Draft NTLs are developed with a conservative bias intentionally built in so that they can serve as the criteria for assessing a single source or small group of proximate sources. In other words, if the single source satisfies the NTL, it can be concluded that the cumulative exposure to which the single source contributes would not likely endanger public health nor cause appreciable health risks. Since the CBCP satisfies the NTLs, it can be concluded that emissions of air toxics from the CBCP, as proposed to be modified, would not endanger the public health nor pose unacceptable health risks.

5.0 ADDITIONAL ANALYSES

In addition to AAQS, increments, and BACT, the PSD program addresses several other analyses:

1. Impacts of secondary emissions associated with any residential, commercial, or industrial growth directly related to the construction or operation of the CBCP.

2. Impacts on soils and vegetation in Class I and II areas.

3. Impacts on visibility in Class I and II areas.

Sections 5.1, 5.2, and 5.3 discuss the manner in which ENSR approached these three issues, respectively, and, for each, present the technical approach, assumptions, data, and results of these analyses. In addition to these analyses, an analysis of potential fogging, icing, and salt deposition due to operation of the CBCP's cooling tower was also performed, and is documented in Section 5.4.

Finally, potential emissions and air quality impacts from lower operating loads on the CBCP CFBs' were compared to those under full capacity operation to ascertain the need for refined assessments of these operating conditions. This comparison is documented in Section 5.5.

5.1 Directly Related Growth Impacts

5.1.1 Existing Project Area Land Use

The CBCP is currently under construction on a vacant portion of SKC's site which is located in northern Duval County at the confluence of the Broward and St. Johns Rivers. SKC's facility is operated as a heavy industrial use. SKC owns a total of 425 acres at this site and has leased 35 of those acres to the CBCP.

The CBCP, SKC's mill, and the Hess Oil terminal are the only land uses on the peninsula created by the Broward River, the St. Johns River, and Dunns Creek. The Broward River lies west of the site. Heckscher Drive is the southern boundary of the Seminole Kraft site. The Hess Oil Terminal is located north of Heckscher Drive abutting the St. Johns River. There is a narrow strip of vacant shoreline south of the Hess Oil Terminal which extends to Dunns Creek. Land north and east of the SKC's site is vacant and heavily wooded until it reaches Dunns Creek and Faye Road. The Jacksonville Electrical Authority operates two generating facilities, the St. Johns River

Power Park and the Northside Generating Station on the east side of Dunns Creek. Land uses along Eastport Road and Faye Road north of SKC's site include manufacturing and low density residential uses, including the San Mateo residential area south of Eastport Road and east of Main Street. The nearest residential land use to the CBCP's site occurs along both shorelines of the Broward River northwest of the project site with the closest residential uses on the south bank of the river approximately one-half mile away from the CBCP's site. Across the Broward River directly south of the CBCP's site is the City of Jacksonville water treatment plant.

5.1.2 Growth Associated with the CBCP's Development

5.1.2.1 Work Force

Construction of the CBCP commenced in 1991 with commercial operation scheduled for February 6, 1994. The construction work force for the CBCP has come from Duval County and the surrounding counties, primarily St. Johns and Clay Counties. It is estimated that only six percent of the construction workforce is drawn from outside the general Jacksonville area. Peak on-site construction, which totalled approximately 900 workers, occurs in early 1993. Construction worker commuting has not impacted the level of operating service on the project area roadway network. Air pollutant emissions associated with the construction phase traffic will not represent a significant effect over background air emissions.

Total employment as a result of operation of the CBCP is expected to be 60-45-45 across three shifts. Due to the small number of employees at the CBCP relative to the overall labor market, no net migration to Duval County is expected for operation of the CBCP. The CBCP's operational employment will have no significant impact on the level of operating service on the area roadway network. No measurable vehicular related air quality impacts will result.

5.1.2.2 Housing

The 50 to 60 construction workers from outside the region are accommodated by the existing local temporary housing supply. Both the construction work force and facility operational employment will not have a measurable impact on housing construction in the Jacksonville area. No effect on area wide emissions due to housing activity (ie - construction, heating) is expected.

5.1.2.3 Industry

The City of Jacksonville has a diverse economy which includes heavy industrial uses, especially port related activity. The planning area in which the CBCP is located is called the North Planning Area, or Planning District #6.

Some of the steam from the CBCP will be supplied to SKC's existing recycled operation. Electricity produced by the CBCP will be supplied to the utility grid to meet the identified demand for power. Neither the steam nor electricity produced by the CBCP will be a stimulus for inducing growth in the local industrial economic base. It is not expected that any new industrial related air emissions will occur due to new development being stimulated by the CBCP.

5.2 Impacts of the CBCP on Soils and Vegetation

PSD review also addresses the impacts on soils and vegetation. This review entails understanding the soils land vegetation in the areas in the sphere of influence of a source, knowing what the source emits, the exposure of those emissions to soils land vegetation, and a comparison of those exposures with screening levels of acceptability. If those levels are satisfied, it can be concluded that the source will not adversely affect the soils and vegetation in its sphere of influence.

This section discusses potential impacts of the CBCP on soils and vegetation. In Section 5.2.1, the existing soils and vegetation in two PSD Class I areas (the Okefenokee and Wolf Island Wilderness Areas (WA)), in the immediate vicinity of the CBCP, and in the Timucuan Preserve are described. Following the soil and vegetation descriptions, potential impacts of trace elements are discussed in Section 5.2.2. In Section 5.2.3, direct impacts from airborne concentrations on plants are discussed.

5.2.1 Description of Existing Soils and Vegetation

Following is a brief description of the soils and dominant plant species for the Okefenokee, Wolf Island, the immediate vicinity of the CBCP, and the Timucuan Preserve.

5.2.1.1 Okefenokee

Introduction

The Okefenokee is a forested peat-forming bog with extensive open water and marshes maintained by periodic drought and fires (Meyers and Odum 1991). Relative areas in major

habitats within the swamp are as follows: marshes, 21 percent; shrub swamp, 34 percent; swamp forest, 29 percent; upland islands, 8 percent; and open water, 7 percent (Blood 1980).

Vegetation

Major marsh species in the deeper water are white water lily (Nymphaea oderata), neverwet (Orontium aquaticum), bladderwort (Utricularia spp.), haptin (Eriocaulon compressum), and spike rush (Eleocharis elongata). At shallow water sites, panic grass (Panicum spp.), sedge (Carex spp.), beak rush (Rhynchospora spp.), chain fern (Woodwardia virginica), red root (Lachnanthes caroliniana), and Sphagnum moss may be found (Meyers and Odum 1991).

Major species in the shrub swamp habitat are hurrah bush (Lyonia lucida), titi (Cyrilla racemiflora), greenbrier (Simlax laurifolia), pepper bush (Clethera alnifolia), and fetter bush (Leucothoe racemosa) (Meyers and Odum 1991).

Forested wetlands are dominated by pond cypress (Taxodium ascendens), three species of bays (Gordonia lasianthus, Magnolia virginiana, and Persea palustris), or black gum (Nyssa sylvatica biflora). Spanish moss (Tillandsia usneoides) is a ubiquitous epiphyte in the forested wetlands (Meyers and Odum 1991).

Predominant upland forest types are longleaf and slash pine (Pinus palustris, and P. elliotii). Southern oaks and other hardwoods (Quercus virginiana, Q. nigra, Q. laurifolia, Q. phellos, and Magnolia virginiana) become established in the absence of fire (Meyers and Odum 1991).

Soils

The wetland soils are nutrient poor, have a mean pH of 4.0 (Gerritsen and Greening 1989), and are anoxic.

5.2.1.2 Wolf Island

Introduction

Wolf Island National Wildlife Refuge is located in McIntosh County, Georgia 12 miles east of the town of Darien. This 5,126-acre migratory bird refuge is comprised of Wolf Island (4,519 acres), Egg Island (593 acres), and Little Egg Island (14 acres) (Wolf Island Annual Report 1991).

Wolf Island contains 300 acres of upland including a long, narrow four mile strip of ocean front beach and several small (< 20 acres) 20+ year old spoil sites along the Little Mud River. The

highest elevation recorded on the island is 10.57 feet above mean low water and is located on one of the spoil sites. The remainder of the island (4,219 acres) is salt marsh, small marsh hammocks, and tidal creeks which flood daily with lunar tides of five to nine feet (Wolf Island Annual Report 1991).

Vegetation

Vegetation on the upland portions of the island consists of sea oats (Uniola paniculata), sandspurs, and other beach-dune perennials. The only woody growth consists of wax-myrtle (Myrica cerifera) and cedars (Juniperis silicicola) on the highest elevations. The salt marsh is dominated by salt marsh cordgrass (Spartina alterniflora) with sea-ox-eye (Borrichia frutescens), black needlerush (Juncus roemerianus), and glasswort (Salicornia spp.) in a narrow band around the spoil sites and higher elevations (Wolf Island Annual Report 1991).

Egg Island contains 200 acres of uplands ranging from six to ten feet above mean low water. Approximately 70 acres of the island is above nine feet. This acreage has a dense growth of cedar, greenbriar, and blackberry (Rubus spp.), along with a small number of oak (Quercus spp.) and pine (Pinus spp.). The remaining upland acres are dominated by wax-myrtle, except for the ocean front beach, which is dominated by sea-oats, sandspurs, and other beach-dune perennials. The balance of the island (393 acres) is salt marsh, dominated by salt marsh cordgrass (Wolf Island Annual Report 1991).

Little Egg Island is a low salt marsh dominated by salt marsh cordgrass. The island is completely inundated during high tides (Wolf Island Annual Report 1991).

Soils

The soils of the Atlantic Coastal Plain intertidal wetlands contain little peat due, most likely, to a combination of factors, among which are tidal flushing, rapid degradation of plant detritus, and a slow rate of coastal submergence (Frey and Basan 1985).

The soil and sediment in the southeastern marshes contain substantial amounts of organic carbon, due in large part to the growth of roots and rhizomes. The inorganic substrate is composed of a mixture of sand, silt, and clay. In Georgia marshes, soil along creek banks averages 50 percent clay and approximately 20 percent sand. At the high end of marshes, the soil is almost entirely sand (Wiegert and Freeman 1990).

Although the soils of intertidal salt marshes is flooded each day, the interstitial water is virtually stagnate. Exchange in most part of the marsh is by diffusion, bioturbation, or slow seepage from

the creek bank at low tide. Aerobic microbial processes use up free oxygen faster than it can be supplied at depth, resulting in a soil containing relatively high levels of hydrogen sulfide (H2S) and organic matter with low pH (Pomeroy and Wiegert 1981). Oxygen penetration from the soil-water interface is intercepted within the first 1-2 mm of the stagnate zone and removed by the action of sulfide oxidizers, methane oxidizers, etc. Thus, within the soil, there is not only a biological oxygen demand created by the end products of anaerobic microbial processes such as fermentation, but also a considerable chemical oxygen demand (Frey and Basan 1985).

5.2.2 PSD Class II Areas

5.2.2.1 Vicinity of the CBCP

Vegetation

The natural vegetation in the vicinity of the CBCP is turkey oak (Quercus laevis), blackjack oak (Q. cinerea), slash pine (Pinus caribaea), and longleaf pine (P. palustris). Other species include sawpalmetto (Seriona repens), wax myrtle (Myrica cerifera), and fetterbush (Clethra alnifolia). The pines, sawpalmetto, and the shrubs are characteristic of flatwoods.

The vegetation in closest proximity to the CBCP is located along the banks of the St John's River, adjacent to the CBCP. The vegetation is comprised of such salt-tolerant species as salt marsh cordgrass and black-needlerush.

Soils

According to the soil survey of City of Jacksonville, Duval County, Florida (SCS 1978), soils adjacent to the CBCP belong to the Kershaw-Ortega Association. This association is comprised of 55 percent Kershaw soils, 35 percent Ortega soils, and 10 percent soils of minor extent. Both the Kershaw and Ortega series are members of the thermic, uncoated family of Typic Quartzipsamments. These soils consist of gently sloping excessively to moderately drained, acid soils that formed in thick deposits of marine sands. Soil reaction in the Kershaw series ranges from very strongly acid to medium acid. Soil reaction in the Ortega series ranges from strongly acid to slightly acid throughout. Texture for both series in all horizons is fine sand.

To the southeast of the CBCP the two major soil associations are the Leon-Ridgeland-Wesconnett Association and the Wesconnett-Maurepas-Stockade Association.

The Leon-Ridgeland-Wesconnett Association is comprised of 30 percent Leon soils, 14 percent Ridgeland soils, 12 percent Wesconnett soils, and 44 percent soils of minor content. The Leon

soils are Aeric Haplaquods and the Ridgeland and Wesconnett soils are Typic Haplaquods. Leon soils are nearly level and poorly drained. Texture in all horizons is fine sand. Soil reaction ranges from extremely acid to strongly acid. The Ridgeland series consists of nearly level, poorly drained, acid soils that formed in marine sands. Texture in all horizons is fine sand. Soil reaction ranges from extremely acid to slightly acid. The Wesconnett series consists of nearly level, very poorly drained soils that have formed in marine sands. Texture of all horizons is fine sand. Soil reaction ranges from extremely acid to slightly acid.

The Wesconnett-Maurepas-Stockade Association is comprised of 30 percent Wesconnett soils, 25 percent Maurepas soils, 20 percent Stockade soils, and 25 percent soils of minor extent. The Wesconnett soils are discussed above. The Maurepas series is a member of the euic, thermic family of Typic Medisaprists. The Maurepas series consists of nearly level, very poorly drained, organic soils that formed from herbaceous and woody fibrous hydrophytic plant remains. Soil reaction ranges from medium acid to moderately alkaline. The Stockade series is a member of the fine-loamy, mixed, thermic family of Typic Umbraqualfs. It consists of nearly level, very poorly drained soils that formed in a thick bed of unconsolidated, moderately fine textured materials. Soil reaction ranges from strongly acid to slightly acid in the A horizon and from medium acid to neutral in the Bt and C horizons.

5.2.2.2 Timucuan Preserve

The 35,000 acre Timucuan Ecological and Historic Preserve is a complex of wetlands and uplands in the lower St. Johns River, Florida. Of the preserves 35,000 acres, 24,000 acres are in a wetland complex, ranging from saltwater marshes to tidally influenced freshwater marshes. The uplands consist of hardwood hammocks, flatwoods, and scrub (National Park Service 1990).

The salt marshes are dominated by smooth cordgrass (Spartina alterniflora) (Kurz and Wagner 1957). Subdominant species include saltmeadow cordgrass (Spartina patens), saltgrass (Distichlis spicata), and black needlerush (Juncus roemerianus). In the tidally influenced freshwater wetlands, such species as narrowleaf cattails (Typha angustifolia) potentially can be found.

Upland vegetation is comprised of mixed hardwoods which include oaks (Quercus spp.)

The soils of the marshlands are mapped as being within the Tisonia series (SCS 1978). The Tisonia series is a member of the clayey, montmorillonitic, euic, thermic family of Typic Sulfihemists. It consists of level to nearly level, very poorly drained, organic soils that formed from nonwoody halophytic plant remains over fine textured sediments. The soils are inundated twice a day by tides. Sulfur content ranges from 1.5 to about 3.5 percent. The organic layers

in all tiers are dominantly hemic materials. Thickness of the organic material is 16 to 27 inches. Reaction ranges from slightly acid to mildly alkaline in water throughout the profile in its natural state; after air drying. The pH in 0.01 M calcium chloride decreases to medium acid or lower.

5.2.3 Screening Analysis of Trace Elements

EPA's methodology described in the document "A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals" (Smith and Levenson 1980) was used to evaluate the potential for adverse effects of trace elements in the areas just discussed.

The procedure is a several step process for screening a source. The procedure begins by estimating the maximum annual average ambient concentrations associated with the CBCP emissions of trace elements. For trace elements, estimates of deposition in the soil and subsequent uptake by plants are made based on an estimate of the maximum annual concentration at the locations of interest of each trace element that is to be screened. The estimated concentration of the trace element in the soil and aerial plant parts are then compared to appropriate screening concentrations. Concentrations in excess of any of the screening concentrations would indicate that additional, refined site-specific studies may be required.

EPA's Industrial Source Complex Short Term (ISCST2) model (Version 92062) was used to calculate the maximum annual average concentration for each of the trace elements at each of the four sites referred to in Section 5.2.1 and 5.2.2. The modeling approach and emissions data are documented in Sections 1, 2 and 3.

The following equation from the screening procedure was used to estimate the maximum deposited concentration (DC) in the soil:

$DC = 21.5\ (N/d)X$

where:

DC = deposited concentration (ppmw);

N = expected life time of the CBCP (30 years);

d = depth of soil through which deposited material is distributed (3 cm as recommended in screening procedure); and

X = maximum annual average concentration from the CBCP emissions (ug/m^3).

Once the deposited concentration in the soil has been calculated, application of the plant:soil concentration ratios as provided by Smith and Leverson (1980) can be used to estimate the concentration in aerial plant parts (tissue concentration).

The equation from the screening procedure to estimate tissue concentrations of the trace elements is as follows:

TC = DC x CR

where:

TC = Tissue concentration

DC = Deposited Concentration

CR = Concentration Ratio

Calculated concentrations are then compared to tabulated screening concentrations (Tables 5-1 through 5-4). The screening concentrations are conservative criteria intended to address all types of soils and vegetation, including those exposed near the CBCP and the other areas discussed earlier. In the tables, the calculated deposited concentrations (DCs) are compared to the tabulated soil screening concentrations and the calculated plant tissue concentrations (TCs) are compared to the tabulated tissue screening concentrations. The screening concentrations, as provided in Smith and Levenson (1980), are from Dvorak and Lewis, et al. "Impacts of Coal-Fired Power Plants on Fish, Wildlife, and Their Habitats" (1978).

A calculated concentration in excess of any one of the two screening concentrations is an indication that a more detailed evaluation may be required, since it would be an indication of potential impacts to soils and/or plants.

In the Okefenokee, Wolf Island, the immediate vicinity of the CBCP, and the Timucuan Preserve, both the deposited concentrations and the tissue concentrations are well below the tabulated screening concentrations. This indicates that the deposition of the trace elements into the four areas listed above would not result in adverse impacts.

5.2.4 Impact of CBCP Gaseous Pollutant Emissions on Vegetation

A potential for direct impacts to vegetation from the operation of the CBCP would be from the emissions of SO_2, NO_2, and CO. Vegetation is exposed to gaseous substances in the

TABLE 5-1

Okefenokee Swamp Comparison of Elemental Deposition with EPA Screening Levels[1]

Element	Maximum CBCP Annual Impact ($\mu g/m^3$)	Deposited Concentration	Plant Tissue Concentration	Plant:Soil Concentration Ratios	EPA Screening Concentration[2]	
					Soil	Plant Tissue
Antimony	2.22×10^{-6}	4.77×10^{-4}	---	---	NA	NA
Arsenic	3.00×10^{-5}	6.45×10^{-3}	9.03×10^{-4}	0.14	3	0.25
Barium	1.27×10^{-4}	2.73×10^{-2}	---	---	---	---
Beryllium	1.82×10^{-6}	3.91×10^{-4}	---	---	NA	NA
Cadmium	6.60×10^{-6}	1.42×10^{-3}	1.52×10^{-2}	10.7	2.5	3
Chromium	2.20×10^{-7}	4.73×10^{-5}	9.46×10^{-7}	0.02	8.4	1
Cobalt	8.02×10^{-6}	1.72×10^{-3}	1.89×10^{-4}	0.11	NA	19
Copper	1.75×10^{-5}	3.76×10^{-3}	1.77×10^{-3}	0.47	40	0.73
Fluoride	1.55×10^{-4}	3.33×10^{-2}	9.99×10^{-4}	0.03	400	310
Lead	1.26×10^{-5}	2.71×10^{-3}	1.22×10^{-3}	0.45	1,000	126
Manganese	1.04×10^{-4}	2.24×10^{-2}	1.48×10^{-3}	0.066	2.5	400
Mercury	6.02×10^{-6}	1.29×10^{-3}	2.58×10^{-5}	0.02 - 0.5	455	NA
Molybdenum	2.10×10^{-5}	4.52×10^{-3}	---	---	NA	NA
Nickel	1.73×10^{-5}	3.72×10^{-3}	1.67×10^{-4}	0.045	500	60
Selenium	3.32×10^{-6}	7.14×10^{-4}	7.14×10^{-4}	1.0	13	100
Vanadium	6.89×10^{-5}	1.48×10^{-2}	1.48×10^{-4}	0.01	NA	NA

[1]All units in parts per million by weight, unless otherwise noted.
[2]Source: Dvorak and Lewis, et al. 1978, as cited in Smith and Levenson 1980
NA - Not available

TABLE 5-2

Wolf Island Comparison of Elemental Deposition with EPA Screening Levels[1]

Element	Maximum CBCP Annual Impact ($\mu g/m^3$)	Deposited Concentration	Plant Tissue Concentration	Plant:Soil Concentration Ratios	EPA Screening Concentration[2]	
					Soil	Plant Tissue
Antimony	1.23×10^{-6}	2.64×10^{-4}	---	---	NA	NA
Arsenic	1.66×10^{-5}	3.57×10^{-3}	5.00×10^{-4}	0.14	3	0.25
Barium	7.02×10^{-5}	1.51×10^{-2}	---	---	---	---
Beryllium	1.01×10^{-6}	2.17×10^{-4}	---	---	NA	NA
Cadmium	3.65×10^{-6}	7.85×10^{-4}	8.40×10^{-3}	10.7	2.5	3
Chromium	1.20×10^{-7}	2.58×10^{-5}	5.16×10^{-7}	0.02	8.4	1
Cobalt	4.46×10^{-6}	9.59×10^{-4}	1.05×10^{-4}	0.11	NA	19
Copper	9.78×10^{-6}	2.10×10^{-3}	9.87×10^{-4}	0.47	40	0.73
Fluoride	8.56×10^{-5}	1.84×10^{-2}	5.52×10^{-4}	0.03	400	310
Lead	6.94×10^{-6}	1.49×10^{-3}	6.71×10^{-4}	0.45	1,000	126
Manganese	5.76×10^{-5}	1.24×10^{-2}	8.18×10^{-4}	0.066	2.5	400
Mercury	3.33×10^{-6}	7.16×10^{-4}	1.43×10^{-5}	0.02 - 0.5	455	NA
Molybdenum	1.16×10^{-5}	2.49×10^{-3}	---	---	NA	NA
Nickel	9.63×10^{-6}	2.07×10^{-3}	9.32×10^{-5}	0.045	500	60
Selenium	1.84×10^{-6}	3.96×10^{-4}	3.96×10^{-4}	1.0	13	100
Vanadium	3.84×10^{-5}	8.26×10^{-3}	8.26×10^{-5}	0.01	2.5	NA

[1]All units in parts per million by weight, unless otherwise noted
[2]Source: Dvorak and Lewis, et al. 1978, as cited in Smith and Levenson 1980
NA - Not available

TABLE 5-3

Class II Area (Vicinity of CBCP) Comparison of Elemental Deposition with EPA Screening Levels[1]

Element	Maximum CBCP Annual Impact ($\mu g/m^3$)	Deposited Concentration	Plant Tissue Concentration	Plant:Soil Concentration Ratios	EPA Screening Concentration[2]	
					Soil	Plant Tissue
Antimony	4.00×10^{-5}	8.60×10^{-3}	---	---	NA	NA
Arsenic	1.90×10^{-4}	4.09×10^{-2}	5.73×10^{-3}	0.14	3	0.25
Barium	8.10×10^{-4}	1.74×10^{-1}	---	---	---	---
Beryllium	2.00×10^{-5}	4.30×10^{-3}	---	---	NA	NA
Cadmium	1.00×10^{-4}	2.15×10^{-2}	2.30×10^{-1}	10.7	25	3
Chromium	1.00×10^{-5}	2.15×10^{-3}	4.30×10^{-5}	0.02	8.4	1
Cobalt	6.20×10^{-4}	1.33×10^{-1}	1.46×10^{-2}	0.11	NA	19
Copper	2.76×10^{-3}	5.93×10^{-1}	2.79×10^{-1}	0.47	40	0.73
Fluoride	1.00×10^{-3}	2.15×10^{-1}	6.45×10^{-3}	0.03	400	310
Lead	9.00×10^{-5}	1.94×10^{-2}	8.73×10^{-3}	0.45	1,000	126
Manganese	6.70×10^{-4}	1.44×10^{-1}	9.50×10^{-3}	0.066	2.5	400
Mercury	4.00×10^{-5}	8.60×10^{-3}	1.72×10^{-4}	0.02 - 0.5	455	NA
Molybdenum	4.80×10^{-4}	1.03×10^{-1}	---	---	NA	NA
Nickel	1.69×10^{-3}	3.63×10^{-1}	1.63×10^{-2}	0.045	500	60
Selenium	1.10×10^{-4}	2.37×10^{-2}	2.37×10^{-2}	1.0	13	100
Vanadium	7.42×10^{-3}	1.59	1.59×10^{-2}	0.01	2.5	NA

[1]All units in parts per million by weight, unless otherwise noted.
[2]Source: Dvorak and Lewis, et al. 1978, as cited in Smith and Levenson 1980
NA - Not available

TABLE 5-4

Timucuan Preserve Comparison of Elemental Deposition with EPA Screening Levels[1]

Element	Maximum CBCP Annual Impact ($\mu g/m^3$)	Deposited Concentration	Plant Tissue Concentration	Plant:Soil Concentration Ratios	EPA Screening Concentration[2]	
					Soil	Plant Tissue
Antimony	1.14×10^{-5}	2.45×10^{-3}	---	---	NA	NA
Arsenic	1.51×10^{-4}	3.25×10^{-2}	4.55×10^{-3}	0.14	3	0.25
Barium	6.38×10^{-4}	1.37×10^{-1}	---	---	---	---
Beryllium	9.27×10^{-6}	1.99×10^{-3}	---	---	NA	NA
Cadmium	3.38×10^{-5}	7.27×10^{-3}	7.78×10^{-2}	10.7	2.5	3
Chromium	1.12×10^{-6}	2.41×10^{-4}	4.82×10^{-6}	0.02	8.4	1
Cobalt	4.37×10^{-5}	9.40×10^{-3}	1.03×10^{-3}	0.11	NA	19
Copper	1.03×10^{-4}	2.21×10^{-2}	1.04×10^{-2}	0.47	40	0.73
Fluoride	7.80×10^{-4}	1.68×10^{-1}	5.04×10^{-3}	0.03	400	310
Lead	6.36×10^{-5}	1.37×10^{-2}	6.17×10^{-3}	0.45	1,000	126
Manganese	5.24×10^{-4}	1.13×10^{-1}	7.46×10^{-3}	0.066	.25	400
Mercury	3.04×10^{-5}	6.54×10^{-3}	1.31×10^{-4}	0.02 - 0.5	455	NA
Molybdenum	1.08×10^{-4}	2.32×10^{-2}	---	---	NA	NA
Nickel	9.61×10^{-5}	2.07×10^{-2}	9.32×10^{-4}	0.045	500	60
Selenium	1.73×10^{-5}	3.72×10^{-3}	3.72×10^{-3}	1.0	13	100
Vanadium	3.87×10^{-4}	8.32×10^{-2}	8.32×10^{-4}	0.01	2.5	NA

[1]All units in parts per million by weight, unless otherwise noted.
[2]Source: Dvorak and Lewis et al. 1978, as cited in Smith and Levenson 1980
NA - Not available

atmosphere and to those deposited on the soil. Uptake of gases through foliage is the more rapid route of entry into plants of airborne gases, and plants are most often injured by this type of exposure.

Conclusions pertinent to the potential for adverse impacts of the CBCP's emissions on vegetation can be drawn from the modeling results presented in Section 2. In Section 2, comparisons were made of the combined impacts of the CBCP and SKC's package boilers with those of SKC's existing power and bark boilers in future recycle operation. Those comparisons clearly showed that there would be a net regional improvement in maximum concentrations of SO2, NO2, and CO. Since SKC's power and bark boilers are to be retired when the CBCP begins operation, it can be concluded that impacts (if any) of these substances on vegetation will be decreased. Indeed, the comparisons made in Section 2 did not reflect the existing shorter stacks on the power boilers and did not account for SKC's other sources to be retired when the CBCP SKC's package boilers begin operation. Thus, it can be concluded that the improvements will be even greater than those implied by the comparisons in Section 2. In addition, the CBCP's insignificant contributions to ambient concentrations of CO, the CBCP's nearly insignificant contributions to ambient concentrations of NO_x, the CBCP's small effect on SO_2 ambient concentrations, and the attainment of all ambient standards where the CBCP does contribute significant impacts, further attests to the conclusion of no adverse impacts due to the CBCP by itself.

5.2.5 Salt Deposition

The issue of salt deposition arises since the operation of the CBCP's cooling towers will emit salt as part of their PM emissions. The issue is important since high deposition rates can cause damage for some plant species. However, the coastal vegetation (vegetation which is exposed to salt spray) around the CBCP should not be greatly affected by the operation of the CBCP, as explained below, since these plants are adapted to saline conditions.

The highest salt deposition rates resulting from operation of the CBCP were predicted by dispersion modeling, as reported in Section 5.4 below, to occur within 200 meters of the cooling tower at locations east northeast through east southeast and west through west southwest of the cooling tower. Most of this area is located on the property of either the CBCP or SKC.

The only exception is for that area west through west southwest. Terrestrial vegetation in this area is sparse, comprised primarily by intertidal wetland plant species associated with the St. Johns River. Because these plants are adapted to saline conditions, they should not be adversely affected by the operation of the CBCP's cooling tower.

5.3 Visibility Impacts

5.3.1 Class I Area Visibility Impairment Analysis

EPA defines visibility impairment as any humanly perceptible change in visibility (visual range, contrast, coloration) from that which would have existed under natural conditions. 40 CFR § 51.301(X). ENSR performed a screening analysis to assess the potential for adverse visibility impairment in a manner consistent with the requirements and procedures contained in the EPA's Workbook for Plume Visual Impact Screening and Analysis. An analysis was performed for the two nearest Class I areas, Okefenokee National Wildlife Refuge and Wolf Island Wilderness Area. The point of reference for both areas was their nearest point to the CBCP: about 55 kilometers northwest of the CBCP's site for the former and about 100 km to the north for the latter.

Plume visibility impairment is most prevalent during stable dispersion conditions when stack emissions can travel significant distances with little dilution. NO_2 and primary particulate emissions are the major contributors to this visibility impairment, which occurs when the plume appears darker, lighter, or discolored with respect to the background sky or terrain.

The EPA Workbook identifies two levels of screening modeling to evaluate plume visibility impairment. Level 1 is designed to represent generic "worst-case" atmospheric dispersion conditions. As defined in the EPA Workbook, "worst-case" meteorological conditions are extremely stable (stability class F) atmospheric conditions, a very low wind speed (1 m/s) persisting for 12 hours and a wind that would transport the plume directly adjacent to the observer. In Level 2, an analysis of meteorological data is conducted to determine the site-specific worst-case conditions that are most appropriate for transport from the source to the Class 1 area. Both the Level 1 and Level 2 analyses make use of the U.S. EPA VISCREEN model. VISCREEN calculates two visibility impairment parameters, plume contrast (Cp) and plume perceptibility (ΔE). Critical values which represent the potential for significant visibility impairment are ± 0.05 for Cp and 2.0 for ΔE. If the magnitude of either Level 1 visibility impairment parameter exceeds the critical value, a Level 2 analysis can be performed.

VISCREEN computes C_p and ΔE for lines-of-sight both within and beyond the boundaries of the Class I area for two types of background, sky and terrain. Because integral vistas (Specific lines-of-sight to view points beyond the Class I area boundary) have not been identified for either the Okefenokee or Wolf Island Wilderness Areas, ENSR only modeled lines-of-sight within the Class I areas.

The Level 1 visibility analysis makes use of maximum short-term emission rates of particulate matter (PM) and oxides of nitrogen (NO_x). The VISCREEN model has been applied to all PM and

NO_x sources associated with the CBCP as proposed to be modified. This includes NO_x and PM from the CFB and limestone dryers plus PM from the cooling tower and aggregate material handling and storage operations. The inclusion of low-level sources with the CFB stack emissions is conservative because in VISCREEN all emissions are simulated as a single elevated plume. The Level 1 analysis also uses as input the distance to the closest portion of the Class I area and the background visual range determined from the EPA Workbook. The background visual range determined from the EPA Workbook is 25 km for Okefenokee and 40 km for Wolf Island.

The VISCREEN output of the Level 1 analysis for the Cedar Bay Project (as modified) is provided in Tables 5-5 and 5-6. Maximum screening values for Cp and ΔE are much less than the significant impact criteria. These worst-case modeling results, therefore, indicate that neither the Okefenokee nor Wolf Island Wilderness Areas will be affected by visible plumes from CBCP emissions.

As discussed above, the background visual range for Okefenokee Wilderness area, determined from the map in the EPA Workbook, is 25 km. However, because the line on the map marking the boundary between the 25 km and 40 km visual range appears to pass close to the eastern portion of the Class I area (about 20 km), the visibility screening analysis for Okefenokee was repeated using the 40 km background value. Because modeled visibility impairment is inversely related to background visual range, using the higher value will result in an even more conservative assessment. The resultant Level 1 values of the perceptibility of the CBCP's emissions(ΔE) were determined to be above the screening criteria of 2.0 while the values of plume contrast (against both the sky and terrain) were determined to be below the screening criteria of ± 0.05. Therefore, a Level 2 analysis was conducted.

The most important potential difference between Level 1 and Level 2 analysis centers on the meteorology of plume transport. Refinements of the worst case meteorological assumptions were made to conduct a Level 2 visibility screening analysis following the U.S. EPA Workbook. Five years of hourly surface observations from Jacksonville Airport (1983-1987) were examined to statistically determine site-specific worst case meteorological conditions. The first step in the selection process was to determine the range of directions which join the source and the Class I area. The Level 2 analysis requires the consideration of wind directions that would transport the plume from the source within a 22.5° sector. In this assessment, 2 of the 16 cardinal wind direction sectors would transport the Cedar Bay plume to Okefenokee WA. The next step in the Level 2 analysis is to categorize each of the hourly meteorological conditions within each of the two wind direction sectors in terms of wind speed and atmospheric stability. The objective is to rank in order of decreasing severity the worst case dispersion conditions along with the frequency of occurrence of these conditions for each wind direction sector that could transport emissions

TABLE 5-5

Visual Effects Screening Analysis for Source: Cedar Bay Class I Area: Okefenokee Wilderness

*** Level-1 Screening ***

Input Emissions for

Particulates	66.38	LB /HR
NOx (as NO2)	546.90	LB /HR
Primary NO2	.00	LB /HR
Soot	.00	LB /HR
Primary SO4	.00	LB /HR

**** Default Particle Characteristics Assumed

Transport Scenario Specifications:

Background Ozone:	.04 ppm
Background Visual Range:	25.00 km
Source-Observer Distance:	55.00 km
Min. Source-Class I Distance:	55.00 km
Max. Source-Class I Distance:	80.00 km
Plume-Source-Observer Angle:	11.25 degrees
Stability: 6	
Wind Speed: 1.00 m/s	

R E S U L T S

Asterisks (*) indicate plume impacts that exceed screening criteria

Maximum Visual Impacts INSIDE Class I Area
Screening Criteria ARE NOT Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	84.	55.0	84.	2.00	1.284	.05	-.002
SKY	140.	84.	55.0	84.	2.00	.386	.05	-.009
TERRAIN	10.	84.	55.0	84.	2.00	.144	.05	.002
TERRAIN	140.	84.	55.0	84.	2.00	.038	.05	.002

Maximum Visual Impacts OUTSIDE Class I Area
Screening Criteria ARE NOT Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	70.	52.3	99.	2.00	1.345	.05	-.002
SKY	140.	70.	52.3	99.	2.00	.403	.05	-.009
TERRAIN	10.	55.	49.2	114.	2.00	.191	.05	.003
TERRAIN	140.	55.	49.2	114.	2.00	.051	.05	.003

TABLE 5-6

Visual Effects Screening Analysis for
Source: Cedar Bay
Class I Area: Wolf Island

*** Level-1 Screening ***

Input Emissions for

Particulates	66.38	LB /HR
NOx (as NO2)	546.90	LB /HR
Primary NO2	.00	LB /HR
Soot	.00	LB /HR
Primary SO4	.00	LB /HR

**** Default Particle Characteristics Assumed

Transport Scenario Specifications:

Background Ozone:	.04 ppm
Background Visual Range:	40.00 km
Source-Observer Distance:	100.00 km
Min. Source-Class I Distance:	100.00 km
Max. Source-Class I Distance:	105.00 km
Plume-Source-Observer Angle:	11.25 degrees

Stability: 6
Wind Speed: 1.00 m/s

R E S U L T S

Asterisks (*) indicate plume impacts that exceed screening criteria

Maximum Visual Impacts INSIDE Class I Area
Screening Criteria ARE NOT Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	84.	100.0	84.	2.00	.431	.05	-.001
SKY	140.	84.	100.0	84.	2.00	.137	.05	-.004
TERRAIN	10.	84.	100.0	84.	2.00	.050	.05	.001
TERRAIN	140.	84.	100.0	84.	2.00	.013	.05	.001

Maximum Visual Impacts OUTSIDE Class I Area
Screening Criteria ARE NOT Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	70.	95.1	99.	2.00	.450	.05	-.001
SKY	140.	70.	95.1	99.	2.00	.143	.05	-.004
TERRAIN	10.	55.	89.5	114.	2.00	.065	.05	.001
TERRAIN	140.	55.	89.5	114.	2.00	.018	.05	.001

toward Okefenokee. Dispersion conditions are ranked by evaluating the product of $\sigma_z u$, where σ_z is the Pasquill-Gifford vertical diffusion coefficient for the given stability class and downwind distance to Okefenokee and u is the wind speed.

The Level 2 frequency tables as described in the EPA Workbook were developed for each of the meteorological data years and each wind direction sector as shown in Tables 5-7 and 5-8. In the left-hand column, the tables list the meteorological category identified by stability parameter category and wind speed (m/sec). The next column is the vertical dispersion parameter times the wind speed SIGZ*U which is used to rank the meteorological conditions in terms of potential plume perceptibility. The transport time in the next column is based on 1) the minimum distance from the CBCP to Okefenokee for the particular wind direction sector and 2) the midpoint value of the wind speed class, i.e., the wind speed class of 1 m/s would use 0.5 m/s, 2 m/s would use 1.5 m/s, and so on. Dispersion conditions associated with a transport time of more than 12 hours are not considered in the Level-2 screening analysis. The Level 2 analysis categorizes hours by time of day into four six-hour periods. The next four columns represent the frequency of occurrence of the corresponding meteorological condition for each of four periods. The Workbook calls for the maximum frequency among the four periods to be summed in cumulative frequency, which is listed in the far right column.

EPA's basis for using four daily periods rather than basing frequency on a single 24-hour period is that even if only one six-hour period in a day is affected, it will be counted as a "day" in terms of visibility impairment. The objective of the analysis is to identify the dispersion condition for each wind direction sector that has a $\sigma_z u$ product with a cumulative probability of 1 percent. The 1-percentile meteorology is assumed to be indicative of the worst case day in a year when the one percentile meteorological condition is coupled with the 50 percentile background ozone concentration and the 50 percentile visual range, i.e.,

$$0.01 \times 0.5 \times 0.5 = 0.0025 = \frac{1}{400} \approx \frac{1}{365} \; or 1 \; day per year$$

The dispersion condition representing the one percentile is then used in VISCREEN. Other inputs are default median background ozone concentration (0.04 ppm) and a 40 km median background visual range.

As shown in Tables 5-7 and 5-8, the one percentile meteorological conditions were determined for each wind direction sector and meteorological year. For each wind direction sector, Level 2 VISCREEN modeling was performed using all identified one percentile dispersion conditions to evaluate worst-case visual impacts. The results of the Level 2 screening analysis, presented in

TABLE 5-7

Worst-Case Meteorological Conditions for Plume Discoloration Calculations for ESE Wind Direction Sector

Stability, Wind Speed Category	STGZ*U (m2/s)	Transport Time (hrs)	Frequency by Time of Day				Maximum 6-hr Frequency	Cumulative Frequency
			0-6	6-12	12-18	18-24		
1983 Meteorological Data								
F,1	81	31*	0.274	0.000	0.000	0.411	0.000	0.000
E,1	156	31*	0.046	0.091	0.000	0.000	0.000	0.000
F,2	163	10	0.137	0.000	0.000	0.137	0.137	0.137
F,3	244	6	0.046	0.000	0.000	0.320	0.320	0.457
E,2	312	10	0.000	0.000	0.000	0.000	0.000	0.457
F,4	325	4	0.000	0.000	0.000	0.137	0.137	0.594
D,1	343	31*	0.000	0.091	0.000	0.137	0.000	0.594
F,5	406	3	0.000	0.000	0.000	0.000	0.000	0.594
E,3	468	6	0.000	0.091	0.000	0.502	0.502	1.096
1984 Meteorological Data								
F,1	81	31*	2.641	0.228	0.000	2.140	0.000	0.000
E,1	156	31*	0.091	0.273	0.000	0.000	0.000	0.000
F,2	163	10	0.046	0.000	0.000	0.319	0.319	0.319
F,3	244	6	0.000	0.000	0.000	0.683	0.683	1.002
1985 Meteorological Data								
F,1	81	31*	3.242	0.228	0.000	1.553	0.000	0.000
E,1	156	31*	0.091	0.548	0.000	0.091	0.000	0.000
F,2	163	10	0.183	0.000	0.000	0.228	0.228	0.228
F,3	244	6	0.000	0.000	0.000	0.639	0.639	0.868
E,2	312	10	0.000	0.000	0.000	0.137	0.137	1.005
1986 Meteorological Data								
F,1	81	31*	1.142	0.091	0.000	0.959	0.000	0.000
E,1	156	31*	0.046	0.091	0.000	0.046	0.000	0.000
F,2	163	10	0.137	0.000	0.000	0.137	0.137	0.137
F,3	244	6	0.091	0.000	0.000	0.183	0.183	0.320
E,2	312	10	0.000	0.046	0.000	0.137	0.137	0.457
F,4	325	4	0.000	0.000	0.000	0.137	0.137	0.594
D,1	343	31*	0.000	0.137	0.091	0.046	0.000	0.594
F,5	406	3	0.000	0.000	0.000	0.000	0.000	0.594
E,3	468	6	0.091	0.046	0.046	0.365	0.365	0.959
F,6	488	3	0.000	0.000	0.000	0.000	0.000	0.959
F,7	569	2	0.000	0.000	0.000	0.000	0.000	0.959
E,4	624	4	0.000	0.046	0.091	0.502	0.502	1.461
1987 Meteorological Data								
F,1	81	31*	1.918	0.091	0.000	1.416	0.000	0.000
E,1	156	31*	0.091	0.274	0.000	0.228	0.000	0.000
F,2	163	10	0.046	0.000	0.000	0.274	0.274	0.274
F,3	244	6	0.046	0.000	0.000	0.137	0.137	0.411
E,2	312	10	0.000	0.000	0.000	0.046	0.046	0.457
F,4	325	4	0.000	0.000	0.000	0.137	0.137	0.594
D,1	343	31*	0.365	0.183	0.091	0.274	0.000	0.594
F,5	406	3	0.000	0.000	0.000	0.000	0.000	0.594
E,3	468	6	0.091	0.000	0.046	0.685	0.685	1.279

* Frequency of this meteorological condition was not included in the cumulative frequency summation since plume transport time is greater than 12 hours.

TABLE 5-8

Worst-Case Meteorological Conditions for Plume Discoloration Calculations for SE Wind Direction Sector

Stability, Wind Speed Category	SIGZ*U (m2/s)	Transport Time (hrs)	Frequency by Time of Day 0–6	6–12	12–18	18–24	Maximum 6-hr Frequency	Cumulative Frequency
1983 Meteorological Data								
F,1	83	33*	2.146	0.091	0.000	1.689	0.000	0.000
E,1	160	33*	0.091	0.228	0.000	0.000	0.000	0.000
F,2	166	11	0.411	0.046	0.000	0.685	0.685	0.685
F,3	249	7	0.411	0.046	0.000	1.187	1.187	1.872
1984 Meteorological Data								
F,1	83	33*	4.189	0.228	0.000	2.550	0.000	0.000
E,1	160	33*	0.364	0.455	0.000	0.228	0.000	0.000
F,2	166	11	0.182	0.046	0.000	1.184	1.184	1.184
1985 Meteorological Data								
F,1	83	33*	2.785	0.183	0.000	2.009	0.000	0.000
E,1	160	33*	0.228	0.411	0.046	0.137	0.000	0.000
F,2	166	11	0.365	0.091	0.000	1.005	1.005	1.005
1986 Meteorological Data								
F,1	83	33*	4.247	0.457	0.000	3.516	0.000	0.000
E,1	160	33*	0.183	0.411	0.000	0.137	0.000	0.000
F,2	166	11	0.274	0.000	0.000	1.142	1.142	1.142
1987 Meteorological Data								
F,1	83	33*	4.658	0.365	0.000	3.699	0.000	0.000
E,1	160	33*	0.046	0.502	0.000	0.320	0.000	0.000
F,2	166	11	0.228	0.000	0.000	0.639	0.639	0.639
F,3	249	7	0.137	0.000	0.000	1.142	1.142	1.781

* Frequency of this meteorological condition was not included in the cumulative frequency summation since plume transport time is greater than 12 hours.

Table 5-9, indicate that the values of plume perceptibility (ΔE) and plume contrast to the sky and terrain (Cp) are below the screening criteria values. Table 5-10, the VISCREEN model output for the Level 2 analysis which results in the highest calculated values of ΔE and C_p, also lists the inputs used in the analysis.

Thus, the emissions from the proposed facility are shown to have an insignificant impact on visibility at both the Okefenokee and Wolf Island Class I areas.

The FWS conducted a similar analysis and came to the same conclusions reported here.[1]

5.3.2 Class II Area Visibility Assessment

A VISCREEN analysis has also been performed to evaluate plume visibility in the area surrounding the facility. Although specifically designed to evaluate plume visibility at somewhat distant Class I areas, VISCREEN, with appropriate limitations, can be applied in a more generalized context.

Because any vistas in the vicinity of the CBCP contain no elevated terrain it is appropriate to use the VISCREEN visibility parameters applicable to the effect of the plume against the background sky. In addition, because VISCREEN simulates the emissions as a point source (with infinite concentration at the origin), it is inappropriate to apply the model to simulate observers very close to the source. In the Class II analysis, ENSR therefore limited the observer distance to a minimum of 5 km out to a maximum distance of 25 km. Two types of sight-lines were considered. In the first case, the observer is looking almost straight down the centerline of the plume in the direction of the stack. Given the assumed background visual range of 40 km, for such a line-of-sight, the facility would be in full view. In the second case, the observer is assumed to view the plume (if it were visible) at a right angle. This cross-plume case is more applicable to the general observer than is the first case.

Meteorological conditions selected for the Class II area VISCREEN analysis are neutral stability (D) and 3 m/sec wind speed. These conditions are typical of early morning hours before the atmosphere becomes unstable from the sun's surface heating. An unstable atmosphere forms in mid-morning thereby enhancing dispersion and reducing the potential for visible plumes. Stable conditions associated with a lack of surface heating from the sun (categories E and F) were not considered because they typically occur at night when plume visibility is not an issue. The Class I analysis addresses stable conditions in order to consider the potential for overnight long-range

[1]Correspondence from J. Pulliam, Jr.; Regional Director, Fish and Wildlife Service; Atlanta, Georgia to C.H. Fancy, Chief, Bureau of Air Regulation, Florida DER; December 24, 1992.

TABLE 5-9

Results of Level 2 Analysis of Potential Visibility Impairment at Okefenokee WA Due to CBCP as Proposed to be Modified

Visibility Impairment Parameter	Wind Director Section	Closest Distance to Class I Area (km)	1-Percentile Meteorological Condition (Stability, Wind Speed Category)	Maximum Calculated Value	Screening Criteria Value
Plume Perceptibility (ΔE)	ESE	55.0	F,3 E,2 E,3 E,4	1.261 0.989 0.667 0.503	2.0
	SE	59.5	F,2 F,3	1.613 1.098	
Plume Contrast (C_p)	ESE	55.0	F,3 E,2 E,3 E,4	-0.008 -0.006 -0.004 -0.003	±0.05
	SE	59.5	F,2 F,3	-0.010 -0.007	

TABLE 5-10

Visual Effects Screening Analysis for
Source: USG - CBCP as Modified
Class I Area: Okefenokee NWR
F,2 Meteorological Condition for SE Wind Direction

*** User-selected Screening Scenario Results ***

Input Emissions for

Particulates	66.38	LB /HR
NOx (as NO2)	546.90	LB /HR
Primary NO2	.00	LB /HR
Soot	.00	LB /HR
Primary SO4	.00	LB /HR

**** Default Particle Characteristics Assumed

Transport Scenario Specifications:

Background Ozone:	.04 ppm
Background Visual Range:	40.00 km
Source-Observer Distance:	59.50 km
Min. Source-Class I Distance:	59.50 km
Max. Source-Class I Distance:	101.60 km
Plume-Source-Observer Angle:	11.25 degrees

Stability: 6
Wind Speed: 2.00 m/s

R E S U L T S

Asterisks (*) indicate plume impacts that exceed screening criteria

Maximum Visual Impacts INSIDE Class I Area
Screening Criteria ARE NOT Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	84.	59.5	84.	2.00	1.613	.05	-.001
SKY	140.	84.	59.5	84.	2.00	.565	.05	-.010
TERRAIN	10.	84.	59.5	84.	2.00	.280	.05	.004
TERRAIN	140.	84.	59.5	84.	2.00	.082	.05	.003

Maximum Visual Impacts OUTSIDE Class I Area
Screening Criteria ARE NOT Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	75.	57.6	94.	2.00	1.628	.05	-.001
SKY	140.	75.	57.6	94.	2.00	.570	.05	-.010
TERRAIN	10.	55.	53.2	114.	2.00	.329	.05	.005
TERRAIN	140.	55.	53.2	114.	2.00	.100	.05	.004

transport to the Class I area. This is not appropriate in considering near-field visibility where the transport time is short.

The results, shown in Table 5-11, indicate that beyond 5 km the CBCP's plume would only be detectable when directly viewing the facility at distances within 20 km. Because the facility would have to be in full view to experience this impact, the plume to sky contrast would not affect scenic vistas since it would be secondary to the contrast of the facility itself with background. For the general observer, the potential for a visible plume is limited to the closest distance modeled (5 km). At greater distances, the modeled visibility parameters are much less than the critical values and fall off rapidly. Therefore, the potential for a visible plume from the CBCP is expected to be localized and occur only under light wind, neutral dispersion conditions which occur primarily during early daylight hours.

5.4 CBCP Cooling Tower Impact Analysis

This section presents two analyses: the potential for fogging or icing conditions on nearby transportation routes to be caused by the CBCP's cooling towers and salt deposition rates due to cooling tower operations. The probability (in hours per year) that fogging or icing may occur on nearby transportation routes as well as the salt deposition rates were determined by performing comprehensive, conservative atmospheric modeling of cooling tower plume thermodynamics and dispersion. Representative meteorological data from Jacksonville International Airport was utilized in conjunction with tower design data as input to a recommended model. The model predicted the probability of fogging and icing over a dense grid of locations encompassing the local transportation routes. The results of the analysis indicate that the cooling towers pose no significant threat to these transportation routes. The results of the salt deposition analyses are employed in Section 5.2, to address impacts on local vegetation.

5.4.1 Technical Approach

The potential for visibility impairment (fogging) and rime icing caused by the operation of the CBCP's cooling tower was evaluated. The vapor plume emitted by a cooling tower will become visible (condense) when the sum of the water vapor in the plume plus the ambient water vapor reaches the saturation mixing ratio. The saturation mixing ratio is a function of temperature. As the temperature decreases, the amount of water vapor the atmosphere can hold before condensation occurs also decreases. Therefore, the maximum occurrences of visible plumes would be expected during periods when the background relative humidity is high and the temperature is low. Icing on road surfaces can result from two conditions. The first condition is the impaction of the condensed plume on road surfaces under freezing temperatures. The

TABLE 5-11

VISCREEN Class II Area
Visibility Parameters for the CBCP

Distance (km)	View Towards Source		Cross Plume View	
	ΔE	Cp	ΔE	Cp
5	8.0	-0.044	3.0	-0.016
10	6.6	-0.039	1.5	-0.009
15	4.0	-0.026	0.7	-0.005
20	2.1	-0.016	0.4	0.004
25	1.3	-0.008	0.3	-0.002

Notes:
Detectability thresholds: ΔE = 2.0, Cp = ±0.05
Meteorological Conditions: Stability D, 3 m/sec wind speed

second condition is the deposition of drift droplets, which escape the cooling tower, on road surfaces with temperatures at or below the freezing point.

Salt deposition resulting from the operation of the cooling tower is determined through the deposition of the drift droplets which contain a concentration of dissolved or suspended salt. Therefore, the magnitude of salt deposition is directly related to the concentration of salt in the water circulating in the cooling tower and the efficiency of the cooling tower drift eliminators.

5.4.2 Model Selection

The Electric Power Research Institute (EPRI) has supported research efforts to develop and validate a mathematical model to predict seasonal and annual salt deposition and the probabilities of icing and fogging caused by cooling tower plumes. The result of their efforts is the Seasonal and Annual Cooling Tower Impacts (SACTI) model (EPRI, 1984) developed and validated for EPRI by Argonne National Laboratory, Argonne, IL. The SACTI model represents an improvement over previous cooling tower models that applied very simplified methods. The methodology employed in the SACTI model is based on the premise that distinct plume formations can be described for a minimum number of wind direction-tower orientations. The SACTI model determines the combinations of cooling tower operation and ambient meteorological conditions that describe distinct, visible plumes. These plume conditions are then physically evaluated through the use of an integral type plume model to simulate thermodynamic interaction of the plume with ambient air as well as physical plume dispersion. The model then determines potential frequencies of fogging and icing based on input of meteorological data for a specific location.

In determining salt drift deposition the SACTI model considers plume dispersion, droplet breakaway, droplet evaporation, and deposition. Droplet breakaway refers to the process by which the drift droplets settle out of the dispersing plume. Variables such as the drift rate, the salt concentration of the circulating water, density of the salt, and the drift droplet distribution are input to the SACTI model in addition to the tower design data.

The SACTI model was chosen for this application primarily because it represents a validated cooling tower plume model designed for assessing cooling tower plume impacts. The model contains a state-of-the-art methodology for these assessments and has been applied in many regulatory applications (e.g., Environmental Impacts Assessments).

5.4.3 Source Data

The CBCP will operate a linear-mechanical draft wet design cooling tower. The design information required by the SACTI model for the tower is presented in Table 5-12. These design conditions are based on the performance of the cooling tower at full capacity. Based upon these data, the SACTI model internally computes tower performance for varying environmental conditions.

5.4.4 Meteorological Data

The SACTI model was applied with five years (1983-1987) of surface observations from Jacksonville International Airport, Jacksonville, FL. These surface observations contain the parameter values required by the SACTI model. These parameters are:

- wind speed,
- wind direction,
- temperature,
- relative humidity and dew point temperature,
- cloud cover (opaqueness), and
- cloud ceiling height.

5.4.5 Evaluation of Ground-Level Fogging and Icing

Impacts of the cooling tower were evaluated with the SACTI model for the potential to create fogging and icing conditions on the nearby transportation routes. Surface fogging is assumed to occur when a visible plume reaches ground-level at the road surface. Icing is predicted to occur during freezing conditions when the visible plume impacts the road surface.

The predicted ground-level fogging impacts for 1983 through 1987 meteorological conditions are presented in Tables 5-13 through 5-17. No icing is predicted to occur for any of the years of meteorology. The tables show the probability in hours per year of fogging predicted by the SACTI model. The modeled impacts are shown for receptor locations relative to the location of the center of the tower. The receptors were placed at ground level along 16 equally spaced radials (22.5 degree increments) at 100 meter distance increments. The receptor locations indicated by the plume heading and distance are assumed to represent the entire area of a sector within which they are centered. For example, a location at a southerly (S) plume heading and a distance of 200 meters represents the area between 150 and 250 meters downwind and ± 11.25 degrees crosswind. Results are included only out to 1600 meters since no impacts of fogging were

TABLE 5-12

CBCP Cooling Tower Design Information

Tower Type	Linear - Mechanical Draft	
Number of Cells	7	
Circulation Rate	160,000 gpm	
Tower Heat Dissipation	375 MW	
Input Air Flow Rate	4791 kg/sec	
Exit Diameter of Each Cell	9.75 m	
Drift	.001 percent of circulation	
Cooling Water Salt Concentration	0.0125 gm salt/gm solution	
Salt Density	1.5 gm/cm^3	
Drift Droplet Parameters	Drop Diameter (μm)	Fraction of Mass Emission Rate
	1	0.00
	20	0.25
	45	0.25
	85	0.20
	115	0.10
	170	0.10
	240	0.05
	375	0.04
	425	0.01
Tower Dimensions		
Height	14.94 m	
Length	115.72 m	
Width	16.46 m	

Source. December 3, 1992 Fascimile transmission from Arshad Nawaz of Bechtel to Jeff Yuhas of ENSR.

TABLE 5-13

SACTI Modeling Results
Probability of Plume Fogging (Hours/Year)
1983 Meteorology

Distance from Tower* (m)	Plume Heading*															
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE
100		2.1	6.0	2.5	2.3	1.6	1.2				1.3	4.7	6.2	4.7	1.1	
200		1.7	8.0	0.9	2.4	0.9	2.0				0.9	4.3	6.8	4.3	0.8	
300		1.0	8.0	0.4	2.0	0.4	1.2				0.5	3.3	5.9	3.3	0.4	
400			4.9		2.0		0.2					2.0	5.0	2.0		
500			4.0		2.0							2.0	5.0	2.0		
600			4.0		2.0							1.7[E]	4.3[E]	2.0[E]		
700			4.0		1.0							1.0[E]	2.5[E]	1.0[E]		
800			4.0		1.0							1.0	2.5	1.0[E]		
900			4.0		1.0							1.0	2.5	1.0[E]		
1000			4.0		1.0							1.0	2.5	1.0[E&R]		
1100			4.0		1.0							1.0	2.5	1.0[E&R]		
1200			2.0		1.0							1.0	2.5	1.0[R]		
1300					0.2							1.0	2.5	0.2[R]		
1400												1.0	2.5			
1500												1.0	2.5			
1600												0.7	1.9			

* Relative to center of tower.
[E] = Impact on Eastport Road.
[R] = Impact on Route 105.

TABLE 5-14

SACTI Modeling Results
Probability of Plume Fogging (Hours/Year)
1984 Meteorology

Distance from Tower* (m)	Plume Heading*															
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE
100	4.8		1.8													
200	8.0		3.0													
300	4.8		1.8													
400			0.3													
500																
600																
700																
800																
900																
1000																
1100																
1200																
1300																
1400																
1500																
1600																

* Relative to center of tower.

TABLE 5-15

SACTI Modeling Results
Probability of Plume Fogging (Hours/Year)
1985 Meteorology

Distance from Tower* (m)	Plume Heading*															
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE
100											0.6		1.9	3.0		
200											1.0		0.5	2.0		
300											0.6		0.2	1.0		
400											0.1			1.0		
500														1.0		
600														1.0[E]		
700														0.5[E]		
800														0.5[E]		
900														0.5[E]		
1000														0.5[E&R]		
1100														0.5[E&R]		
1200														0.5[R]		
1300														0.1[R]		
1400																
1500																
1600																

* Relative to center of tower.
E = Impact on Eastport Road.
R = Impact on Route 105.

TABLE 5-16

SACTI Modeling Results
Probability of Plume Fogging (Hours/Year)
1986 Meteorology

Distance from Tower* (m)	Plume Heading*															
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE
100		0.6	1.0				0.6									
200		0.8	2.0				1.0									
300		0.5	1.0				0.6									
400			0.1				0.1									
500																
600																
700																
800																
900																
1000																
1100																
1200																
1300																
1400																
1500																
1600																

* Relative to center of tower.

TABLE 5-17

SACTI Modeling Results
Probability of Plume Fogging (Hours/Year)
1987 Meteorology

Distance from Tower* (m)	Plume Heading*															
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE
100		0.7	1.9	1.6	1.1								1.0	1.5	1.0	0.6
200		0.8	1.8	2.0	0.8								0.5	1.4	0.5	0.8
300		0.5	1.4	2.0	0.4								0.2	1.0	0.2	0.5
400			0.6	2.0										1.0		
500			0.5	2.0										1.0		
600			0.5	2.0										1.0[E]		
700			0.5	1.0										0.5[E]		
800			0.5	1.0										0.5[E]		
900			0.5	1.0										0.5[E]		
1000			0.5	1.0										0.5[E&R]		
1100			0.5	1.0										0.5[E&R]		
1200			0.2	1.0										0.5[R]		
1300				0.2										0.1[R]		
1400																
1500																
1600																

* Relative to center of tower.
[E] = Impact on Eastport Road.
[R] = Impact on Route 105.

predicted to occur beyond 1600 meters. A blank for a receptor in the tables indicates that no fogging was predicted by the model.

The transportation routes investigated include Eastport Road, Route 105, Cedar Bay Road and Baisden Road. Eastport Road is located about 600 m to the east of the CBCP and Route 105, which runs east and west, is located about 1000 m to the south of the CBCP. Cedar Bay Road is located about 800 m to the northeast of CBCP while Baisden Road is located about 1700 m to the north of the facility. Of these transportation routes, impacts were only predicted to occur at locations on Eastport Road and Route 105. A letter identification next to the results shown in Tables 5-13 through 5-17 indicate the route or routes affected by the prediction. "E" indicates that the receptor's sector encompasses Eastport Road, while "R" indicates the receptor's sector encompasses Route 105. "E&R" indicates both Eastport Road and Route 105 are impacted within the receptor's sector.

The highest probability of fogging predicted in any year on Eastport Road is 4.3 hours/year. This value is predicted for 1983 meteorology at 600 m E. The highest probability of fogging impact on any Eastport Road receptor predicted for any of the other years is 1.0 hour/year. Two years, 1984 and 1986, predicted no fogging on Eastport Road. The highest probability of fogging predicted in any year on Route 105 is 1.0 hour/year. This value is predicted for 1983 meteorology at 1000 m ESE and 1100 m ESE. The highest probability of fogging impact on any Route 105 receptor predicted for any of the other years is 0.5 hour/year. As was the case for Eastport Road, no fogging is predicted on Route 105 with 1984 and 1986 meteorology.

The meteorological conditions associated with the predictions of plume fogging represent dry-bulb temperatures at or below 43°F, wet-bulb temperatures that represent 70-90 percent relative humidities, neutral atmospheric stability, and high wind speeds (10.0 to 17.0 m/sec).

5.4.6 Interpretation of Fogging and Icing Results

The SACTI model predicted impacts are considered to be a conservative estimate of the probability of the cooling tower's impacting local visibility or roadway icing. This is true for the following reasons. The meteorological conditions for which fogging are predicted are naturally very damp and related to inclement weather. Therefore, the existing environmental conditions by themselves are conducive to limited visibility. Under such conditions, the cooling tower plumes would be less discernible over background conditions. The frequencies, in hours per year, of predicted impacts are not necessarily consecutive hours, but are joint probabilities of several conditions for a given representative year of meteorological conditions. When considering the joint probability of cooling tower operation at full capacity with these conditions, the predictions are seen as being even more conservative. For these reasons, and based on the low

probabilities predicted, the visibility reduction due to the CBCP's cooling tower is not expected to pose a threat to local transportation routes.

5.4.7 Salt Deposition Results

The SACTI model predictions of salt deposition rates are presented in Tables 5-18 through 5-22 for each of the five years of meteorological data simulated. For each plume heading and distance from the center of the cooling tower, the predicted average monthly salt deposition rate is listed. Model predictions were made out to a distance of 10 kilometers. As can be seen from the tables, the highest deposition rates are predicted to occur very close to or on the property of either the CBCP or SKC. The implications of these results in terms of the impacts on local vegetation are discussed in Section 5.2.

5.5 Screening Modeling Analysis for Low Load CFB Operation

A screening modeling analysis was conducted to compare impacts of four operating scenarios for the CBCP's CFBs as presented in Table 5-23. The purpose of this analysis is to evaluate the potential for lower load operation to result in higher total ambient CBCP impacts than maximum load.

The ISCST dispersion model was applied with a range of meteorological conditions to assess the relative air quality impact of air emissions from the CBCP's CFBs under the four operating load conditions. For each comparison, unit emissions were assumed for the 100 percent load case and scaled down linearly for each of the remaining load cases (i.e., 100% load emissions = 1 g/sec; 67% load emissions = 0.67 g/sec; 40% load emissions = 0.040 g/sec; and 17% load emissions = 0.17 g/sec). This may not be entirely accurate for CO emissions from a single CFB boiler at less than 100% load, when CO emissions may be slightly higher than the scaled down value. However, the ambient impacts of CO attributable to the CBCP are so far below the SIL that this departure from linearity is not considered to be significant for this analysis.

The meteorological conditions used in the analysis are listed in Table 5-24. Receptors were placed in a single radial downwind from the stack at the following distances:

TABLE 5-18

Plume Salt Deposition Table (KG./)KM.**2-MO.)) 1983

CBCP property

SKC property

5402-027 Cedar Bay LMCDT - 7 cells 1983 Met 3 SWDs 12/04/92
SEASON = ANNUAL

DISTANCE FROM TOWER (M)	WIND FROM N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	AVG
	PLUME HEADED S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	AVG
100	0.00	0.00	0.00	182.44	174.73	132.43	0.00	0.00	0.00	0.00	0.00	70.59	334.19	277.51	0.00	0.00	73.24
200	0.00	0.00	0.00	328.57	358.78	260.22	0.00	0.00	0.00	0.00	0.00	185.73	501.97	382.68	0.00	0.00	131.76
300	0.00	0.00	7.20	107.45	122.51	79.28	9.79	0.00	0.00	0.00	4.42	115.71	216.04	87.79	4.42	0.00	47.16
400	0.02	0.07	11.28	61.04	76.70	49.20	13.80	16.37	28.62	16.41	16.52	61.80	147.84	37.09	13.80	0.07	35.70
500	6.59	6.34	11.83	20.36	27.98	14.19	13.51	12.64	20.65	14.33	6.84	29.34	41.80	20.00	7.01	5.78	16.70
600	21.29	17.02	19.52	15.16	19.20	7.33	17.06	18.12	21.05	20.51	14.26	17.81	32.14	21.31	13.14	13.33	18.58
700	22.71	17.37	28.61	11.38	13.24	5.32	21.32	15.22	25.60	16.03	19.81	11.08	20.12	12.63	21.87	12.98	17.21
800	17.05	12.13	20.35	9.53	10.47	4.59	13.22	8.66	15.04	8.88	13.13	9.49	14.91	8.74	17.77	8.44	12.02
900	7.86	4.89	13.04	8.72	9.49	4.28	9.99	4.93	7.79	4.64	8.41	9.03	13.09	7.69	14.07	4.12	8.25
1000	2.81	1.87	6.01	8.72	9.49	4.28	5.07	3.53	5.35	3.11	4.69	9.03	13.09	7.69	7.79	1.38	5.87
1100	1.49	0.98	2.33	8.72	9.49	4.28	1.83	3.05	4.85	2.83	2.55	9.03	13.09	7.69	3.17	0.71	4.74
1200	0.66	0.57	1.87	8.72	9.49	4.28	1.42	2.78	4.81	2.81	2.36	9.03	13.09	7.69	2.52	0.40	4.53
1300	0.58	0.53	1.61	7.38	8.40	3.86	1.26	2.75	4.80	2.80	2.21	8.53	12.08	6.93	2.00	0.37	4.12
1400	0.58	0.53	1.61	5.34	6.49	3.27	1.26	2.75	4.80	2.80	2.21	7.56	10.51	5.98	2.00	0.37	3.62
1500	0.58	0.53	1.61	4.61	5.66	3.09	1.26	2.75	4.80	2.80	1.45	7.09	9.93	5.77	1.24	0.37	3.34
1600	0.58	0.53	1.51	3.54	4.20	2.02	1.26	0.96	1.67	1.01	0.96	5.84	8.60	4.52	0.76	0.37	2.39
1700	0.58	0.53	1.51	3.49	4.13	1.95	1.26	0.53	0.91	0.58	0.96	5.78	8.54	4.46	0.76	0.37	2.27
1800	0.58	0.53	1.51	3.49	4.13	1.95	1.26	0.53	0.91	0.58	0.96	5.78	8.54	4.46	0.76	0.37	2.27
1900	0.58	0.53	1.51	3.00	3.34	1.50	1.26	0.53	0.91	0.58	0.96	4.61	7.43	3.79	0.76	0.37	1.98
2000	0.58	0.53	1.51	2.55	2.84	1.24	1.26	0.53	0.91	0.58	0.96	3.98	6.64	3.28	0.76	0.37	1.78
2100	0.56	0.48	1.51	2.11	2.51	1.08	1.26	0.40	0.72	0.42	0.96	3.51	6.03	2.98	0.76	0.32	1.60
2200	0.56	0.47	1.51	1.86	2.12	0.93	1.26	0.37	0.67	0.38	0.96	2.94	5.35	2.61	0.76	0.31	1.43
2300	0.56	0.47	1.51	1.09	1.42	0.62	1.26	0.37	0.67	0.38	0.96	2.09	3.99	1.99	0.76	0.31	1.15
2400	0.56	0.47	1.51	1.03	1.34	0.57	1.26	0.37	0.67	0.38	0.96	1.96	3.76	1.89	0.76	0.31	1.11
2500	0.56	0.47	0.76	0.86	1.11	0.45	0.40	0.37	0.67	0.38	0.43	1.62	3.27	1.54	0.52	0.31	0.86
2600	0.56	0.47	0.76	0.63	0.83	0.36	0.40	0.37	0.67	0.38	0.43	1.18	2.64	1.10	0.52	0.31	0.73
2700	0.56	0.47	0.76	0.46	0.61	0.29	0.40	0.37	0.67	0.38	0.43	0.86	2.11	0.70	0.52	0.31	0.62
2800	0.56	0.47	0.76	0.38	0.48	0.21	0.40	0.37	0.67	0.38	0.43	0.73	1.77	0.45	0.52	0.31	0.55
2900	0.56	0.47	0.76	0.34	0.41	0.18	0.40	0.37	0.67	0.38	0.43	0.68	1.61	0.35	0.52	0.31	0.53
3000	0.56	0.47	0.76	0.28	0.33	0.17	0.39	0.37	0.67	0.38	0.42	0.63	1.43	0.21	0.52	0.31	0.49
3100	0.56	0.47	0.76	0.24	0.28	0.17	0.39	0.37	0.67	0.38	0.42	0.60	1.31	0.12	0.52	0.31	0.47
3200	0.56	0.47	0.76	0.24	0.28	0.17	0.39	0.37	0.67	0.38	0.42	0.60	1.31	0.12	0.52	0.31	0.47
3300	0.56	0.47	0.76	0.24	0.28	0.17	0.39	0.37	0.67	0.38	0.42	0.60	1.31	0.12	0.52	0.31	0.47
3400	0.56	0.47	0.73	0.24	0.22	0.13	0.39	0.37	0.67	0.38	0.42	0.53	1.24	0.10	0.52	0.31	0.45
3500	0.56	0.47	0.63	0.17	0.15	0.10	0.38	0.37	0.67	0.38	0.41	0.29	0.71	0.08	0.49	0.31	0.39
3600	0.56	0.47	0.63	0.11	0.15	0.10	0.38	0.37	0.67	0.38	0.41	0.12	0.25	0.08	0.49	0.31	0.34
3700	0.56	0.47	0.63	0.11	0.15	0.10	0.38	0.37	0.67	0.38	0.41	0.12	0.25	0.08	0.49	0.31	0.34
3800	0.55	0.46	0.63	0.11	0.15	0.10	0.38	0.37	0.67	0.38	0.41	0.12	0.25	0.08	0.49	0.31	0.34
3900	0.55	0.46	0.63	0.11	0.15	0.10	0.38	0.36	0.67	0.38	0.41	0.12	0.25	0.08	0.49	0.30	0.34
4000	0.55	0.46	0.63	0.11	0.15	0.10	0.38	0.36	0.67	0.38	0.41	0.12	0.25	0.08	0.49	0.30	0.34
4100	0.55	0.46	0.63	0.11	0.15	0.10	0.38	0.36	0.67	0.38	0.41	0.12	0.25	0.08	0.49	0.30	0.34
4200	0.55	0.46	0.63	0.11	0.15	0.10	0.38	0.36	0.67	0.38	0.41	0.12	0.25	0.08	0.49	0.30	0.34
4300	0.55	0.46	0.63	0.11	0.15	0.10	0.38	0.36	0.67	0.38	0.41	0.12	0.25	0.08	0.49	0.30	0.34
4400	0.55	0.46	0.63	0.11	0.15	0.10	0.38	0.36	0.67	0.38	0.41	0.12	0.25	0.08	0.49	0.30	0.34

TABLE 5-18 (Cont'd)

Plume Salt Deposition Table (KG./)KM.**2-MO.)) 1983

5402-027 Cedar Bay LMCDT - 7 cells 1983 Met 3 SWDs 12/04/92
SEASON = ANNUAL

DISTANCE FROM TOWER (M)	WIND FROM N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	AVG
	PLUME HEADED S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	AVG
4500	0.55	0.40	0.63	0.11	0.15	0.10	0.38	0.38	0.67	0.38	0.41	0.12	0.25	0.08	0.49	0.30	0.34
4600	0.55	0.40	0.63	0.11	0.15	0.10	0.38	0.38	0.67	0.38	0.41	0.12	0.25	0.08	0.49	0.30	0.34
4700	0.55	0.40	0.63	0.11	0.15	0.10	0.38	0.38	0.67	0.38	0.41	0.12	0.25	0.08	0.49	0.30	0.34
4800	0.55	0.40	0.63	0.11	0.15	0.10	0.38	0.38	0.67	0.38	0.41	0.12	0.25	0.08	0.49	0.30	0.34
4900	0.55	0.40	0.63	0.11	0.15	0.10	0.38	0.38	0.67	0.38	0.41	0.12	0.25	0.08	0.49	0.30	0.34
5000	0.55	0.40	0.59	0.11	0.15	0.10	0.37	0.38	0.67	0.38	0.38	0.12	0.25	0.08	0.47	0.30	0.33
5100	0.55	0.4	0.56	0.11	0.15	0.1	0.35	0.36	0.67	0.38	0.36	0.12	0.25	0.08	0.45	0.3	0.32
5200	0.55	0.4	0.56	0.11	0.15	0.1	0.35	0.36	0.67	0.38	0.36	0.12	0.25	0.08	0.45	0.3	0.32
5300	0.53	0.39	0.56	0.11	0.15	0.1	0.35	0.35	0.62	0.36	0.36	0.12	0.25	0.08	0.45	0.29	0.32
5400	0.5	0.37	0.56	0.11	0.15	0.1	0.35	0.33	0.57	0.34	0.36	0.12	0.25	0.08	0.45	0.27	0.31
5500	0.48	0.35	0.56	0.11	0.15	0.1	0.35	0.3	0.53	0.32	0.36	0.12	0.25	0.08	0.45	0.26	0.3
5600	0.48	0.35	0.56	0.11	0.15	0.1	0.35	0.3	0.53	0.32	0.36	0.12	0.25	0.08	0.45	0.26	0.3
5700	0.48	0.35	0.56	0.11	0.15	0.1	0.35	0.3	0.53	0.32	0.36	0.12	0.25	0.08	0.45	0.26	0.3
5800	0.48	0.35	0.53	0.11	0.15	0.1	0.34	0.3	0.53	0.32	0.35	0.12	0.25	0.08	0.44	0.26	0.29
5900	0.48	0.35	0.48	0.11	0.15	0.1	0.33	0.3	0.53	0.32	0.33	0.12	0.25	0.08	0.42	0.26	0.29
6000	0.48	0.35	0.48	0.11	0.15	0.1	0.33	0.3	0.53	0.32	0.33	0.12	0.25	0.08	0.42	0.26	0.29
6100	0.48	0.35	0.48	0.11	0.15	0.1	0.33	0.3	0.53	0.32	0.33	0.12	0.25	0.08	0.42	0.26	0.29
6200	0.48	0.35	0.48	0.11	0.15	0.1	0.33	0.3	0.53	0.32	0.33	0.12	0.25	0.08	0.42	0.26	0.29
6300	0.48	0.35	0.48	0.11	0.15	0.1	0.33	0.3	0.53	0.32	0.33	0.12	0.25	0.08	0.42	0.26	0.29
6400	0.47	0.35	0.48	0.11	0.15	0.1	0.33	0.3	0.52	0.31	0.33	0.12	0.25	0.08	0.42	0.26	0.29
6500	0.42	0.31	0.47	0.11	0.15	0.1	0.32	0.28	0.45	0.3	0.32	0.12	0.25	0.08	0.42	0.23	0.27
6600	0.42	0.31	0.41	0.11	0.15	0.1	0.31	0.28	0.45	0.3	0.29	0.12	0.25	0.08	0.38	0.23	0.26
6700	0.42	0.31	0.39	0.11	0.15	0.1	0.3	0.28	0.45	0.3	0.27	0.12	0.25	0.08	0.37	0.23	0.26
6800	0.42	0.31	0.39	0.11	0.15	0.1	0.3	0.28	0.45	0.3	0.27	0.12	0.25	0.08	0.37	0.23	0.26
6900	0.42	0.31	0.39	0.11	0.15	0.1	0.3	0.28	0.45	0.29	0.27	0.12	0.25	0.08	0.37	0.23	0.26
7000	0.41	0.3	0.39	0.11	0.15	0.1	0.3	0.26	0.43	0.28	0.27	0.12	0.25	0.08	0.37	0.22	0.25
7100	0.38	0.28	0.39	0.11	0.15	0.1	0.3	0.25	0.41	0.27	0.27	0.12	0.25	0.08	0.37	0.21	0.25
7200	0.36	0.27	0.39	0.11	0.15	0.1	0.3	0.24	0.4	0.26	0.27	0.12	0.25	0.08	0.37	0.21	0.24
7300	0.33	0.25	0.39	0.11	0.15	0.1	0.3	0.24	0.39	0.26	0.27	0.12	0.25	0.08	0.37	0.2	0.24
7400	0.32	0.25	0.33	0.11	0.15	0.1	0.22	0.24	0.39	0.25	0.23	0.12	0.25	0.08	0.3	0.19	0.22
7500	0.32	0.25	0.3	0.11	0.15	0.1	0.19	0.24	0.39	0.25	0.21	0.12	0.25	0.08	0.28	0.19	0.21
7600	0.32	0.25	0.3	0.11	0.15	0.1	0.19	0.24	0.39	0.25	0.21	0.12	0.25	0.08	0.28	0.19	0.21
7700	0.32	0.25	0.29	0.11	0.15	0.1	0.18	0.24	0.39	0.25	0.19	0.12	0.25	0.08	0.27	0.19	0.21
7800	0.31	0.24	0.28	0.11	0.15	0.1	0.18	0.23	0.37	0.24	0.19	0.12	0.25	0.08	0.26	0.19	0.21
7900	0.31	0.24	0.28	0.11	0.15	0.1	0.18	0.22	0.35	0.22	0.19	0.12	0.25	0.08	0.26	0.18	0.2
8000	0.31	0.24	0.28	0.11	0.15	0.1	0.18	0.22	0.35	0.22	0.19	0.12	0.25	0.08	0.26	0.18	0.2
8100	0.31	0.24	0.28	0.11	0.15	0.1	0.18	0.22	0.35	0.22	0.19	0.12	0.25	0.08	0.26	0.18	0.2
8200	0.31	0.24	0.28	0.11	0.15	0.1	0.17	0.22	0.35	0.22	0.19	0.12	0.25	0.08	0.26	0.18	0.2
8300	0.3	0.23	0.26	0.07	0.09	0.05	0.14	0.21	0.34	0.22	0.17	0.09	0.21	0.06	0.25	0.15	0.18
8400	0.23	0.18	0.26	0.05	0.05	0.02	0.14	0.19	0.31	0.19	0.17	0.08	0.19	0.05	0.25	0.15	0.16
8500	0.22	0.17	0.26	0.05	0.05	0.02	0.14	0.18	0.29	0.18	0.17	0.08	0.19	0.05	0.25	0.15	0.16
8600	0.21	0.16	0.23	0.05	0.05	0.02	0.12	0.17	0.28	0.18	0.15	0.08	0.19	0.05	0.23	0.14	0.14
8700	0.21	0.16	0.23	0.05	0.05	0.02	0.12	0.17	0.28	0.18	0.15	0.08	0.19	0.05	0.23	0.14	0.14
8800	0.2	0.16	0.22	0.05	0.05	0.02	0.12	0.17	0.27	0.17	0.15	0.08	0.19	0.05	0.22	0.13	0.14

TABLE 5-18 (Cont'd)

Plume Salt Deposition Table (KG./)KM.**2-MO.)) 1983

5402-027 Cedar Bay LMCDT – 7 cells 1983 Met 3 SWDs 12/04/92
SEASON = ANNUAL

DISTANCE FROM TOWER (M)	WIND FROM / PLUME HEADED																
	N / S	NNE / SSW	NE / SW	ENE / WSW	E / W	ESE / WNW	SE / NW	SSE / NNW	S / N	SSW / NNE	SW / NE	WSW / ENE	W / E	WNW / ESE	NW / SE	NNW / SSE	AVG / AVG
8900	0.17	0.13	0.19	0.05	0.05	0.02	0.1	0.16	0.25	0.16	0.14	0.08	0.19	0.05	0.2	0.11	0.13
9000	0.16	0.11	0.18	0.05	0.05	0.02	0.1	0.15	0.24	0.15	0.13	0.08	0.19	0.05	0.18	0.1	0.12
9100	0.16	0.11	0.18	0.05	0.05	0.02	0.1	0.15	0.24	0.16	0.13	0.08	0.19	0.05	0.18	0.1	0.12
9200	0.15	0.11	0.17	0.05	0.05	0.02	0.09	0.14	0.23	0.15	0.12	0.08	0.19	0.05	0.17	0.1	0.12
9300	0.14	0.1	0.16	0.05	0.05	0.02	0.08	0.14	0.22	0.15	0.11	0.08	0.19	0.05	0.17	0.08	0.11
9400	0.14	0.1	0.15	0.05	0.05	0.02	0.08	0.14	0.22	0.15	0.11	0.08	0.19	0.05	0.17	0.08	0.11
9500	0.14	0.1	0.15	0.05	0.05	0.02	0.08	0.14	0.22	0.15	0.11	0.08	0.19	0.05	0.17	0.08	0.11
9600	0.14	0.1	0.13	0.05	0.05	0.02	0.07	0.14	0.22	0.15	0.11	0.08	0.19	0.05	0.16	0.08	0.11
9700	0.12	0.09	0.12	0.05	0.05	0.02	0.07	0.13	0.2	0.13	0.08	0.08	0.19	0.05	0.14	0.07	0.1
9800	0.11	0.08	0.12	0.05	0.05	0.02	0.07	0.13	0.18	0.12	0.07	0.08	0.19	0.05	0.13	0.06	0.09
9900	0.11	0.07	0.12	0.05	0.05	0.02	0.07	0.12	0.17	0.11	0.07	0.08	0.19	0.05	0.13	0.06	0.09
10000	0.11	0.07	0.12	0.05	0.05	0.02	0.07	0.12	0.17	0.11	0.07	0.08	0.19	0.05	0.13	0.06	0.09

TABLE 5-19

Plume Salt Deposition Table (KG./)KM.**2-MO.)) 1984

CBCP property

SKC property

5402–027 Cedar Bay LMCDT – 7 calls 1984 Met 3 SWDs 12/04/92
SEASON = ANNUAL

DISTANCE FROM TOWER (M)	WIND FROM N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	AVG
	PLUME HEADED S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	AVG
100	0.00	0.00	0.00	118.85	163.43	111.43	0.00	0.00	0.00	0.00	0.00	199.89	341.27	110.55	0.00	0.00	65.33
200	0.00	0.00	0.00	213.79	321.51	241.02	0.00	0.00	0.00	0.00	0.00	421.76	681.97	174.18	0.00	0.00	126.39
300	0.51	0.14	8.38	99.28	127.14	96.01	6.88	0.13	0.10	0.16	4.49	162.06	268.04	77.76	1.58	0.22	52.68
400	6.15	1.92	7.76	54.29	82.17	64.24	12.04	66.19	55.72	27.10	22.28	99.58	155.29	46.92	20.06	16.55	46.08
500	13.13	6.11	11.27	37.62	52.64	40.24	17.11	18.78	25.22	9.89	12.64	71.16	109.94	31.72	13.53	11.84	30.55
600	23.72	11.03	10.72	10.49	10.11	7.96	10.71	17.95	22.11	15.67	9.55	42.31	77.73	15.07	9.46	11.90	19.17
700	27.79	11.63	21.32	5.35	5.01	3.39	16.98	16.81	20.60	16.36	18.58	34.22	46.61	6.56	16.59	13.14	17.73
800	23.20	6.96	19.65	4.69	4.61	3.23	16.19	11.95	15.97	11.50	16.72	13.10	18.17	4.96	17.64	11.18	12.80
900	10.49	3.25	14.87	4.24	4.34	3.14	11.29	6.20	8.05	3.95	12.33	6.38	9.18	4.33	13.07	5.57	7.35
1000	5.01	1.24	4.24	4.24	4.34	3.14	3.42	3.42	3.50	1.97	4.26	6.38	9.18	4.33	5.02	2.93	4.16
1100	1.76	0.71	1.17	4.24	4.34	3.14	1.23	2.46	2.41	1.06	1.43	6.38	9.18	4.33	1.90	1.44	2.95
1200	0.94	0.46	0.83	4.17	4.20	3.02	1.07	2.19	2.30	0.95	1.19	6.33	9.11	4.23	1.44	0.95	2.71
1300	0.74	0.40	0.83	3.69	3.67	2.57	1.07	2.13	2.27	0.92	1.19	5.52	8.13	3.77	1.44	0.84	2 45
1400	0.74	0.40	0.71	3.54	3.54	2.46	0.98	2.13	2.27	0.92	1.14	5.22	7.77	3.64	1.26	0.84	2.35
1500	0.74	0.40	0.69	3.54	3.54	2.46	0.96	2.13	2.27	0.92	1.13	5.22	7.77	3.64	1.22	0.84	2.34
1600	0.74	0.40	0.69	3.54	3.54	2.46	0.96	2.13	2.27	0.92	1.13	5.22	7.77	3.64	1.22	0.84	2 34
1700	0.74	0.40	0.69	3.54	3.54	2.46	0.96	2.13	2.27	0.92	1.13	5.22	7.77	3.64	1.22	0.84	2.34
1800	0.74	0.40	0.69	2.91	3.04	2.10	0.96	2.13	2.27	0.92	1.13	4.67	6.86	3.32	1.22	0.84	2.14
1900	0.74	0.40	0.69	2.29	2.39	1.73	0.96	2.13	2.27	0.92	1.13	4.04	6.10	3.05	1.22	0.84	1.93
2000	0.67	0.28	0.69	1.87	2.05	1.48	0.96	2.02	2.10	0.87	1.13	3.66	5.55	2.71	1.22	0.84	1.75
2100	0.63	0.20	0.69	1.66	1.89	1.33	0.96	1.96	1.99	0.83	1.13	3.26	5.26	2.40	1.22	0.84	1.64
2200	0.63	0.20	0.69	1.41	1.66	1.17	0.96	1.96	1.99	0.83	1.13	2.99	4.92	2.03	1.22	0 84	1.54
2300	0.63	0.20	0.69	1.24	1.40	1.03	0.96	1.96	1.99	0.83	1.13	2.87	4.56	1.61	1.22	0.84	1.46
2400	0.63	0.20	0.69	0.99	0.94	0.74	0.96	1.96	1.99	0.83	1.13	2.25	3.67	1.42	1.22	0.84	1.29
2500	0.63	0.20	0.69	0.73	0.72	0.59	0.96	1.96	1.99	0.83	1.13	1.82	3.24	1.14	1.22	0.84	1.17
2600	0.63	0.20	0.69	0.44	0.51	0.37	0.96	1.96	1.99	0.83	1.13	1.37	2.41	0.67	1.22	0.84	1.01
2700	0.63	0.20	0.69	0.39	0.48	0.32	0.96	1.96	1.99	0.83	1.13	1.27	2.27	0.63	1.22	0.84	0.99
2800	0.63	0.20	0.66	0.34	0.45	0.29	0.95	1.96	1.99	0.83	1.11	1.20	2.14	0.59	1.16	0 84	0.96
2900	0.63	0.20	0.57	0.27	0.41	0.25	0.89	1.96	1.99	0.83	1.00	1.12	1.86	0 41	0.95	0.84	0.89
3000	0.63	0.20	0.57	0.27	0.41	0.25	0.89	1.96	1.99	0.83	1.00	1.12	1.86	0.41	0.95	0.84	0.89
3100	0.63	0.20	0.57	0.27	0.41	0.25	0.89	1.96	1.99	0.83	1.00	1.12	1.86	0.41	0.95	0.84	0 89
3200	0.63	0.20	0.57	0.26	0.40	0.25	0.89	1.96	1.99	0.83	1.00	1.11	1.82	0 38	0.95	0.84	0.88
3300	0.56	0.19	0.48	0.23	0.38	0.24	0.69	1.93	1.96	0.81	0.78	1.05	1.67	0.26	0.76	0 80	0.80
3400	0.41	0.17	0.28	0.20	0.36	0.24	0.21	1.48	1.12	0.77	0.27	1.02	1.61	0.21	0.27	0.34	0.56
3500	0.41	0.17	0.28	0.18	0.35	0.23	0.21	1.39	0.83	0.77	0.27	1.00	1.59	0.19	0.27	0.25	0.53
3600	0.41	0.17	0.28	0.18	0.35	0.23	0.21	0.68	0.53	0.36	0.27	1.00	1.59	0.19	0.27	0 25	0.43
3700	0.41	0.17	0.28	0.18	0.35	0.23	0.21	0.38	0.43	0.26	0.26	1.00	1.59	0.19	0.27	0 25	0.40
3800	0.41	0.17	0.28	0.18	0.35	0.23	0.21	0.38	0.43	0.26	0.26	1.00	1.59	0.19	0.27	0 25	0.40
3900	0.41	0.17	0.28	0.17	0.30	0.21	0.21	0.38	0.43	0.26	0.26	0.96	1.51	0.16	0.27	0.25	0.39
4000	0.41	0.17	0.28	0.16	0.21	0.18	0.21	0.38	0.43	0.26	0.26	0.90	1.40	0.13	0.27	0.25	0 37
4100	0.41	0.17	0.28	0.16	0.21	0.18	0.21	0.38	0.43	0.26	0.26	0.90	1.40	0.13	0.27	0 25	0 37
4200	0.41	0.17	0.28	0.16	0.21	0.18	0.21	0.38	0 43	0.26	0.26	0.90	1.40	0.13	0.27	0.25	0 37
4300	0.41	0.17	0.28	0.16	0.21	0.18	0.21	0.38	0.43	0.26	0.26	0.9	1.4	0.13	0.27	0.25	0 37
4400	0.41	0.17	0.28	0.16	0.21	0.18	0.21	0.38	0.43	0.26	0.26	0.9	1.4	0.13	0.27	0.25	0 37

TABLE 5-19 (Cont'd)

Plume Salt Deposition Table (KG./)KM.**2-MO.)) 1984

5402-027 Cedar Bay LMCDT - 7 cells 1984 Met 3 SWDs 12/04/92
SEASON = ANNUAL

DISTANCE FROM TOWER (M)	WIND FROM N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	AVG
	PLUME HEADED S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	AVG
4500	0.41	0.17	0.28	0.16	0.21	0.16	0.21	0.38	0.43	0.26	0.26	0.9	1.4	0.13	0.27	0.25	0.37
4600	0.41	0.17	0.28	0.16	0.21	0.16	0.21	0.38	0.43	0.26	0.26	0.9	1.4	0.13	0.27	0.25	0.37
4700	0.41	0.17	0.28	0.16	0.2	0.16	0.21	0.38	0.43	0.26	0.26	0.9	1.39	0.13	0.27	0.25	0.37
4800	0.41	0.17	0.28	0.15	0.16	0.15	0.21	0.38	0.43	0.26	0.26	0.88	1.34	0.12	0.27	0.26	0.36
4900	0.41	0.17	0.28	0.09	0.11	0.1	0.21	0.38	0.43	0.26	0.26	0.78	1.23	0.07	0.27	0.26	0.33
5000	0.41	0.17	0.28	0.09	0.11	0.1	0.21	0.38	0.43	0.26	0.26	0.78	1.23	0.07	0.27	0.26	0.33
5100	0.41	0.17	0.28	0.09	0.11	0.1	0.21	0.38	0.43	0.26	0.26	0.46	0.82	0.07	0.27	0.25	0.29
5200	0.41	0.17	0.28	0.09	0.11	0.1	0.21	0.38	0.43	0.26	0.26	0.24	0.56	0.07	0.27	0.25	0.26
5300	0.41	0.17	0.28	0.09	0.11	0.1	0.21	0.38	0.43	0.26	0.26	0.24	0.56	0.07	0.27	0.25	0.26
5400	0.41	0.17	0.28	0.09	0.11	0.1	0.21	0.38	0.43	0.26	0.26	0.24	0.56	0.07	0.27	0.25	0.26
5500	0.41	0.17	0.19	0.09	0.11	0.1	0.14	0.38	0.43	0.26	0.21	0.24	0.4	0.07	0.26	0.25	0.23
5600	0.41	0.17	0.19	0.09	0.11	0.1	0.14	0.38	0.43	0.26	0.21	0.24	0.38	0.07	0.26	0.25	0.23
5700	0.41	0.17	0.19	0.09	0.11	0.1	0.14	0.38	0.43	0.26	0.21	0.24	0.38	0.07	0.26	0.25	0.23
5800	0.41	0.17	0.19	0.09	0.11	0.1	0.14	0.38	0.43	0.26	0.21	0.24	0.38	0.07	0.26	0.25	0.23
5900	0.41	0.17	0.19	0.09	0.11	0.1	0.14	0.38	0.43	0.26	0.21	0.24	0.38	0.07	0.26	0.25	0.23
6000	0.41	0.17	0.19	0.09	0.11	0.1	0.14	0.38	0.42	0.26	0.21	0.24	0.38	0.07	0.26	0.25	0.23
6100	0.4	0.16	0.19	0.09	0.11	0.1	0.14	0.34	0.37	0.23	0.21	0.24	0.36	0.07	0.26	0.23	0.22
6200	0.4	0.16	0.19	0.09	0.11	0.1	0.14	0.32	0.35	0.22	0.21	0.24	0.36	0.07	0.26	0.23	0.21
6300	0.4	0.16	0.19	0.09	0.11	0.1	0.14	0.32	0.35	0.22	0.21	0.24	0.36	0.07	0.26	0.23	0.21
6400	0.4	0.16	0.19	0.09	0.11	0.1	0.14	0.32	0.35	0.22	0.21	0.24	0.36	0.07	0.26	0.23	0.21
6500	0.4	0.16	0.19	0.09	0.11	0.1	0.14	0.32	0.35	0.22	0.21	0.24	0.36	0.07	0.26	0.23	0.21
6600	0.4	0.16	0.19	0.09	0.11	0.1	0.14	0.32	0.35	0.22	0.21	0.24	0.36	0.07	0.26	0.23	0.21
6700	0.4	0.16	0.19	0.09	0.11	0.1	0.14	0.32	0.35	0.22	0.21	0.24	0.36	0.07	0.26	0.23	0.21
6800	0.4	0.16	0.19	0.09	0.11	0.1	0.14	0.32	0.35	0.22	0.21	0.24	0.36	0.07	0.26	0.23	0.21
6900	0.4	0.16	0.19	0.09	0.11	0.1	0.14	0.32	0.35	0.22	0.21	0.24	0.36	0.07	0.26	0.23	0.21
7000	0.4	0.16	0.19	0.09	0.11	0.1	0.14	0.32	0.35	0.22	0.21	0.24	0.36	0.07	0.26	0.23	0.21
7100	0.4	0.16	0.19	0.09	0.11	0.1	0.14	0.32	0.35	0.22	0.21	0.24	0.36	0.07	0.26	0.23	0.21
7200	0.4	0.16	0.19	0.09	0.11	0.1	0.14	0.32	0.35	0.22	0.21	0.24	0.36	0.07	0.26	0.23	0.21
7300	0.4	0.16	0.19	0.09	0.11	0.1	0.13	0.32	0.35	0.22	0.21	0.24	0.36	0.07	0.25	0.23	0.21
7400	0.4	0.16	0.18	0.09	0.11	0.1	0.12	0.32	0.35	0.22	0.2	0.24	0.36	0.07	0.25	0.23	0.21
7500	0.4	0.16	0.18	0.09	0.11	0.1	0.12	0.32	0.35	0.22	0.2	0.24	0.36	0.07	0.25	0.23	0.21
7600	0.4	0.16	0.18	0.09	0.11	0.1	0.12	0.32	0.35	0.22	0.2	0.24	0.36	0.07	0.25	0.23	0.21
7700	0.4	0.16	0.18	0.09	0.11	0.1	0.12	0.32	0.35	0.22	0.2	0.24	0.36	0.07	0.25	0.23	0.21
7800	0.4	0.16	0.18	0.09	0.11	0.1	0.12	0.32	0.35	0.22	0.2	0.24	0.36	0.07	0.25	0.23	0.21
7900	0.4	0.16	0.18	0.09	0.11	0.1	0.12	0.32	0.35	0.22	0.2	0.24	0.36	0.07	0.25	0.23	0.21
8000	0.4	0.16	0.18	0.09	0.11	0.1	0.12	0.32	0.35	0.22	0.2	0.24	0.36	0.07	0.25	0.23	0.21
8100	0.37	0.14	0.18	0.09	0.11	0.1	0.12	0.31	0.34	0.21	0.2	0.24	0.36	0.07	0.25	0.22	0.21
8200	0.36	0.13	0.18	0.09	0.11	0.1	0.12	0.31	0.33	0.21	0.2	0.24	0.36	0.07	0.25	0.22	0.21
8300	0.34	0.12	0.18	0.09	0.11	0.1	0.12	0.3	0.32	0.2	0.2	0.24	0.36	0.07	0.25	0.21	0.2
8400	0.34	0.12	0.18	0.09	0.11	0.1	0.12	0.3	0.32	0.2	0.2	0.24	0.36	0.07	0.25	0.21	0.2
8500	0.34	0.12	0.18	0.09	0.11	0.1	0.12	0.3	0.32	0.2	0.2	0.24	0.36	0.07	0.25	0.21	0.2
8600	0.34	0.12	0.18	0.09	0.11	0.1	0.12	0.3	0.32	0.2	0.2	0.24	0.36	0.07	0.25	0.21	0.2
8700	0.34	0.12	0.18	0.09	0.11	0.1	0.12	0.3	0.32	0.2	0.2	0.24	0.36	0.07	0.25	0.21	0.2
8800	0.34	0.12	0.18	0.09	0.11	0.1	0.12	0.3	0.32	0.2	0.2	0.24	0.36	0.07	0.25	0.21	0.2

TABLE 5-19 (Cont'd)

Plume Salt Deposition Table (KG./)KM.**2-MO.)) 1984

5402-027 Cedar Bay LMCDT – 7 cells 1984 Met 3 SWDs 12/04/92
SEASON = ANNUAL

DISTANCE FROM TOWER (M)	WIND FROM N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	AVG
	PLUME HEADED S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	AVG
8900	0.34	0.12	0.17	0.09	0.11	0.1	0.11	0.3	0.32	0.2	0.18	0.24	0.36	0.07	0.22	0.21	0.2
9000	0.34	0.12	0.16	0.09	0.11	0.1	0.11	0.3	0.32	0.2	0.18	0.24	0.36	0.07	0.2	0.21	0.2
9100	0.34	0.12	0.16	0.09	0.11	0.1	0.11	0.3	0.32	0.2	0.18	0.24	0.36	0.06	0.2	0.21	0.19
9200	0.32	0.12	0.16	0.09	0.11	0.1	0.11	0.3	0.31	0.2	0.18	0.24	0.36	0.06	0.2	0.2	0.19
9300	0.31	0.11	0.16	0.09	0.11	0.1	0.11	0.29	0.31	0.19	0.18	0.24	0.36	0.06	0.2	0.2	0.19
9400	0.3	0.11	0.16	0.09	0.11	0.1	0.11	0.29	0.3	0.18	0.18	0.24	0.36	0.06	0.2	0.19	0.19
9500	0.3	0.11	0.16	0.09	0.11	0.1	0.11	0.29	0.3	0.18	0.18	0.24	0.36	0.06	0.2	0.19	0.19
9600	0.3	0.11	0.16	0.09	0.11	0.1	0.11	0.28	0.3	0.18	0.18	0.24	0.36	0.06	0.2	0.18	0.18
9700	0.3	0.11	0.16	0.09	0.11	0.1	0.11	0.28	0.3	0.18	0.18	0.24	0.36	0.06	0.2	0.18	0.18
9800	0.3	0.11	0.16	0.09	0.11	0.1	0.11	0.28	0.3	0.18	0.18	0.24	0.36	0.06	0.2	0.18	0.19
9900	0.28	0.1	0.15	0.09	0.11	0.1	0.11	0.28	0.29	0.17	0.17	0.24	0.36	0.06	0.19	0.18	0.18
10000	0.28	0.1	0.14	0.09	0.11	0.1	0.11	0.28	0.29	0.17	0.17	0.24	0.36	0.06	0.19	0.17	0.18

TABLE 5-20

Plume Salt Deposition Table (KG./(KM.**2-MO.)) 1985

CBCP property

SKC property

5402-027 Cedar Bay LMCDT – 7 cells 1985 Met 3 SWDe 12/04/92
SEASON = ANNUAL

DISTANCE FROM TOWER (M)	WIND FROM N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	AVG
	PLUME HEADED S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	AVG
100	0.00	0.00	0.00	338.78	189.88	82.41	0.00	0.00	0.00	0.00	0.00	128.19	279.04	244.82	0.00	0.00	78.94
200	0.00	0.00	0.00	509.10	383.50	182.76	0.00	0.00	0.00	0.00	0.00	270.56	661.95	375.99	0.00	0.00	147.66
300	0.00	0.00	14.46	144.48	121.74	67.18	3.47	0.00	0.00	0.00	4.02	102.93	210.64	115.03	3.30	0.00	49.19
400	6.09	0.78	11.06	51.04	67.04	49.53	13.23	43.22	81.58	28.52	60.42	67.07	142.00	49.19	24.73	8.30	43.74
500	5.89	8.30	11.86	40.30	50.35	37.26	12.14	8.72	13.88	9.64	9.63	54.06	126.00	40.20	5.29	5.13	27.28
600	17.73	11.53	9.45	17.91	19.56	12.93	5.79	12.55	25.78	14.50	6.36	21.46	67.24	20.24	4.87	11.46	16.84
700	19.40	11.52	20.94	7.24	7.17	4.53	12.91	11.25	24.63	13.06	16.56	11.42	37.94	10.03	14.46	11.81	14.68
800	15.75	8.34	20.14	6.12	6.32	4.10	11.27	8.38	18.00	9.15	15.54	10.63	36.51	8.79	14.14	10.91	12.70
900	5.57	2.83	17.27	5.06	5.37	3.19	8.88	2.71	5.70	2.91	12.75	5.55	12.96	5.32	11.94	3.58	6.98
1000	1.89	1.06	5.40	5.06	5.37	3.19	3.29	1.50	2.86	1.29	5.22	4.92	9.47	5.00	4.49	1.15	3.82
1100	0.77	0.63	0.88	5.06	5.37	3.19	0.76	1.41	2.45	1.06	1.90	4.92	9.47	5.00	1.31	0.56	2.80
1200	0.44	0.33	0.80	5.06	5.37	3.19	0.70	1.38	2.35	1.00	1.81	4.92	9.47	5.00	1.08	0.43	2.71
1300	0.44	0.33	0.64	5.06	5.37	3.19	0.69	1.38	2.35	1.00	1.76	4.92	9.47	5.00	0.94	0.43	2.69
1400	0.44	0.33	0.57	5.06	5.37	3.19	0.68	1.38	2.35	1.00	1.72	4.92	9.47	5.00	0.89	0.43	2.68
1500	0.44	0.33	0.57	5.06	5.37	3.19	0.68	1.38	2.35	1.00	1.72	4.92	9.47	5.00	0.89	0.43	2.68
1600	0.44	0.33	0.57	5.06	5.37	3.19	0.68	1.38	2.35	1.00	1.72	4.92	9.47	5.00	0.89	0.43	2.68
1700	0.44	0.33	0.57	4.99	5.29	3.16	0.68	1.38	2.35	1.00	1.72	4.85	9.41	4.95	0.89	0.43	2.65
1800	0.44	0.33	0.57	4.22	4.36	2.77	0.68	1.38	2.35	1.00	1.72	4.11	8.62	4.38	0.89	0.43	2.39
1900	0.44	0.33	0.57	3.8	4	2.53	0.68	1.38	2.35	1	1.72	3.8	8.26	4.05	0.89	0.43	2.27
2000	0.44	0.33	0.57	3.25	3.32	2.02	0.68	1.38	2.35	1	1.72	3.15	7.45	3.42	0.89	0.43	2.03
2100	0.4	0.31	0.57	2.62	2.55	1.67	0.68	1.27	2.25	0.93	1.72	2.51	6.42	2.9	0.89	0.34	1.75
2200	0.38	0.16	0.57	2.17	2.19	1.5	0.68	1.22	2.21	0.9	1.72	2.27	5.74	2.62	0.89	0.3	1.6
2300	0.38	0.16	0.57	1.8	1.53	1.16	0.68	1.22	2.21	0.9	1.72	1.8	4.66	1.99	0.89	0.3	1.36
2400	0.38	0.16	0.57	1.23	1.16	0.84	0.68	1.22	2.21	0.9	1.72	1.37	3.94	1.54	0.89	0.3	1.19
2500	0.38	0.16	0.57	0.85	0.68	0.59	0.68	1.22	2.21	0.9	1.72	1.12	3.23	1.16	0.89	0.3	1.05
2600	0.38	0.16	0.57	0.63	0.56	0.44	0.68	1.22	2.21	0.9	1.72	0.9	2.43	0.76	0.89	0.3	0.92
2700	0.38	0.16	0.57	0.47	0.47	0.41	0.68	1.22	2.21	0.9	1.63	0.83	2.16	0.67	0.8	0.3	0.87
2800	0.38	0.16	0.57	0.3	0.36	0.34	0.68	1.22	2.21	0.9	1.55	0.71	1.94	0.5	0.71	0.3	0.8
2900	0.38	0.16	0.57	0.24	0.34	0.33	0.68	1.22	2.21	0.9	1.55	0.65	1.79	0.4	0.71	0.3	0.78
3000	0.38	0.16	0.57	0.17	0.33	0.31	0.68	0.83	1.69	0.51	1.55	0.59	1.63	0.29	0.71	0.3	0.67
3100	0.38	0.16	0.57	0.17	0.33	0.31	0.68	0.79	1.63	0.46	1.55	0.59	1.63	0.29	0.71	0.3	0.66
3200	0.38	0.16	0.57	0.17	0.33	0.31	0.68	0.79	1.63	0.46	1.55	0.59	1.63	0.29	0.71	0.3	0.66
3300	0.38	0.16	0.57	0.17	0.33	0.31	0.68	0.79	1.63	0.46	1.55	0.59	1.63	0.29	0.71	0.3	0.66
3400	0.38	0.16	0.57	0.17	0.33	0.31	0.68	0.79	1.63	0.46	1.55	0.59	1.63	0.29	0.71	0.3	0.66
3500	0.38	0.16	0.57	0.17	0.33	0.31	0.68	0.79	1.63	0.46	1.55	0.59	1.63	0.29	0.71	0.3	0.66
3600	0.38	0.16	0.57	0.14	0.21	0.13	0.68	0.79	1.63	0.46	1.55	0.44	1.49	0.23	0.71	0.3	0.62
3700	0.35	0.16	0.41	0.14	0.2	0.11	0.33	0.63	1.29	0.4	0.51	0.42	1.48	0.22	0.33	0.27	0.45
3800	0.28	0.16	0.31	0.14	0.2	0.11	0.15	0.27	0.49	0.26	0.31	0.42	1.48	0.22	0.24	0.19	0.33
3900	0.28	0.16	0.31	0.14	0.19	0.1	0.15	0.27	0.49	0.26	0.31	0.42	1.47	0.22	0.24	0.19	0.33
4000	0.28	0.16	0.31	0.12	0.14	0.08	0.15	0.26	0.49	0.25	0.31	0.39	1.42	0.18	0.24	0.19	0.31
4100	0.28	0.16	0.31	0.07	0.09	0.06	0.15	0.26	0.49	0.25	0.31	0.36	1.36	0.13	0.24	0.19	0.29
4200	0.28	0.16	0.31	0.07	0.09	0.06	0.15	0.26	0.49	0.25	0.31	0.36	1.36	0.13	0.24	0.19	0.29
4300	0.28	0.16	0.31	0.07	0.09	0.06	0.15	0.26	0.49	0.25	0.31	0.36	1.36	0.13	0.24	0.19	0.29
4400	0.28	0.16	0.31	0.07	0.09	0.06	0.15	0.26	0.49	0.25	0.31	0.36	1.36	0.13	0.24	0.19	0.29

TABLE 5-20 (Cont'd)

Plume Salt Deposition Table (KG./(KM.**2-MO.)) 1985

6402-027 Cedar Bay LMCDT – 7 cells 1985 Met 3 SWDs 12/04/92
SEASON = ANNUAL

DISTANCE FROM TOWER (M)	WIND FROM N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	AVG
	PLUME HEADED S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	AVG
4500	0.28	0.16	0.31	0.07	0.09	0.06	0.15	0.26	0.49	0.25	0.31	0.36	1.36	0.13	0.24	0.19	0.29
4600	0.28	0.16	0.31	0.07	0.09	0.06	0.15	0.26	0.49	0.25	0.31	0.36	1.36	0.13	0.24	0.19	0.29
4700	0.28	0.16	0.31	0.07	0.09	0.06	0.15	0.26	0.49	0.25	0.31	0.36	1.36	0.13	0.24	0.19	0.29
4800	0.28	0.16	0.31	0.07	0.09	0.06	0.15	0.26	0.49	0.25	0.31	0.36	1.36	0.13	0.24	0.19	0.29
4900	0.28	0.16	0.31	0.07	0.09	0.06	0.15	0.26	0.49	0.25	0.31	0.3	1.19	0.13	0.24	0.19	0.28
5000	0.28	0.16	0.29	0.07	0.09	0.06	0.14	0.26	0.49	0.25	0.3	0.25	1.02	0.13	0.24	0.19	0.26
5100	0.28	0.16	0.29	0.07	0.09	0.06	0.14	0.26	0.49	0.25	0.3	0.25	1.02	0.13	0.24	0.19	0.26
5200	0.28	0.16	0.29	0.07	0.09	0.06	0.14	0.26	0.49	0.25	0.3	0.14	0.44	0.08	0.24	0.19	0.22
5300	0.28	0.16	0.29	0.07	0.09	0.06	0.14	0.26	0.49	0.25	0.3	0.13	0.37	0.07	0.24	0.19	0.21
5400	0.28	0.16	0.29	0.07	0.09	0.06	0.14	0.26	0.49	0.25	0.3	0.13	0.37	0.07	0.24	0.19	0.21
5500	0.28	0.16	0.29	0.07	0.09	0.06	0.14	0.26	0.49	0.25	0.3	0.13	0.37	0.07	0.24	0.19	0.21
5600	0.28	0.16	0.29	0.07	0.09	0.06	0.14	0.26	0.49	0.25	0.3	0.13	0.37	0.07	0.24	0.19	0.21
5700	0.28	0.16	0.29	0.07	0.09	0.06	0.14	0.26	0.49	0.25	0.3	0.13	0.37	0.07	0.24	0.19	0.21
5800	0.28	0.16	0.29	0.07	0.09	0.06	0.14	0.26	0.49	0.25	0.3	0.13	0.37	0.07	0.24	0.19	0.21
5900	0.28	0.16	0.29	0.07	0.09	0.06	0.14	0.26	0.49	0.25	0.3	0.13	0.37	0.07	0.24	0.19	0.21
6000	0.28	0.16	0.29	0.07	0.09	0.06	0.14	0.26	0.49	0.25	0.3	0.12	0.37	0.07	0.24	0.19	0.21
6100	0.28	0.16	0.29	0.07	0.09	0.06	0.14	0.26	0.49	0.25	0.3	0.12	0.37	0.07	0.24	0.19	0.21
6200	0.28	0.16	0.29	0.07	0.09	0.06	0.14	0.26	0.49	0.25	0.3	0.12	0.37	0.07	0.24	0.19	0.21
6300	0.28	0.16	0.29	0.07	0.09	0.06	0.14	0.26	0.49	0.25	0.3	0.12	0.37	0.07	0.24	0.19	0.21
6400	0.28	0.16	0.29	0.07	0.09	0.06	0.14	0.26	0.49	0.25	0.3	0.12	0.37	0.07	0.24	0.19	0.21
6500	0.28	0.16	0.29	0.07	0.09	0.06	0.14	0.26	0.49	0.25	0.3	0.12	0.37	0.07	0.24	0.19	0.21
6600	0.27	0.15	0.29	0.07	0.09	0.06	0.14	0.24	0.47	0.23	0.3	0.12	0.37	0.07	0.24	0.18	0.21
6700	0.26	0.13	0.29	0.07	0.09	0.06	0.14	0.21	0.43	0.19	0.3	0.12	0.37	0.07	0.24	0.16	0.2
6800	0.26	0.13	0.2	0.07	0.09	0.06	0.12	0.21	0.43	0.19	0.28	0.12	0.37	0.07	0.22	0.16	0.19
6900	0.26	0.13	0.18	0.07	0.09	0.06	0.11	0.21	0.43	0.19	0.28	0.12	0.37	0.07	0.21	0.16	0.18
7000	0.26	0.13	0.18	0.07	0.09	0.06	0.11	0.21	0.43	0.19	0.28	0.12	0.37	0.07	0.21	0.16	0.18
7100	0.26	0.13	0.18	0.07	0.09	0.06	0.11	0.21	0.43	0.19	0.28	0.12	0.37	0.07	0.21	0.16	0.18
7200	0.26	0.13	0.18	0.07	0.09	0.06	0.11	0.21	0.43	0.19	0.28	0.12	0.37	0.07	0.21	0.16	0.18
7300	0.26	0.13	0.18	0.07	0.09	0.06	0.11	0.21	0.43	0.19	0.28	0.12	0.37	0.07	0.21	0.16	0.18
7400	0.26	0.13	0.18	0.07	0.09	0.06	0.11	0.21	0.43	0.19	0.28	0.12	0.37	0.07	0.21	0.16	0.18
7500	0.26	0.13	0.18	0.07	0.09	0.06	0.11	0.21	0.43	0.19	0.28	0.12	0.37	0.07	0.21	0.16	0.18
7600	0.25	0.13	0.18	0.07	0.09	0.06	0.11	0.21	0.42	0.19	0.28	0.12	0.37	0.07	0.21	0.16	0.18
7700	0.25	0.13	0.18	0.07	0.09	0.06	0.11	0.21	0.42	0.19	0.28	0.12	0.37	0.07	0.21	0.16	0.18
7800	0.25	0.13	0.18	0.07	0.09	0.06	0.11	0.21	0.42	0.19	0.28	0.12	0.37	0.07	0.21	0.16	0.18
7900	0.25	0.13	0.18	0.07	0.09	0.06	0.11	0.21	0.42	0.19	0.28	0.12	0.37	0.07	0.21	0.16	0.18
8000	0.25	0.13	0.18	0.07	0.09	0.06	0.11	0.21	0.42	0.19	0.28	0.12	0.37	0.07	0.21	0.16	0.18
8100	0.24	0.12	0.18	0.07	0.09	0.06	0.11	0.2	0.41	0.18	0.28	0.12	0.37	0.07	0.21	0.15	0.18
8200	0.22	0.12	0.18	0.07	0.09	0.06	0.11	0.2	0.4	0.18	0.26	0.12	0.37	0.07	0.21	0.14	0.18
8300	0.22	0.12	0.18	0.07	0.09	0.06	0.11	0.2	0.4	0.18	0.25	0.12	0.37	0.07	0.21	0.14	0.18
8400	0.22	0.12	0.18	0.07	0.09	0.06	0.11	0.2	0.4	0.18	0.25	0.12	0.37	0.07	0.21	0.14	0.18
8500	0.22	0.12	0.18	0.07	0.09	0.06	0.11	0.2	0.4	0.18	0.26	0.12	0.37	0.07	0.21	0.14	0.18
8600	0.22	0.12	0.18	0.07	0.09	0.06	0.11	0.2	0.4	0.18	0.26	0.12	0.37	0.07	0.21	0.14	0.18
8700	0.22	0.12	0.18	0.07	0.09	0.06	0.11	0.2	0.4	0.18	0.26	0.12	0.37	0.07	0.21	0.14	0.18
8800	0.21	0.11	0.18	0.07	0.09	0.06	0.11	0.18	0.38	0.17	0.26	0.12	0.37	0.07	0.21	0.13	0.17

TABLE 5-20 (Cont'd)

Plume Salt Deposition Table (KG./(KM.**2-MO.)) 1985

5402-027 Cedar Bay LMCDT - 7 cells 1985 Met 3 SWDs 12/04/92
SEASON = ANNUAL

DISTANCE FROM TOWER (M)	WIND FROM N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	AVG
	PLUME HEADED S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	AVG
8900	0.21	0.11	0.18	0.07	0.09	0.06	0.11	0.18	0.38	0.17	0.28	0.12	0.37	0.07	0.21	0.13	0.17
9000	0.21	0.11	0.18	0.07	0.09	0.06	0.11	0.18	0.38	0.17	0.28	0.12	0.37	0.07	0.21	0.13	0.17
9100	0.21	0.11	0.18	0.07	0.09	0.06	0.11	0.18	0.38	0.17	0.28	0.12	0.37	0.07	0.21	0.13	0.17
9200	0.21	0.11	0.18	0.07	0.09	0.06	0.11	0.18	0.38	0.17	0.28	0.12	0.37	0.07	0.21	0.13	0.17
9300	0.19	0.1	0.17	0.07	0.09	0.06	0.11	0.18	0.37	0.16	0.27	0.12	0.37	0.07	0.2	0.12	0.17
9400	0.18	0.1	0.16	0.07	0.09	0.06	0.1	0.17	0.36	0.15	0.26	0.12	0.37	0.07	0.19	0.12	0.16
9500	0.18	0.1	0.16	0.07	0.09	0.06	0.1	0.17	0.36	0.15	0.26	0.12	0.37	0.07	0.19	0.12	0.16
9600	0.17	0.09	0.16	0.07	0.09	0.06	0.1	0.17	0.35	0.15	0.26	0.12	0.37	0.07	0.19	0.11	0.16
9700	0.17	0.09	0.16	0.07	0.09	0.06	0.1	0.17	0.35	0.15	0.26	0.12	0.37	0.07	0.19	0.11	0.16
9800	0.16	0.09	0.16	0.07	0.09	0.06	0.1	0.17	0.34	0.14	0.26	0.12	0.37	0.07	0.19	0.1	0.16
9900	0.15	0.08	0.16	0.07	0.09	0.06	0.1	0.16	0.33	0.14	0.26	0.12	0.37	0.07	0.19	0.1	0.15
10000	0.15	0.08	0.16	0.07	0.09	0.06	0.1	0.16	0.33	0.14	0.26	0.12	0.37	0.07	0.19	0.1	0.15

TABLE 5-21

Plume Salt Deposition Table (KG./(KM.**2-MO.)) 1986

CBCP property

SKC property

5402-027 Cedar Bay LMCDT – 7 cells 1986 Met 3 SWDs 12/04/02
SEASON = ANNUAL

DISTANCE FROM TOWER (M)	WIND FROM N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	AVG
	PLUME HEADED S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	AVG
100	0.00	0.00	0.00	179.65	110.81	66.19	0.00	0.00	0.00	0.00	0.00	272.77	213.42	119.34	0.00	0.00	60.26
200	0.00	0.00	0.00	304.45	233.23	189.00	0.00	0.00	0.00	0.00	0.00	530.85	513.38	256.39	0.00	0.00	126.83
300	0.00	0.00	3.62	106.38	84.37	63.36	7.53	0.00	0.00	0.00	4.18	186.22	192.73	68.66	2.62	0.00	46.86
400	0.19	0.57	8.35	37.58	38.91	42.92	24.93	46.94	32.60	12.53	39.36	84.62	124.35	54.86	8.09	0.50	34.72
500	2.97	4.15	7.88	36.18	38.77	42.39	16.42	11.87	16.15	7.76	12.39	76.62	115.67	53.62	3.40	3.63	28.12
600	20.49	12.02	6.33	18.14	16.91	17.98	8.11	15.70	21.40	13.18	7.52	36.45	46.46	25.16	4.00	10.10	17.63
700	24.61	12.77	14.60	5.65	4.92	2.76	15.24	14.63	20.47	12.67	19.39	19.86	24.58	11.06	12.37	11.61	14.20
800	22.36	11.15	14.27	4.47	3.97	2.44	13.29	12.42	16.61	10.63	16.93	16.95	23.09	9.23	13.10	10.41	12.83
900	10.22	4.22	12.06	4.19	3.78	2.40	11.96	4.48	6.75	3.53	16.57	16.53	22.29	8.14	11.62	5.05	9.11
1000	2.57	0.98	6.56	4.07	3.58	2.25	6.09	1.94	2.03	0.81	8.03	7.33	9.66	4.40	6.15	1.46	4.12
1100	1.10	0.48	1.02	3.69	2.96	1.82	1.45	1.72	1.46	0.57	1.85	6.34	7.61	4.03	1.09	0.68	2.37
1200	0.72	0.39	0.68	3.69	2.96	1.82	1.17	1.67	1.36	0.52	1.56	6.34	7.61	4.03	0.87	0.49	2.23
1300	0.35	0.31	0 65	3.69	2.96	1.82	1.17	1.62	1.26	0.48	1.58	6.34	7.61	4.03	0.67	0.30	2 18
1400	0 35	0.31	0.60	3 69	2.96	1.82	1.13	1.62	1.26	0.48	1.55	6.34	7.61	4.03	0.50	0.30	2.18
1500	0.35	0.31	0.52	3 69	2.96	1.82	1.10	1.62	1.26	0.48	1.52	6.34	7.61	4.03	0.34	0.30	2.14
1600	0.35	0.31	0.52	3.69	2 96	1.82	1.10	1.62	1.26	0.48	1.52	6.34	7.61	4.03	0.34	0.30	2.14
1700	0.35	0.31	0.52	3.69	2.96	1.82	1.10	1.62	1.26	0.48	1.62	6.34	7.61	4.03	0.34	0.30	2.14
1800	0.35	0.31	0.52	3.29	2.42	1.65	1.10	1.62	1.26	0.48	1.52	5.74	7.14	3.49	0.34	0.30	1.97
1900	0.35	0.31	0.52	2.76	1.91	1.35	1.10	1.62	1.26	0.48	1.52	4.92	6.45	3.08	0.34	0.30	1.77
2000	0.35	0.31	0.52	2.20	1.45	1.06	1.10	1.62	1.26	0.48	1.52	4.00	5.58	2.65	0.34	0.30	1.55
2100	0.35	0.31	0.52	1.66	0.97	0.82	1.10	1.62	1.26	0.48	1.52	3.05	4.68	2.09	0.34	0.30	1.32
2200	0.35	0.31	0.52	1.61	0 94	0.80	1.10	1.62	1.26	0.48	1.52	2.98	4.62	2.03	0.34	0.30	1 30
2300	0.35	0.18	0.52	1.45	0.85	0.76	1 10	1.56	1.09	0.43	1.52	2.79	4.35	1.91	0.34	0.19	1.21
2400	0.35	0.18	0.52	1.35	0.81	0.73	1.10	1.56	1.09	0.43	1.52	2.65	4.17	1.82	0.34	0.19	1.18
2500	0.35	0.18	0.52	0.77	0.45	0.55	1.10	1.56	1.09	0.43	1.52	1.63	2.93	1.33	0.34	0.19	0 93
2600	0.35	0.18	0.52	0.51	0.33	0.41	1.10	1.56	1.09	0.43	1.52	1.35	2.40	1.03	0.34	0.19	0.83
2700	0.35	0.18	0.52	0.28	0.25	0.28	1.1	1.56	1.09	0.43	1.52	0.96	1.69	0 81	0.34	0.19	0.72
2800	0.35	0.18	0.52	0.24	0.2	0.24	1.1	1.56	1.09	0.43	1.52	0.91	1.61	0.67	0.34	0.19	0 69
2900	0.35	0.18	0.52	0.22	0.18	0.22	0.95	1.56	1.09	0.43	1.24	0.87	1.41	0.59	0.34	0.19	0.65
3000	0.35	0.18	0.52	0.22	0.18	0.22	0.74	1.26	0.99	0.43	0.81	0.87	1.41	0.59	0.34	0.19	0.58
3100	0.35	0.18	0 52	0.21	0.17	0.21	0.74	0.57	0.76	0 43	0.81	0.86	1.36	0.54	0.34	0.19	0.52
3200	0.35	0.18	0.52	0.18	0.13	0.19	0.74	0.57	0.76	0.43	0.81	0 82	1.25	0.44	0.34	0.19	0.49
3300	0.35	0.18	0.49	0.18	0.13	0.19	0.71	0.57	0.76	0.43	0.77	0.82	1.25	0.44	0.34	0.19	0.49
3400	0.35	0.18	0.44	0.18	0.13	0.19	0 68	0.57	0.76	0 43	0.74	0.82	1.25	0.44	0.33	0.19	0.48
3500	0.35	0.18	0.44	0.18	0.13	0.19	0.68	0.57	0.76	0.43	0.74	0.82	1.25	0 44	0 33	0.19	0 48
3600	0.35	0.18	0.44	0.18	0.13	0.19	0.68	0.57	0.76	0.43	0.74	0.82	1.25	0.44	0.33	0.19	0 48
3700	0.35	0.18	0.44	0.18	0.13	0.19	0.68	0.57	0.76	0.43	0.74	0.82	1.25	0 44	0.33	0.19	0.48
3800	0.35	0.18	0.44	0.14	0.12	0.16	0.68	0.57	0.76	0.43	0.74	0 77	1.2	0 42	0.33	0.19	0 47
3900	0.35	0.16	0.42	0.07	0.08	0.08	0.66	0.57	0.76	0.43	0.66	0 66	1.07	0.38	0.31	0.19	0 43
4000	0.35	0.18	0.32	0.07	0.08	0.08	0.49	0.57	0.75	0.42	0.47	0.66	1.07	0.38	0.25	0.19	0.4
4100	0.35	0.18	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.19	0.27	0.66	1.07	0.38	0.19	0.19	0 29
4200	0.35	0.18	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.19	0.27	0.66	1.07	0 38	0.19	0.19	0 29
4300	0.35	0.18	0.19	0.07	0.08	0.08	0.19	0 27	0.34	0.19	0.27	0.66	1.07	0.38	0.19	0.19	0 29
4400	0.35	0.18	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.19	0.27	0.66	1.07	0 38	0.19	0.19	0 29

TABLE 5-21 (Cont'd)

Plume Salt Deposition Table (KG./(KM.**2-MO.)) 1986

5402-027 Cedar Bay LMCDT - 7 cells 1986 Met 3 SWDs 12/04/92
SEASON = ANNUAL

DISTANCE FROM TOWER (M)	WIND FROM N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	AVG
	PLUME HEADED S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	AVG
4500	0.35	0.18	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.19	0.27	0.66	1.07	0.38	0.19	0.19	0.29
4600	0.35	0.18	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.19	0.27	0.66	1.07	0.38	0.19	0.19	0.29
4700	0.35	0.18	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.19	0.27	0.66	1.07	0.38	0.19	0.19	0.29
4800	0.35	0.18	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.19	0.27	0.66	1.07	0.38	0.19	0.19	0.29
4900	0.35	0.18	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.19	0.27	0.66	1.07	0.38	0.19	0.19	0.29
5000	0.35	0.18	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.19	0.27	0.63	1	0.35	0.19	0.19	0.29
5100	0.35	0.18	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.19	0.27	0.53	0.69	0.25	0.19	0.19	0.26
5200	0.35	0.18	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.19	0.27	0.53	0.69	0.25	0.19	0.19	0.26
5300	0.35	0.18	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.19	0.27	0.53	0.69	0.25	0.19	0.19	0.26
5400	0.35	0.18	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.19	0.27	0.53	0.69	0.25	0.19	0.19	0.26
5500	0.35	0.18	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.19	0.27	0.24	0.34	0.16	0.19	0.19	0.21
5600	0.35	0.18	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.19	0.27	0.21	0.3	0.14	0.19	0.19	0.2
5700	0.35	0.18	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.19	0.27	0.21	0.29	0.14	0.19	0.19	0.2
5800	0.35	0.18	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.19	0.27	0.21	0.29	0.14	0.19	0.19	0.2
5900	0.35	0.18	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.19	0.27	0.21	0.29	0.14	0.19	0.19	0.2
6000	0.35	0.18	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.19	0.27	0.21	0.29	0.14	0.19	0.19	0.2
6100	0.35	0.18	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.19	0.27	0.21	0.29	0.14	0.19	0.19	0.2
6200	0.35	0.18	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.19	0.27	0.21	0.29	0.14	0.19	0.19	0.2
6300	0.35	0.18	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.19	0.27	0.21	0.29	0.14	0.19	0.19	0.2
6400	0.35	0.18	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.19	0.27	0.21	0.29	0.14	0.19	0.19	0.2
6500	0.35	0.18	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.19	0.27	0.21	0.29	0.14	0.19	0.18	0.2
6600	0.35	0.17	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.18	0.27	0.21	0.29	0.14	0.19	0.18	0.2
6700	0.35	0.17	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.18	0.27	0.21	0.29	0.14	0.19	0.18	0.2
6800	0.35	0.17	0.19	0.07	0.08	0.08	0.19	0.27	0.34	0.18	0.27	0.21	0.29	0.14	0.19	0.18	0.2
6900	0.35	0.17	0.18	0.07	0.08	0.08	0.18	0.27	0.34	0.18	0.26	0.21	0.29	0.14	0.19	0.18	0.2
7000	0.35	0.17	0.18	0.07	0.08	0.08	0.13	0.26	0.32	0.18	0.24	0.21	0.29	0.14	0.18	0.18	0.19
7100	0.34	0.18	0.16	0.07	0.08	0.08	0.13	0.23	0.27	0.15	0.24	0.21	0.29	0.14	0.18	0.17	0.18
7200	0.34	0.16	0.16	0.07	0.08	0.08	0.13	0.23	0.27	0.15	0.24	0.21	0.29	0.14	0.18	0.17	0.18
7300	0.34	0.16	0.16	0.07	0.08	0.08	0.13	0.23	0.27	0.15	0.24	0.21	0.29	0.14	0.18	0.17	0.18
7400	0.34	0.16	0.16	0.07	0.08	0.08	0.13	0.23	0.27	0.15	0.24	0.21	0.29	0.14	0.18	0.17	0.18
7500	0.34	0.16	0.16	0.07	0.08	0.08	0.13	0.23	0.27	0.15	0.24	0.21	0.29	0.14	0.18	0.17	0.18
7600	0.34	0.16	0.16	0.07	0.08	0.08	0.13	0.23	0.27	0.15	0.24	0.21	0.29	0.14	0.18	0.17	0.18
7700	0.33	0.15	0.16	0.07	0.08	0.08	0.13	0.23	0.27	0.15	0.24	0.21	0.29	0.14	0.18	0.16	0.18
7800	0.28	0.13	0.16	0.07	0.08	0.08	0.13	0.22	0.26	0.15	0.24	0.21	0.29	0.14	0.18	0.14	0.17
7900	0.28	0.13	0.16	0.07	0.08	0.08	0.13	0.22	0.26	0.15	0.24	0.21	0.29	0.14	0.18	0.14	0.17
8000	0.28	0.13	0.16	0.07	0.08	0.08	0.13	0.22	0.26	0.15	0.24	0.21	0.29	0.14	0.18	0.14	0.17
8100	0.28	0.13	0.16	0.07	0.08	0.08	0.13	0.22	0.26	0.15	0.24	0.21	0.29	0.14	0.18	0.14	0.17
8200	0.28	0.13	0.16	0.07	0.08	0.08	0.13	0.22	0.26	0.15	0.24	0.21	0.29	0.14	0.18	0.14	0.17
8300	0.28	0.13	0.16	0.07	0.08	0.08	0.13	0.22	0.26	0.15	0.24	0.21	0.29	0.14	0.18	0.14	0.17
8400	0.28	0.13	0.16	0.07	0.08	0.08	0.13	0.22	0.26	0.15	0.24	0.21	0.29	0.14	0.18	0.14	0.17
8500	0.26	0.13	0.16	0.07	0.08	0.08	0.13	0.22	0.26	0.15	0.24	0.21	0.29	0.14	0.18	0.14	0.17
8600	0.26	0.11	0.16	0.07	0.08	0.08	0.13	0.21	0.25	0.14	0.24	0.21	0.29	0.14	0.18	0.13	0.17
8700	0.26	0.11	0.16	0.07	0.08	0.08	0.13	0.21	0.25	0.14	0.24	0.21	0.29	0.14	0.18	0.13	0.17
8800	0.26	0.11	0.16	0.07	0.08	0.08	0.13	0.21	0.25	0.14	0.24	0.21	0.29	0.14	0.18	0.13	0.17

TABLE 5-21 (Cont'd)

Plume Salt Deposition Table (KG./(KM.**2-MO.)) 1986

5402-027 Cedar Bay LMCDT – 7 cells 1986 Met 3 SWDs 12/04/92
SEASON = ANNUAL

DISTANCE FROM TOWER (M)	WIND FROM N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	AVG
	PLUME HEADED S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	AVG
8900	0.26	0.11	0.16	0.07	0.08	0.08	0.13	0.21	0.25	0.14	0.24	0.21	0.29	0.14	0.16	0.13	0.17
9000	0.26	0.11	0.16	0.07	0.08	0.08	0.13	0.21	0.25	0.14	0.24	0.2	0.29	0.13	0.16	0.13	0.17
9100	0.25	0.11	0.16	0.07	0.08	0.08	0.13	0.21	0.24	0.14	0.24	0.2	0.29	0.13	0.17	0.12	0.16
9200	0.24	0.11	0.15	0.07	0.08	0.08	0.13	0.21	0.24	0.14	0.24	0.2	0.29	0.13	0.16	0.12	0.16
9300	0.24	0.11	0.15	0.07	0.08	0.08	0.12	0.21	0.24	0.14	0.23	0.2	0.29	0.13	0.15	0.12	0.16
9400	0.24	0.11	0.15	0.07	0.08	0.08	0.12	0.21	0.24	0.14	0.23	0.2	0.29	0.13	0.15	0.12	0.16
9500	0.24	0.11	0.15	0.07	0.08	0.08	0.12	0.21	0.24	0.14	0.23	0.2	0.29	0.13	0.15	0.12	0.16
9600	0.22	0.11	0.15	0.07	0.08	0.08	0.12	0.21	0.23	0.13	0.23	0.2	0.29	0.13	0.15	0.11	0.16
9700	0.22	0.1	0.14	0.07	0.08	0.08	0.12	0.21	0.23	0.13	0.22	0.2	0.29	0.13	0.14	0.11	0.15
9800	0.21	0.1	0.14	0.07	0.08	0.08	0.12	0.2	0.22	0.13	0.22	0.2	0.29	0.13	0.14	0.11	0.15
9900	0.21	0.1	0.14	0.07	0.08	0.08	0.12	0.2	0.22	0.12	0.22	0.2	0.29	0.13	0.14	0.1	0.15
10000	0.21	0.1	0.14	0.07	0.08	0.08	0.11	0.2	0.22	0.12	0.22	0.2	0.29	0.13	0.14	0.1	0.15

TABLE 5-22

Plume Salt Deposition Table (KG./(KM.**2-MO.)) 1987

CBCP property

SKC property

5402-027 Cedar Bay LMCDT – 7 cells 1987 Met 3 SWDs 12/04/92
SEASON = ANNUAL

DISTANCE FROM TOWER (M)	WIND FROM N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	AVG
	PLUME HEADED S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	AVG
100	0.00	0.00	0.00	321.62	260.36	169.04	0.00	0.00	0.00	0.00	0.00	97.50	212.65	344.25	0.00	0.00	87.84
200	0.00	0.00	0.00	494.79	442.38	320.74	0.00	0.00	0.00	0.00	0.00	199.90	485.09	554.47	0.00	0.00	156.09
300	0.00	0.00	13.89	189.71	159.41	130.12	5.10	0.00	0.00	0.00	2.56	127.12	216.19	234.49	7.85	0.00	67.90
400	1.19	1.46	13.32	41.36	48.33	46.93	34.80	60.05	33.74	35.98	44.18	72.02	127.86	81.60	7.31	0.76	40.66
500	9.99	9.59	15.00	32.95	38.93	35.35	21.06	23.81	21.64	16.93	13.95	63.53	113.06	77.21	8.42	5.76	31.70
600	20.55	14.92	15.43	14.32	13.18	8.45	16.63	19.99	20.56	16.82	12.17	34.25	74.32	48.07	12.39	12.61	22.29
700	20.65	14.67	22.57	9.60	7.04	5.44	22.25	18.54	18.87	16.10	17.25	15.80	50.72	28.61	20.91	12.69	18.81
800	15.56	11.90	19.21	7.48	5.34	4.81	16.80	14.04	13.60	11.13	14.80	15.00	26.68	18.76	17.67	9.25	13.88
900	6.57	5.47	15.14	6.72	4.99	4.63	13.60	10.21	5.37	7.29	12.38	14.94	17.53	15.15	13.45	3.76	9.82
1000	2.41	2.33	7.44	6.52	4.58	4.55	9.92	8.70	2.19	5.79	8.60	14.74	17.24	15.02	7.31	1.20	7.41
1100	0.9	1.06	1.93	5.8	3.92	4.08	5.99	6.44	1.41	5.63	6.74	14.02	16.57	14.57	1.45	0.43	5.75
1200	0.56	0.62	1.17	3.94	3.12	2.61	5.01	5.74	1.3	3.81	4.86	11.63	14.71	12.85	0.81	0.25	4.56
1300	0.56	0.62	1	3.94	3.12	2.61	1.74	1.93	1.3	1.27	1.62	11.29	14.38	12.51	0.67	0.25	3.58
1400	0.56	0.62	1	3.94	3.12	2.61	1.74	1.93	1.3	1.27	1.62	11.29	14.38	12.51	0.67	0.25	3.58
1500	0.56	0.62	1	3.63	2.93	2.45	1.74	1.93	1.3	1.27	1.62	10.7	14.06	12.15	0.67	0.25	3.56
1600	0.56	0.62	1	3.17	2.66	2.2	1.74	1.93	1.3	1.27	1.62	7.4	11.15	9.18	0.67	0.25	2.92
1700	0.56	0.62	1	3.17	2.66	2.2	1.74	1.93	1.3	1.27	1.62	3.83	7.59	5.62	0.67	0.25	2.25
1800	0.56	0.62	1	2.71	2.4	1.94	1.74	1.93	1.3	1.27	1.62	3.6	7.01	5.1	0.67	0.25	2.11
1900	0.56	0.62	1	2.06	2.01	1.41	1.74	1.93	1.3	1.27	1.62	3.2	6.32	4.43	0.67	0.25	1.9
2000	0.56	0.62	1	1.96	1.73	1.2	1.74	1.93	1.3	1.27	1.62	2.9	6.01	4.16	0.67	0.25	1.81
2100	0.56	0.62	1	1.72	1.5	0.98	1.74	1.93	1.3	1.27	1.62	2.59	5.54	3.77	0.67	0.25	1.69
2200	0.56	0.62	1	1.46	1.37	0.83	1.74	1.93	1.3	1.27	1.62	2.29	4.95	3.48	0.67	0.25	1.58
2300	0.43	0.39	1	1.07	1.11	0.67	1.74	1.93	1.26	1.22	1.62	1.86	3.98	2.88	0.67	0.25	1.38
2400	0.4	0.33	1	0.68	0.76	0.51	1.74	1.93	1.25	1.21	1.62	1.37	3.06	2.15	0.67	0.25	1.18
2500	0.4	0.33	1	0.46	0.6	0.38	1.74	1.93	1.25	1.21	1.62	1.11	2.4	1.55	0.67	0.25	1.06
2600	0.4	0.33	1	0.37	0.54	0.32	1.74	1.93	1.25	1.21	1.62	0.99	2.15	1.29	0.67	0.25	1
2700	0.4	0.33	1	0.34	0.48	0.31	1.74	1.93	1.25	1.21	1.62	0.95	2.05	1.24	0.67	0.25	0.99
2800	0.4	0.33	1	0.3	0.4	0.3	1.74	1.93	1.25	1.21	1.62	0.89	1.89	1.17	0.67	0.25	0.96
2900	0.4	0.33	1	0.3	0.4	0.3	1.74	1.93	1.25	1.21	1.62	0.89	1.89	1.17	0.67	0.25	0.96
3000	0.4	0.33	0.87	0.29	0.37	0.29	1.52	1.93	1.25	1.21	1.52	0.87	1.85	1.13	0.6	0.25	0.92
3100	0.4	0.33	0.58	0.22	0.28	0.27	1	1.93	1.25	1.21	1.3	0.81	1.7	1.01	0.44	0.25	0.81
3200	0.4	0.33	0.58	0.22	0.28	0.27	1	1.93	1.25	1.21	1.3	0.81	1.68	1	0.44	0.25	0.81
3300	0.4	0.33	0.58	0.22	0.26	0.27	1	1.93	1.25	1.21	1.29	0.81	1.64	0.98	0.44	0.25	0.8
3400	0.4	0.33	0.53	0.22	0.26	0.27	0.99	1.93	1.25	1.21	1.29	0.81	1.64	0.98	0.43	0.25	0.8
3500	0.4	0.33	0.53	0.18	0.2	0.2	0.99	1.93	1.25	1.21	1.29	0.74	1.53	0.94	0.43	0.25	0.77
3600	0.4	0.33	0.52	0.08	0.1	0.09	0.55	1.51	1.25	0.93	0.74	0.61	1.32	0.84	0.43	0.25	0.62
3700	0.38	0.3	0.46	0.08	0.1	0.09	0.46	1.22	1.25	0.74	0.43	0.61	1.32	0.84	0.4	0.25	0.56
3800	0.38	0.3	0.46	0.08	0.1	0.09	0.46	0.89	0.83	0.57	0.43	0.61	1.32	0.84	0.4	0.25	0.5
3900	0.38	0.3	0.46	0.08	0.1	0.09	0.46	0.56	0.43	0.41	0.43	0.61	1.32	0.84	0.4	0.25	0.45
4000	0.38	0.3	0.46	0.08	0.1	0.09	0.46	0.56	0.43	0.41	0.43	0.61	1.32	0.84	0.4	0.25	0.45
4100	0.38	0.3	0.46	0.08	0.1	0.09	0.46	0.56	0.43	0.41	0.43	0.61	1.32	0.84	0.4	0.25	0.45
4200	0.38	0.3	0.46	0.08	0.1	0.09	0.46	0.56	0.42	0.41	0.43	0.61	1.32	0.84	0.4	0.25	0.45
4300	0.38	0.3	0.46	0.08	0.1	0.09	0.46	0.56	0.42	0.41	0.43	0.61	1.32	0.84	0.4	0.25	0.45
4400	0.38	0.3	0.46	0.08	0.1	0.09	0.46	0.56	0.42	0.41	0.43	0.61	1.32	0.84	0.4	0.25	0.45

TABLE 5-22 (Cont'd)

Plume Salt Deposition Table (KG./(KM.**2-MO.)) 1987

5402-027 Cedar Bay LMCDT - 7 cells 1987 Met 3 SWDs 12/04/92
SEASON = ANNUAL

DISTANCE FROM TOWER (M)	WIND FROM N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	AVG
	PLUME HEADED S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	AVG
4500	0.38	0.3	0.46	0.08	0.1	0.09	0.46	0.56	0.42	0.41	0.43	0.61	1.32	0.84	0.4	0.25	0.45
4600	0.38	0.3	0.46	0.08	0.1	0.09	0.46	0.56	0.42	0.41	0.43	0.61	1.32	0.84	0.4	0.25	0.45
4700	0.38	0.3	0.46	0.08	0.1	0.09	0.46	0.56	0.42	0.41	0.43	0.61	1.32	0.84	0.4	0.25	0.45
4800	0.38	0.3	0.46	0.08	0.1	0.09	0.46	0.56	0.42	0.41	0.43	0.61	1.32	0.84	0.4	0.25	0.45
4900	0.38	0.3	0.46	0.08	0.1	0.09	0.46	0.56	0.42	0.41	0.43	0.61	1.32	0.84	0.4	0.25	0.45
5000	0.38	0.3	0.46	0.08	0.1	0.09	0.46	0.56	0.42	0.41	0.43	0.61	1.32	0.84	0.4	0.25	0.45
5100	0.38	0.3	0.46	0.08	0.1	0.09	0.46	0.56	0.42	0.41	0.43	0.61	1.32	0.84	0.4	0.25	0.45
5200	0.38	0.3	0.46	0.08	0.1	0.09	0.46	0.56	0.42	0.41	0.43	0.61	1.32	0.84	0.4	0.25	0.45
5300	0.38	0.3	0.46	0.08	0.1	0.09	0.46	0.56	0.42	0.41	0.43	0.61	1.32	0.84	0.4	0.25	0.45
5400	0.38	0.3	0.46	0.08	0.1	0.09	0.46	0.56	0.42	0.41	0.43	0.61	0.84	0.72	0.4	0.25	0.41
5500	0.38	0.3	0.46	0.08	0.1	0.09	0.46	0.56	0.42	0.41	0.43	0.39	0.57	0.45	0.4	0.25	0.36
5600	0.38	0.3	0.46	0.08	0.1	0.09	0.46	0.56	0.42	0.41	0.43	0.07	0.24	0.12	0.4	0.25	0.3
5700	0.37	0.28	0.46	0.08	0.1	0.09	0.46	0.54	0.4	0.4	0.43	0.07	0.24	0.12	0.4	0.23	0.29
5800	0.35	0.26	0.43	0.08	0.1	0.09	0.45	0.51	0.37	0.37	0.43	0.07	0.24	0.12	0.38	0.21	0.28
5900	0.35	0.26	0.31	0.08	0.1	0.09	0.41	0.51	0.37	0.37	0.41	0.06	0.24	0.12	0.33	0.21	0.26
6000	0.35	0.26	0.31	0.08	0.1	0.09	0.41	0.51	0.37	0.37	0.41	0.06	0.24	0.12	0.33	0.21	0.26
6100	0.35	0.26	0.31	0.08	0.1	0.09	0.41	0.51	0.37	0.37	0.41	0.06	0.24	0.12	0.33	0.21	0.26
6200	0.35	0.26	0.31	0.08	0.1	0.09	0.41	0.51	0.37	0.37	0.41	0.06	0.24	0.12	0.33	0.21	0.26
6300	0.35	0.26	0.31	0.08	0.1	0.09	0.41	0.51	0.37	0.37	0.41	0.06	0.24	0.12	0.33	0.21	0.26
6400	0.35	0.26	0.31	0.08	0.1	0.09	0.41	0.51	0.37	0.37	0.41	0.06	0.24	0.12	0.33	0.21	0.26
6500	0.35	0.26	0.31	0.08	0.1	0.09	0.41	0.51	0.37	0.37	0.41	0.06	0.24	0.12	0.33	0.21	0.26
6600	0.35	0.26	0.31	0.08	0.1	0.09	0.41	0.51	0.36	0.37	0.41	0.06	0.24	0.12	0.33	0.21	0.26
6700	0.35	0.26	0.31	0.08	0.1	0.09	0.41	0.51	0.36	0.37	0.41	0.06	0.24	0.12	0.33	0.21	0.26
6800	0.35	0.26	0.31	0.08	0.1	0.09	0.41	0.51	0.36	0.37	0.41	0.06	0.24	0.12	0.33	0.21	0.26
6900	0.33	0.23	0.31	0.08	0.1	0.09	0.41	0.5	0.35	0.36	0.41	0.06	0.24	0.12	0.33	0.19	0.26
7000	0.32	0.22	0.31	0.08	0.1	0.09	0.41	0.5	0.35	0.36	0.41	0.06	0.24	0.12	0.33	0.19	0.26
7100	0.32	0.22	0.31	0.08	0.1	0.09	0.41	0.5	0.35	0.36	0.41	0.06	0.24	0.12	0.33	0.19	0.26
7200	0.32	0.22	0.31	0.08	0.1	0.09	0.41	0.5	0.35	0.36	0.41	0.06	0.24	0.12	0.33	0.19	0.26
7300	0.3	0.21	0.29	0.08	0.1	0.09	0.4	0.49	0.33	0.36	0.39	0.06	0.24	0.12	0.29	0.18	0.24
7400	0.29	0.21	0.29	0.08	0.1	0.09	0.4	0.49	0.33	0.36	0.39	0.06	0.24	0.12	0.29	0.17	0.24
7500	0.29	0.21	0.29	0.08	0.1	0.09	0.4	0.49	0.33	0.36	0.39	0.06	0.24	0.12	0.29	0.17	0.24
7600	0.29	0.21	0.29	0.08	0.1	0.09	0.4	0.49	0.33	0.36	0.39	0.06	0.24	0.12	0.29	0.17	0.24
7700	0.29	0.21	0.29	0.08	0.1	0.09	0.4	0.49	0.33	0.36	0.39	0.06	0.24	0.12	0.29	0.17	0.24
7800	0.29	0.21	0.29	0.08	0.1	0.09	0.39	0.49	0.33	0.36	0.39	0.06	0.24	0.12	0.29	0.17	0.24
7900	0.29	0.2	0.27	0.08	0.1	0.09	0.39	0.49	0.33	0.35	0.39	0.06	0.24	0.12	0.27	0.17	0.24
8000	0.27	0.19	0.27	0.08	0.1	0.09	0.39	0.48	0.3	0.34	0.39	0.06	0.24	0.12	0.27	0.16	0.23
8100	0.25	0.17	0.27	0.08	0.1	0.09	0.39	0.48	0.29	0.33	0.39	0.06	0.24	0.12	0.27	0.15	0.23
8200	0.23	0.16	0.27	0.08	0.1	0.09	0.39	0.47	0.28	0.32	0.39	0.06	0.24	0.12	0.27	0.13	0.22
8300	0.22	0.15	0.24	0.08	0.1	0.09	0.37	0.46	0.27	0.32	0.37	0.06	0.24	0.12	0.24	0.13	0.22
8400	0.21	0.14	0.24	0.08	0.1	0.09	0.37	0.46	0.25	0.31	0.37	0.06	0.24	0.12	0.24	0.11	0.21
8500	0.19	0.12	0.21	0.08	0.1	0.09	0.31	0.45	0.23	0.3	0.35	0.06	0.24	0.12	0.21	0.1	0.2
8600	0.19	0.12	0.19	0.08	0.1	0.09	0.31	0.45	0.23	0.3	0.34	0.06	0.24	0.12	0.2	0.1	0.2
8700	0.19	0.12	0.19	0.08	0.1	0.09	0.31	0.45	0.23	0.3	0.33	0.06	0.24	0.12	0.19	0.1	0.2
8800	0.19	0.12	0.19	0.08	0.1	0.09	0.31	0.45	0.23	0.3	0.33	0.06	0.24	0.12	0.19	0.1	0.2

TABLE 5-22 (Cont'd)

Plume Salt Deposition Table (KG./(KM.**2-MO.)) 1987

5402-027 Cedar Bay LMCDT - 7 cells 1987 Met 3 SWDe 12/04/92
SEASON = ANNUAL

DISTANCE FROM TOWER (M)	WIND FROM N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	AVG
	PLUME HEADED S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	AVG
8900	0.19	0.12	0.19	0.08	0.1	0.09	0.31	0.45	0.23	0.3	0.33	0.06	0.24	0.12	0.19	0.1	0.2
9000	0.19	0.12	0.19	0.08	0.1	0.09	0.31	0.45	0.23	0.3	0.33	0.06	0.24	0.12	0.19	0.1	0.2
9100	0.19	0.12	0.19	0.08	0.1	0.09	0.31	0.45	0.23	0.3	0.33	0.06	0.24	0.12	0.19	0.1	0.2
9200	0.19	0.12	0.17	0.08	0.1	0.09	0.3	0.45	0.23	0.3	0.33	0.06	0.24	0.12	0.18	0.1	0.19
9300	0.19	0.12	0.17	0.08	0.1	0.09	0.3	0.45	0.23	0.3	0.32	0.06	0.24	0.12	0.18	0.1	0.19
9400	0.18	0.11	0.17	0.08	0.1	0.09	0.22	0.44	0.21	0.3	0.24	0.06	0.24	0.12	0.18	0.1	0.18
9500	0.16	0.11	0.17	0.08	0.1	0.09	0.18	0.31	0.21	0.22	0.19	0.06	0.24	0.12	0.18	0.09	0.16
9600	0.15	0.1	0.16	0.08	0.1	0.09	0.16	0.23	0.2	0.18	0.18	0.06	0.24	0.12	0.16	0.09	0.14
9700	0.14	0.1	0.14	0.08	0.1	0.09	0.16	0.23	0.2	0.18	0.17	0.06	0.24	0.12	0.15	0.08	0.14
9800	0.14	0.1	0.12	0.08	0.1	0.09	0.14	0.23	0.2	0.16	0.16	0.06	0.24	0.12	0.13	0.08	0.14
9900	0.14	0.1	0.12	0.08	0.1	0.09	0.14	0.23	0.2	0.16	0.16	0.06	0.24	0.12	0.13	0.08	0.14
10000	0.14	0.1	0.12	0.08	0.1	0.09	0.14	0.23	0.2	0.16	0.16	0.06	0.24	0.12	0.13	0.08	0.14

TABLE 5-23

Stack Parameters for Representative CBCP CFB's Operating Loads

Load (%)	Case Description	Exit Velocity (m/sec)	Exit Temperature (K)	Frequency
100%	3 CFBs @ 100%	32.45	403	Most Frequent
67%	2 CFBs @ 100%	21.97	397.4	
40%	2 CFBs @ 60%	13.23	377.4	
17%	One CFB producing 380,000 lb/hr steam	5.12	366.3	Least Frequent

TABLE 5-24

Screening Meteorological Conditions

Stability	Wind Speed Combinations (m/s)
A	1.0, 2.0, 3.0
B	1.0, 2.0, 3.0, 4.0, 5.0
C	1.0, 2.0, 3.0, 4.0, 5.0, 8.0, 10.0
D	1.0, 2.0, 3.0, 4.0, 5.0, 8.0, 10.0, 15.0, 20.0
E	1.0, 2.0, 3.0, 4.0, 5.0
F	1.0, 2.0, 3.0, 4.0

Source: EPA, 1988

Range	Increment
100 m - 1000 m	100 m
1000 m - 2000 m	250 m
2000 m - 4000 m	500 m
4000 m - 10000 m	1000 m
10000 m - 25000 m	5000 m

Flat terrain was assumed in the dispersion modeling.

The results of the ISC modeling analysis for each meteorological condition and load case are shown in Table 5-25. From Table 5-25, it is seen that maximum normalized concentrations predicted for each meteorological condition are generally (25 of 33 meteorological conditions analyzed or 76%) associated with the 100% load case.

In Section 3 it was shown that the impact from all of the CBCP's sources at full load had become insignificant within 4.5 km of the CFB's stack for SO_2, 1.25 km for PM-10, and 0.2 km for NO_2. Other pollutants were substantially below the SIL throughout the modeling grid. The CBCP's maximum predicted impacts of SO_2, PM, and NO_2 at full load occurred within 0.37 km of the CFB's stack often within the cavity region of the CFB boiler housing due solely to Limestone Dryer and materials handling emissions. A review of Table 5-25 indicates that low-load cases would not raise the maximum impact of the CBCP's CFBs or their contribution to peak ambient impacts modeled in Section 3.

As to the maximum impact of the CFBs, the low-load cases with normalized values in Table 5-25 above those of full load are either very close to the full-load value or represent very low concentrations. In either event, pursuing low-load cases would not affect critical parameters of the full-load modeling since the CFBs' contribution to ambient air quality are driven by meteorological conditions for which the full-load case's modeled impact is greater than the low-load case's modeled impact. Even if one hour of meteorology could occur when the low-load impact might be higher, those meteorological conditions would be overshadowed by conditions where the full-load case's impacts are greater at the same locations.

Since Table 5-25 shows that the low-load operation of the CBCP's CFBs would not increase the impact of the CFBs within 0.8 km, well beyond the location of the CBCP's peak effect on ambient air quality, it is clear that low-load operation would not affect the estimation of that peak effect.

TABLE 5-25

ISCST Screening Modeling Results
CFB Load Analysis

Stability Class	Wind Speed (m/sec)	Modeled Load (3 CFBs at 100% Load)		67% Facility Load (2 CFBs at 100% Load)		40% Facility Load (2 CFBs at 60% Load)		17% Facility Load (1 CFB 380,000 lb/hr Steam Production)	
		Normalized Concentration	Distance (m)	Normalized Concentration	Distance (m)	Normalized Concentration	Distance (m)	Normalized Concentration	Distance (m)
A	1.0	0.303	1500	0.295	1250	0.309	1250	0.317*	900
A	2.0	0.413*	1000	0.400	1000	0.381	900	0.309	700
A	3.0	0.485*	900	0.431	900	0.382	800	0.270	700
B	1.0	0.136	7000	0.138	5000	0.155	4000	0.168*	2500
B	2.0	0.203*	4000	0.196	3000	0.203*	2500	0.184	1750
B	3.0	0.242*	3000	0.227	2500	0.218	2000	0.176	1500
B	4.0	0.264*	2500	0.241	2000	0.220	1750	0.168	1250
B	5.0	0.277*	2000	0.246	1750	0.217	1500	0.157	1250
C	1.0	0.090	15000	0.090	10000	0.108	8000	0.124*	5000
C	2.0	0.144	8000	0.142	7000	0.151*	5000	0.141	3000
C	3.0	0.177*	6000	0.168	5000	0.165	3500	0.139	2500
C	4.0	0.197*	5000	0.182	4000	0.170	3000	0.133	2500
C	5.0	0.210*	4000	0.189	3500	0.168	3000	0.127	2000
C	8.0	0.221*	3000	0.185	3000	0.155	2500	0.105	1750
C	10.0	0.216*	3000	0.180	2500	0.148	2000	0.093	1750
D	1.0	0.006	25000	0.010	25000	0.022	25000	0.040*	20000
D	2.0	0.030	25000	0.039	25000	0.049	20000	0.054*	10000
D	3.0	0.054	25000	0.055	20000	0.061*	15000	0.058	9000

TABLE 5-25 (Cont'd)

ISCST Screening Modeling Results
CFB Load Analysis

Stability Class	Wind Speed (m/sec)	Modeled Load (3 CFBs at 100% Load)		67% Facility Load (2 CFBs at 100% Load)		40% Facility Load (2 CFBs at 60% Load)		17% Facility Load (1 CFB 380,000 lb/hr Steam Production)	
		Normalized Concentration	Distance (m)	Normalized Concentration	Distance (m)	Normalized Concentration	Distance (m)	Normalized Concentration	Distance (m)
D	4.0	0.066*	20000	0.065	15000	0.066*	10000	0.058	7000
D	5.0	0.074*	15000	0.069	15000	0.068	10000	0.056	6000
D	8.0	0.086*	10000	0.076	9000	0.068	7000	0.048	5000
D	10.0	0.088*	10000	0.075	8000	0.065	6000	0.043	5000
D	15.0	0.085*	8000	0.072	6000	0.058	5000	0.034	4500
D	20.0	0.082*	6000	0.067	6000	0.051	5000	0.028	4000
E	1.0	0.101*	25000	0.091	25000	0.080	25000	0.054	20000
E	2.0	0.080*	25000	0.067	25000	0.055	20000	0.036	20000
E	3.0	0.066*	25000	0.054	20000	0.043	20000	0.029	15000
E	4.0	0.057*	25000	0.046	20000	0.036	20000	0.024	15000
E	5.0	0.051*	20000	0.041	20000	0.032	20000	0.021	15000
F	1.0	0.010	25000	0.010	25000	0.011*	25000	0.011*	25000
F	2.0	0.010*	25000	0.009	25000	0.009	25000	0.009	25000
F	3.0	0.009*	25000	0.009*	25000	0.009*	25000	0.008	25000
F	4.0	0.009*	35000	0.008	25000	0.009*	25000	0.007	25000

*Denotes maximum concentration for each meteorological condition

This is due in part to the fact that the CFBs' emissions do not impact within it's own cavity and do not contribute to maximum material handling impacts. Indeed, modeling of the low-load case under conditions when it has its largest near-field effect would actually report significantly lower total ambient impacts since other CBCP facilities (limestone dryers, materials handling) with a relatively larger impact are also at low-load and the meteorological conditions being modeled are not those associated with the highest impact from those CBCP's other sources. Therefore, lower loads do not warrant additional analyses as they have no bearing on modeling results for critical parameters.

REFERENCES FOR SECTION 5

Blood, E. R. 1980. Surface Water Hydrology and Biochemistry of the Okefenokee Watershed. Ph.D. thesis. Univ. Georgia, Georgia. Reproduced as Okefenokee Ecosystems Investigations, Tech. Rept. 7, Inst. Ecol. Univ. Georgia, Athens, Georgia. (as cited in Meyers and Odum 1991).

Dvorak, A.J., B.G. Lewis, et al. 1978. Impacts of Coal-fired Power Plants on Fish, Wildlife, and Their Habitats. Argonne National Laboratory. Argonne, Illinois. Fish and Wildlife Service Publication No. FWS/OBS-78/29.

EPA (1988). "Screening Procedures for Estimating the Air Quality Impact of Stationary Sources," Office of Air Quality Planning and Standards, EPA-450/4-88-010, August.

EPRI, 1984. Users Manual: Cooling-Tower-Plume Prediction Code, prepared by Argonne National Laboratory, Argonne Illinois for Electric Power Research Institute, Palo Alto, CA, April 1984.

Frey, R. W. and P.B. Basan. 1985. Coastal salt marshes. Pages 225-301 in R.A. Davis, Jr., ed. Coastal sedimentary environments. 2nd ed. Springer-Verlag, Inc., New York, New York. (as cited in Wiegert and Freeman 1990).

Gerritsen, J. and H.S. Greening. 1989. Marsh seed banks of the Okefenokee Swamp: Effects of hydrologic regime and nutrients. Ecology 70(3): 750-763.

Kurz, H. and K. Wagner. 1957. Tidal Marshes of the Gulf and Atlantic Coasts of Northern Florida and Charleston, South Carolina. The Florida State University.

Meyers, J.M. and E.P. Odum. 1991. Breeding Bird Populations of the Okefenokee Swamp in Georgia: Baseline for Assessing Future Avifaunal Changes. J. Field Ornithol., 62 (1):53-68.

National Park Service. 1990. Timucuan Today and Tomorrow.

Pomeroy, L.R. and R.G. Wiegert. 1981. Ecology of a Salt Marsh. Ecological Studies Series. Vol. 38. Springer-Verlag, New York, Inc., New York. 271 pp. (as cited in Wiegert and Freeman 1990).

Smith, A.E. and J.B. Levenson. 1980. A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals. U. S. Environmental Protection Agency. EPA 450/2-81-078.

Soil Conservation Service. 1978. Soil Survey of City of Jacksonville, Duval County, Florida.

Wiegert, R.G. and B.J. Freeman. 1990. Tidal Salt Marshes of the Southeast Atlantic Coast: A Community Profile. U.S. Department of the Interior, Fish and Wildlife Service. Biological Report 85(7.29).

Wolf Island National Wildlife Refuge. 1991 Annual Narrative Report.

APPENDIX A

EMISSION RATES FOR SKC POWER AND BARK BOILERS

APPENDIX A

EMISSION RATES FOR SKC POWER AND BARK BOILERS

A.1 Introduction

This appendix describes the data and methodology used to estimate emissions from SKC's five existing power and bark boilers for purposes of the air quality modeling analyses reported in Section 2. The annual emissions data that were employed in the Section 2 modeling are also tabulated in Section 1 for the comparisons presented there.

The principal objective of these emissions data for SKC's five existing boilers was to compare their modeled air quality impacts with those of the CBCP together with SKC's three proposed package boilers. These comparisons are for two operating conditions for SKC's boilers: full load generating 745,000 lb/hr and partial load generating 640,000 lb/hr of steam.

To be as consistent as possible with standard modeling procedures, impacts are based on all pollutants and averaging times for which there are ambient standards and PSD increments and are based on maximum allowable emission factors where they exist, on reasonable emission factors (derived from the available data, which included EPA references) where the former do not exist, and on full load where it applies. While the partial load case departs from this last condition, ENSR could still use the emission factors per unit of output to be responsive to the need for maximum emissions.

The specific methodologies used to specify the emission factors to support the comparisons for Sections 1 and 2 for SKC's five existing boilers are set forth separately below for each load case and for each pollutant that was modeled.

A.2 Full Load

SKC's facility now has three power boilers and two bark boilers. As presented in Table A-1, the power boilers are capable of producing 135,000, 180,000, and 180,000 lb/hr, respectively, of steam with a maximum heat input of 185, 246, and 246 MMBtu/hr, respectively. These boilers have always been permitted to burn only oil, and they now fire the same fuel. Thus, to calculate the hourly emissions for a given pollutant from these boilers at full load, one would multiply the emission factor for that pollutant (in lb/MMBtu) by 677 MMBtu/hr (185 + 246 + 246).

TABLE A-1

Steam Rates, Heat Input Rates and Stack Parameters for SKC Existing Sources at Full Load to Produce 745,000 lb/hr Steam with a Combined Stack for the Power Boilers

	PB1	PB2	PB3	BB1	BB2	Totals
Steam Flow (lb/hr)[a]	135,000	180,000	180,000	125,000	125,000	745,000
Heat Input (MMBtu/hr)[a]	185	246	246	193	193	1,063
	Combined Stack					
Stack height (ft)[a]	125			136	136	
Stack diameter (ft)[a]	10.50			8.08	8.08	
Flow rate (acfm)[b]	298,000			132,000	132,000	
Temperature (deg. F)[b]	338			138	138	
Velocity (fps)	57.36			42.91	42.91	
Stack height (m)	38.1			41.5	41.5	
Stack diameter (m)	3.20			2.46	2.46	
Temperature (deg. K)	443			332	332	
Velocity (m/s)	17.48			13.08	13.08	

[a]Source: SKC
[b]ENSR 1993 based on 1991 SKC stack tests by IEA

As shown in Table A-1, the two bark boilers, BB-1 and 2, are each capable of producing 125,000 lb/hr of steam with a maximum heat input of 193 MMBtu/hr. To calculate the emissions of a given pollutant from these boilers at full load, one would multiply the emission factor for that pollutant (in lb/MMBtu) by 386 MMBtu/hr (193 x 2). Calculating emissions from these boilers is complicated by the fact that they are permitted to burn oil, bark, and recycle rejects (in any combination, subject only to an equivalent annual limit of 8400 hours per year of oil firing at a 100% heat input basis) and burning these different fuels produces different emission factors. For some pollutants, the emission factors resulting from burning oil are higher than the emission factors associated with burning bark. For other pollutants, the opposite is true. Thus, the 3-hour average SO_2 emissions, for example, would be determined by the choice of fuel. Since the modeling process focuses on the maximum emissions, the fuel choice for this exercise must depend on which fuel has the highest emission factor for the pollutant.

As described below, this procedure was used to calculate the emissions for each pollutant from the bark boilers and then added to the emissions from the power boilers for assessment of ambient impact. This impact was then compared with the modeled impact of the combination of the maximum permitted (or proposed) emissions of that pollutant from the CBCP and the proposed package boilers.

This is a very straightforward process until the annual emissions for each pollutant emitted by SKC's five boilers are totalled for comparisons in Section 1 with the annual emissions of the CBCP and the proposed package boilers to facilitate the balancing requested by the Siting Board. The emission-specific comparisons of annual averages in Section 2 are appropriate since the annual emissions of a particular pollutant from SKC's sources that was analyzed could occur in a year and standard modeling practice calls for their impacts to be modeled. However, adding the maximum emissions of a pollutant calculated with a certain fuel assumption, which could occur in one year, to the maximum emissions of another pollutant estimated with another fuel assumption, which could occur in another year, yields total emissions that could not occur in the same year. To adjust for this aspect of the comparison process, ENSR added conservatism to its estimation of the emission factors for SKC's power and bark boilers and then tested the reasonableness of the conservatism employed.

The emission factors for regulated pollutants emitted by the power boilers, bark boilers on oil and bark boilers on bark are presented in Tables A-2, A-3, and A-4, respectively, along with references describing their sources. These emission factors for both boiler types and all fuels are presented in Table A-5, along with entries for the oil/bark, 50/50 fuel mix, which averages the heat input based emission factors for the two fuels. The emission factors for unregulated pollutants emitted by the power and bark boilers (oil, bark firing) are presented in Tables A-6, A-7, and A-8, respectively, along with references describing their sources. The emission factors for all

TABLE A-2

Power Boiler Emission Factors for Regulated Pollutants
Oil Firing

Regulated Pollutant	Derived Factor	Ref.	Referenced Factor	
	(lb/10^6 Btu)			
Particulate (TSP)	0.1	1	0.1	lb/10^6 Btu
Particulate (PM10)	0.071	2	71	% of TSP
Sulfur Dioxide (2.27% S)	2.48	5,6	164 S	lb SO2/1000 gal
Sulfur Dioxide (1% S)	1.1	5,6	164 S	lb SO2/1000 gal
Nitrogen Oxides	0.447	2,5	67	lb/1000 gal
Carbon Monoxide	0.033	2,5	5	lb/1000 gal
Volatile Organic Compounds	0.0051	2,5	0.76	lb/1000 gal
	(lb/10^12 Btu)			
Lead	28	3	28	lb/10^12 Btu
Mercury	3.2	3	3.2	lb/10^12 Btu
Beryllium	4.2	3	4.2	lb/10^12 Btu
Fluorides	118	4	50.9	pg/J
Sulfuric Acid Mist (2.27% S)	55000	2	2.9 S	lb SO3/1000 gal
Sulfuric Acid Mist (1% S)	24000	2	2.9 S	lb SO3/1000 gal

1. Permit limit (0.1 lb/10^6 Btu TSP)
2. AP-42 emission factors
3. Toxic Air Pollutant Emission Factors (EPA-450/2-90-011)
4. Emissions Assessment of Conventional Stationary Combustion Sources (EPA-600/7-81-003c)
5. Fuel heating value of 150,000 Btu/gal assumed (residual oil)
6. Mass balance

TABLE A-3

Bark Boiler Emission Factors For Regulated Pollutants
Oil Firing

Regulated Pollutant	Derived Factor	Ref.	Referenced Factor
	(lb/10^6 Btu)		
Particulate (TSP)	0.1	1	0.1 lb/10^6Btu
Particulate (PM_{10})	0.1	2	100% of TSP
Sulfur Dioxide (2.27% S)	2.48	6,7	164 S lb/1000 gal
Sulfur Dioxide (1%)	1.1	6,7	164 S lb/1000 gal
Sulfur Dioxide (1% S, Controlled)	0.55	5,6,7	82 S lb/1000 gal
Nitrogen Oxides	0.447	2,6	67 lb/1000 gal
Carbon Monoxide	0.033	2,6	5 lb/1000 gal
Volatile Organic Compounds	0.0051	2,6	0.76 lb/1000 gal
	(lb/10^{12} Btu)		
Lead	28	3	28 lb/10^{12} Btu
Mercury	0.83	3	0.83 lb/10^{12} Btu
Beryllium	0.25	3	0.25 lb/10^{12} Btu
Fluorides	118	4	50.9 pg/J
Sulfuric Acid Mist (2.27% S)	55000	2	2.9 S lb SO3/1000 gal
Sulfuric Acid Mist (1% S)	24000	2	2.9 S lb SO3/1000 gal

1. Permit limit (0.2 lb/10^6 Btu TSP and 2.27% fuel sulfur)
2. AP-42 emission factors
3. Toxic Air Pollutant Emission Factors (EPA-450/2-90-011)
4. Emissions Assessment of Conventional Stationary Combustion Sources (EPA-600/7-81-003c)
5. Scrubber efficiency of 50% assumed per SKC
6. Fuel heating value of 150,000 Btu/gal assumed (residual oil)
7. Mass balance

TABLE A-4

Bark Boiler Emission Factors for Regulated Pollutants
Bark Firing

Regulated Pollutant	Derived Factor	Ref.	Referenced Factor
	(lb/10^6 Btu)		
Particulate (TSP)	0.2	1	0.2 lb/10^6 Btu
Particulate (PM10)	0.174	2	87 % of TSP
Sulfur Dioxide	0.057	3,6	1 lb/ton,dry
Nitrogen Oxides	0.39	5	0.39 lb/10^6 Btu
Carbon Monoxide	1.7	5	1.7 lb/10^6 Btu
Volatile Organic Compounds	0.26	5	0.26 lb/10^6 Btu
	(lb/10^12 Btu)		
Lead	76	5	76 lb/10^12 Btu
Mercury	2.4	5	2.4 lb/10^12 Btu
Beryllium	0	5	0.0000 lb/10^12 Btu
Fluorides	120000	4,7	1.069 lb/ton,wet
Sulfuric Acid Mist	4700	5	4700 lb/10^12 Btu

1. Permit limit (0.2 lb TSP/10^6 Btu)
2. AP-42 emission factors
3. Fuel heating value of 4,400 Btu/lb,wet and 50% moisture assumed per SKC
4. VOC/PM Speciation Data System (EPA-450/2-90-001)
5. 1991 IEA Stack Test (maximum of boilers 1 & 2) from SKC
6. Seminole Kraft Corporation (Referenced Factor)
7. Fuel heating value of 4,400 Btu/lb,wet assumed

TABLE A-5

Power and Bark Boiler (PB & BB) Emission Factors for Regulated Pollutants

Regulated Pollutant	Derived Emission Factors			BB (Bark/Oil) 1
	PB (No. 6 Oil)	BB (No. 6 Oil)	BB (Bark)	
	($lb/10^6$ Btu)			
Particulate (TSP)	0.1	0.1	0.2	0.15
Particulate (PM10)	0.071	0.1	0.174	0.137
Sulfur Dioxide (2.27% S)	2.48	2.48	0.057	1.2685
Sulfur Dioxide (1% S)	1.1	1.1	0.057	0.5785
Sulfur Dioxide (1% S, controlled)	1.1	0.55	0.057	0.3035
Nitrogen Oxides	0.447	0.447	0.39	0.4185
Carbon Monoxide	0.033	0.033	1.7	0.8665
Volatile Organic Compounds	0.0051	0.0051	0.26	0.13255
	($lb/10^{12}$ Btu)			
Lead	28	28	76	52
Mercury	3.2	0.83	2.4	1.615
Beryllium	4.2	0.25	0	0.125
Fluorides	118	118	120000	60059
Sulfuric Acid Mist (2.27%)	55000	55000	4700	29850
Sulfuric Acid Mist (1%)	24000	24000	4700	14350

1. Bark and oil firing of 50% bark and 50% oil on a heat input basis per SKC

TABLE A-6

Power Boiler Emission Factors for Non-Regulated Pollutants
Oil Firing

Non-Regulated Pollutant	Derived Factor	Ref.	Referenced Factor	
	(lb/10^12 Btu)			
Antimony (Sb)	14.4	2,3	0.00216	lb/1000 gal
Arsenic (As)	19	1	19	lb/10^12 Btu
Barium (Ba)	14.4	2,3	0.00216	lb/1000 gal
Bromine (Br)	7.0	5	3.0	pg/J
Cadmium (Cd)	15.7	1	15.7	lb/10^12 Btu
Hydrogen Chloride	660	5	274	pg Cl/J
Chromium VI (Cr)	0.21	1,6	21	lb/10^12 Btu
Cobalt (Co)	26	5	11	pg/J
Copper (Cu)	278	1	278	lb/10^12 Btu
Formaldehyde	405	1	405	lb/10^12 Btu
Indium (In)	15.2	2,3	0.00228	lb/1000 gal
Manganese (Mn)	26	1	26	lb/10^12 Btu
Molybdenum (Mo)	48.8	5	21	pg/J
Nickel (Ni)	1260	1	1260	lb/10^12 Btu
Phosphorous (P)	58	5	25	pg/J
Polycyclic Organic Matter (POM)	9.2	4	9.2	lb/10^12 Btu
Selenium (Se)	2.4	2,3	0.00036	lb/1000 gal
Tin (Sn)	330	5	142	pg/J
Vanadium (V)	3515	1	3515	lb/10^12 Btu
Zinc (Zn)	77	5	33	pg/J

1. Toxic Air Pollutant Emission Factors (EPA-450/2-90-011)
2. VOC/PM Speciation Data System (EPA-450/2-90-001)
3. Fuel heating value of 150,000 Btu/gal assumed
4. Estimating Air Toxics Emissions from Coal and Oil Combustion Sources (EPA-450/2-89-001)
5. Emissions Assessment of Conventional Stationary Combustion Sources (EPA-600/7-81-003c) vol.V Industrial Combustion Sources: residual oil
6. Assumed 1% of total chromium is hexavalent

TABLE A-7

Bark Boiler Emission Factors for Non-Regulated Pollutants
Oil Firing

Non-Regulated Pollutant	Derived Factor	Ref.	Referenced Factor	
	(lb/10^12 Btu)			
Antimony (Sb)	14.4	2,3	0.00216	lb/1000 gal
Arsenic (As)	1.9	1	1.9	lb/10^12 Btu
Barium (Ba)	14.4	2,3	0.00216	lb/1000 gal
Bromine (Br)	7.0	5	3.0	pg/J
Cadmium (Cd)	3.96	1	3.96	lb/10^12 Btu
Hydrogen Chloride	330	5,6	274	pg Cl/J
Chromium VI (Cr)	0.0168	1,7	1.68	lb/10^12 Btu
Cobalt (Co)	26	5	11	pg/J
Copper (Cu)	25.2	1	25.2	lb/10^12 Btu
Formaldehyde	405	1	405	lb/10^12 Btu
Indium (In)	15.2	2,3	0.00228	lb/1000 gal
Manganese (Mn)	2.86	1	2.86	lb/10^12 Btu
Molybdenum (Mo)	48.8	5	21	pg/J
Nickel (Ni)	50.4	1	50.4	lb/10^12 Btu
Phosphorous (P)	58	5	25	pg/J
Polycyclic Organic Matter (POM)	9.2	4	9.2	lb/10^12 Btu
Selenium (Se)	2.4	2,3	0.00036	lb/1000 gal
Tin (Sn)	330	5	142	pg/J
Vanadium (V)	602.9	1	602.9	lb/10^12 Btu
Zinc (Zn)	77	5	33	pg/J

1. Toxic Air Pollutant Emission Factors (EPA-450/2-90-011)
2. VOC/PM Speciation Data System (EPA-450/2-90-001)
3. Fuel heating value of 150,000 Btu/gal assumed
4. Estimating Air Toxics Emissions from Coal and Oil Combustion Sources (EPA-450/2-89-001)
5. Emissions Assessment of Conventional Stationary Combustion Sources (EPA-600/7-81-003c) vol.V Industrial Combustion Sources: residual oil
6. Scrubber efficiency of 50% assumed per SKC
7. Assumed 1% of total chromium is hexavalent

TABLE A-8

Bark Boiler Emission Factors for Non-Regulated Pollutants
Bark Firing

Non-Regulated Pollutant	Derived Factor	Ref.	Referenced Factor	
	(lb/10^12 Btu)			
Antimony (Sb)	0.0	4	0.0000	lb/10^12 Btu
Arsenic (As)	0.0	4	0.0000	lb/10^12 Btu
Barium (Ba)	430	4	430	lb/10^12 Btu
Bromine (Br)	9346.6	2,3	0.08225	lb/ton
Cadmium (Cd)	12	4	12	lb/10^12 Btu
Hydrogen Chloride	12000	3,5,6,7	200	ppm in fuel
Chromium VI (Cr)	0.26	4,10	26	lb/10^12 Btu
Cobalt (Co)	3100	2,3	0.02764	lb/ton
Copper (Cu)	40	4	40	lb/10^12 Btu
Formaldehyde as CH2O	850	8,9	454	ppb
Indium (In)	801.1	2,3	0.00705	lb/ton
Manganese (Mn)	68	4	68	lb/10^12 Btu
Molybdenum (Mo)	1602.3	2,3	0.0141	lb/ton
Nickel (Ni)	90	4	90	lb/10^12 Btu
Phosphorous (P)	360	4	360	lb/10^12 Btu
Polycyclic Organic Matter (POM)	250	1,3,5	0.0044	lb/ton,dry
Selenium (Se)	0.0	4	0.0000	lb/10^12 Btu
Tin (Sn)	1014.8	2,3	0.00893	lb/ton
Vanadium (V)	480	2,3	0.00423	lb/ton
Zinc (Zn)	870	4	870	lb/10^12 Btu

1. Toxic Air Pollutant Emission Factors (EPA-450/2-90-011)
2. VOC/PM Speciation Data System (EPA-450/2-90-001)
3. Fuel heating value of 4,400 Btu/ton,wet assumed
4. 1991 IEA Stack Test (maximum of boilers 1 & 2)
5. Fifty percent bark moisture assumed per SKC
6. Seminole Kraft Corporation (Referenced Factor)
7. Scrubber efficiency of 50% assumed per SKC
8. Air Toxic Emissions from Wood Fired Boilers (Sassenrath, 1991)
9. Applied to DSCFM and %CO2 values in 1991 IEA stack test (avg. of boilers 1 and 2)
10. Assumed 1% of total chromium is hexavalent

unregulated pollutants from both boiler types and all fuels are presented in Table A-9, along with entries for the oil/bark, 50/50 fuel mix, which averages the heat input based emission factors for the two fuels. These figures are then presented with heat input values for each boiler configuration and fuel choice as appropriate in Table A-10 and extended to hourly and annual emission rates. The necessary sums are then taken, as explained below, and summary information are presented in Tables 1-3 and 1-4 of the text of this report with individual pollutant emission rates modeled in Section 2.

A.2.1 SO_2

A.2.1.1 Power Boilers

The modeling in Section 2 for SO_2 is based on maximum 3-hour, 24-hour, and annual average emissions. Estimating the 3-hour SO_2 emissions starts with the identification of the emission factor for the permitted fuel oil for the power boilers. Initially, the power boilers were permitted to fire oil with a 2.27% sulfur content. Currently, however, they are permitted to burn 1.0% sulfur oil until SKC demonstrates that they can meet the applicable PM limit with a higher sulfur oil. The emission factor associated with 2.7% sulfur oil is 2.48 lb/MMBtu. If a 2.27% S oil could be found with the PM emission characteristics that enabled the power boilers to burn it and to satisfy their PM limit, the maximum SO_2 emission factor for the 3 hour average would be 2.48 lb/MMBtu, which would yield emissions of 1679 lb/hr. Using this value for the 24-hour averaging and the annual averaging periods, as well, would be reasonable under this contingency and would permit the other SO_2 comparisons to go forward. This rate converts into annual emissions of 7354 TPY.

To be conservative, ENSR also analyzed a 1.0% sulfur content fuel. The SO_2 emission factor for 1.0 % sulfur oil is 1.1 lb/MMBtu, which yields emissions of 745 lb/hr. With this emission factor, the annual emissions for all three power boilers is 3262 TPY. These values appear in Table A-2 (as well as in Tables A-5, A-10, and 1-3, as appropriate) and were modeled in the analyses described in Section 2.

A.2.1.2 Bark Boilers

The modeling in Section 2 for SO_2 is based on maximum 3-hour, 24-hour, and annual average emissions. The bark boilers are permitted to fire oil with a 2.27% sulfur content; they are not subject to the same 1.0% S ceiling that applies to the power boilers, because the bark boilers have a scrubber to control PM emissions. Thus, the SO_2 emission factor for the permitted fuel for the 3-hour average is the 2.48 lb/MMBtu factor associated with 2.27% sulfur oil. The SO_2 emission factor resulting from burning 100% bark is 0.055 lb/MMBtu. Since the emission factor resulting from firing oil is higher than from firing bark, the former was used for further analysis.

TABLE A-9

Power and Bark Boiler (PB & BB) Emission Factors for Non-Regulated Pollutants

Non-Regulated Pollutant	Derived Emission Factors (lb/10^12 Btu)			
	PB (No. 6 Oil)	BB (No. 6 Oil)	BB (Bark)	BB (Bark/Oil) 1
Antimony (Sb)	14.4	14.4	0	7.2
Arsenic (As)	19	1.9	0	0.95
Barium (Ba)	14.4	14.4	430	222.2
Bromine (Br)	7	7	9346.6	4676.8
Cadmium (Cd)	15.7	3.96	12	7.98
Hydrogen Chloride	660	330	12000	6165
Chromium VI (Cr)	0.21	0.0168	0.26	0.1384
Cobalt (Co)	26	26	3100	1563
Copper (Cu)	278	25.2	40	32.6
Formaldehyde	405	405	850	627.5
Indium (In)	15.2	15.2	801.1	408.15
Manganese (Mn)	26	2.86	68	35.43
Molybdenum (Mo)	48.8	48.8	1602.3	825.55
Nickel (Ni)	1260	50.4	90	70.2
Phosphorous (P)	58	58	360	209
Polycyclic Organic Matter (POM)	9.2	9.2	250	129.6
Selenium (Se)	2.4	2.4	0	1.2
Tin (Sn)	330	330	1014.8	672.4
Vanadium (V)	3515	602.9	480	541.45
Zinc (Zn)	77	77	870	473.5
1. Bark and oil emission factor assuming 50% bark and 50% oil on a heat input basis per SKC				

TABLE A-10

Conservative Estimate of the Maximum Emissions from the Power and Bark Boilers at Full Load Generating 745,000 lb/hr of Steam, Using Alternative Fuels

	Power Boilers				Bark Boilers				
			Mass Emissions				Mass Emissions		
	Heat Input	EF (lb/MMBtu)	lb/hr	TPY	Heat Input	EF (lb/MMBtu)	lb/hr	TPY	Total TPY
Particulate (TSP)	677	0.1	67.7	297	386	0.2 (b)	77.2	338	635
Particulate (PM10)	677	0.071	48.1	211	386	0.174 (b)	67.2	294	505
Sulfur Dioxide (2.27% S)	677	2.48	1679.0	7354	386	2.48 (d)	957.3	402	11374 (e)
Sulfur Dioxide (2.27% S)	677	2.48	1679.0	7354	386	1.2685 (c)	489.6	2145	9498 (e)
Sulfur Dioxide (1% S)	677	1.1	744.7	3262	386	0.5785 (c)	223.3	978	4240 (e)
Sulfur Dioxide (1% S, controlled) (a)	677	1.1	744.7	3262	386	0.3035 (c)	117.2	513	3775
Nitrogen Oxides	677	0.447	302.6	1325	386	0.4185 (c)	161.5	708	2033
Carbon Monoxide	677	0.033	22.3	98	386	1.7 (b)	656.2	2874	2972 (e)
Carbon Monoxide	677	0.033	22.3	98	386	1.25 (b)	482.5	2113	2211
Volatile Organic Compounds	677	0.0051	3.5	15	386	0.26 (b)	100.4	440	455
		(lb/MMMMBtu)				(lb/MMMMBtu)			
Lead	677	28	0.018956	0.083027	386	76 (b)	0.029336	0.128491	0.211518
Mercury	677	3.2	0.002166	0.009488	386	2.4 (b)	0.000926	0.004057	0.013546
Beryllium	677	4.2	0.002843	0.012454	386	0.125 (c)	0.000048	0.000211	0.012665
Fluorides	677	118	0.079886	0.349900	386	120000 (b)	46.32	202.8816	203.2315
Sulfuric Acid Mist (2.27%)	677	55000	37.235	163.0893	386	29850 (c)	11.5221	50.46679	213.5560 (e)
Sulfuric Acid Mist (1%)	677	24000	16.248	71.16624	386	14350 (c)	5.5391	24.26125	95.42749

TABLE A-10 (Cont'd)

Conservative Estimate of the Maximum Emissions from the Power and Bark Boilers at Full Load Generating 745,000 lb/hr of Steam, Using Alternative Fuels

	Power Boilers				Bark Boilers				
			Mass Emissions				Mass Emissions		
	Heat Input	EF (lb/MMBtu)	lb/hr	TPY	Heat Input	EF (lb/MMBtu)	lb/hr	TPY	Total TPY
Unregulated Substances		(lb/MMMMBtu)				(lb/MMMMBtu)			
Antimony (Sb)	677	14.4	0.009748	0.042699	386	7.2 (c)	0.002779	0.012172	0.054872
Arsenic (As)	677	19	0.012863	0.056339	386	0.95 (c)	0.000366	0.001606	0.057946
Barium (Ba)	677	14.4	0.009748	0.042699	386	430 (b)	0.16598	0.726992	0.769692
Bromine (Br)	677	7	0.004739	0.020756	386	9346.6 (b)	3.607787	15.80210	15.82286
Cadmium (Cd)	677	15.7	0.010628	0.046554	386	12 (b)	0.004632	0.020288	0.066842
Hydrogen Chloride	677	660	0.44682	1.957071	386	12000 (b)	4.632	20.28816	22.24523
Chromium VI (Cr)	677	0.21	0.000142	0.000622	386	0.26 (b)	0.000100	0.000439	0.001062
Cobalt (Co)	677	26	0.017602	0.077096	386	3100 (b)	1.1966	5.241108	5.318204
Copper (Cu)	677	278	0.188206	0.824342	386	40 (b)	0.01544	0.067627	0.891969
Formaldehyde	677	405	0.274185	1.200930	386	850 (b)	0.3281	1.437078	2.638008
Indium (In)	677	15.2	0.010290	0.045071	386	801.1 (b)	0.309224	1.354403	1.399475
Manganese (Mn)	677	26	0.017602	0.077096	386	68 (b)	0.026248	0.114966	0.192063
Molybdenum (Mo)	677	48.8	0.033037	0.144704	386	1602.3 (b)	0.618487	2.708976	2.853681
Nickel (Ni)	677	1260	0.85302	3.736227	386	90 (b)	0.03474	0.152161	3.888388
Phosphorous (P)	677	58	0.039266	0.171985	386	360 (b)	0.13896	0.608644	0.780629
Polycyclic Organic Matter (POM)	677	9.2	0.006228	0.027280	86	250 (b)	0.0965	0.42267	0.449950
Selenium (Se)	677	2.4	0.001624	0.007116	386	1.2 (c)	0.000463	0.002028	0.009145

TABLE A-10 (Cont'd)

Conservative Estimate of the Maximum Emissions from the Power and Bark Boilers at Full Load Generating 745,000 lb/hr of Steam, Using Alternative Fuels

	Power Boilers				Bark Boilers				
			Mass Emissions				Mass Emissions		
	Heat Input	EF (lb/MMBtu)	lb/hr	TPY	Heat Input	EF (lb/MMBtu)	lb/hr	TPY	Total TPY
Tin (Sn)	677	330	0.22341	0.978535	386	1014.8 (b)	0.391712	1.715702	2.694237
Vanadium (V)	677	3515	2.379655	10.42288	386	541.45 (c)	0.208999	0.915418	11.33830
Zinc	677	77	0.052129	0.228325	386	870 (b)	0.33582	1.470891	1.699216
TOTALs									9985 (f)

(a) Assumes 50% reduction in the PM scrubber on the bark boilers
(b) Bark boiler firing bark
(c) Bark boiler firing 50/50 bark-oil mix
(d) Bark boiler firing oil
(e) Not used in totals
(f) Emissions not used in total: 8478 TPY

Using the emission factor for oil yields SO_2 emissions of 957 lb/hr from the bark boilers. Extending this emission rate to the 24-hour and the annual averaging periods is reasonable and permits the other SO_2 comparisons to go forward. This rate converts into annual emissions of 4021 TPY.

To be conservative, ENSR also considered other issues. First, according to SKC, the bark boilers do not operate well now exclusively on oil; a 50/50 mixture is preferable. The emission factor associated with such a mix is 1.27 lb/MMBtu (based on an average of the oil and bark emission factors according to the permit), yielding emissions of 490 lb/hr and 2145 TPY. Second, the oil now being used in the bark boilers is the same oil as that fired at the power boilers, which has a 1% S content. Using this fuel in a 50/50 mix with bark would produce an emission factor of 0.58 lb/MMBtu, yielding emissions of 223 lb/hr, and 978 TPY. Third, there may be some reduction of SO_2 as a result of the operation of the PM scrubbers. While there is basis for concluding that the percentage reduction is very small, SKC has recommended a conservative estimate of 50% removal. Combining this assumption with the use of 1.0% S oil and a 50/50 mix with bark results in an emission factor of 0.30 lb/MMBtu. This factor yields emissions of 117 lb/hr, and 513 TPY for SO_2 from the two bark boilers.

These values appear in Tables A-3 and A-4 (as well as in Tables A-5, A-10, and 1-3, as appropriate) and were modeled in the analyses described in Section 2.

A.2.2 PM

A.2.2.1 Power Boilers

The modeling in Section 2 for PM is based on maximum 24-hour and annual average emissions. On a 24-hour basis, the permitted emission rate for the power boilers is 0.1 lb/MMBtu for TSP; and the emission factor is 0.071 lb/MMBtu for PM-10. Using these emission rates would produce emissions of 67 and 48 lb/hr for TSP and PM-10, respectively, for the 24-hour averaging period. Extending these figures to the annual averaging period is reasonable and permits the other PM comparison to go forward. The maximum annual emissions for TSP would be 297 TPY and for PM-10 would be 211 TPY. These values appear in Table A-2 (as well as in Tables A-5, A-10, and 1-3, as appropriate) and were modeled in the analyses described in Section 2.

A.2.2.2 Bark Boilers

TSP

The modeling in Section 2 for PM is based on maximum 24- hour and annual average emissions. The permitted emission rate for TSP on oil is 0.1 lb/MMBtu and for bark is 0.2 lb/MMBtu. Since the emission rate for bark is higher, it was used to calculate the maximum allowable 24-hour average TSP emissions. This rate yields emissions of 77 lb/hr. Extending this figure to the annual averaging period is reasonable and permits the other TSP comparisons to go forward. The maximum annual emissions for TSP would be 338 TPY. These values appear in Tables A-3 and A-4 (as well as in Tables A-5, A-10, and 1-3, as appropriate) and were modeled in the analyses described in Section 2.

PM-10

As with TSP, the modeling in Section 2 for PM-10 is based on maximum 24-hour and annual average emissions. The emission factor for PM-10 on oil is 0.1 lb/MMBtu and for bark is 0.174 lb/MMBtu. Since the emission factor for bark is higher, it was used to calculate the maximum 24-hour average PM-10 emissions. This rate yields emissions of 67 lb/hr. Extending this figure to the annual averaging period is reasonable and permits the other PM-10 comparisons to go forward. The maximum annual emissions for PM-10 would be 294 TPY. These values appear in Tables A-3 and A-4(as well as in Tables A-5, A-10, and 1-3, as appropriate) and were modeled in the analyses described in Section 2.

A.2.3 CO

A.2.3.1 Power Boilers

The modeling in Section 2 for CO is based on maximum allowable 1- and 8-hour average emissions. The emission factor for CO from the power boilers is 0.033 lb/MMBtu. Using this level would produce emissions of 22 lb/hr. Extending this figure to the 8-hour and annual averaging periods is reasonable and permits the other CO comparisons to go forward. The estimated annual emissions of CO would thus be 98 TPY. These values appear in Table A-2 (as well as in Tables A-5, A-10, and 1-3, as appropriate) and were modeled in the analyses described in Section 2.

A.2.3.2 Bark Boilers

The modeling in Section 2 for CO is based on maximum allowable 1- and 8-hour average emissions. The emission factor for CO from the bark boilers is 0.033 lb/MMBtu for oil and 1.7 lb/MMBtu for bark. Since the emission factor for bark is higher, it was used to calculate the maximum hourly CO emissions. This factor yields emissions of 656 lb/hr. Extending this figure to the 8-hour and annual averaging periods is reasonable and permits the other CO comparisons to go forward. The maximum annual emissions of CO would be 2874 TPY.

At this level, CO is the pollutant with the second highest emission rate. As such, it merited consideration for conservatism. Since the 1.7 factor just mentioned was the peak reported in stack tests and since there was more than one data point at a level of about 1.25 lb/MMBtu, ENSR used this lower level to estimate maximum hourly CO emissions. This factor yields emissions of 482 lb/hr. Extending this figure to the 8-hour and annual averaging periods is reasonable and permits the other CO comparisons to go forward. The maximum annual emissions of CO would be 2113 TPY. These values appear in Tables A-3 and A-4 (as well as in Tables A-5, A-10, and 1-3, as appropriate) and were modeled in the analyses described in Section 2.

A.2.4 Lead

A.2.4.1 Power Boilers

The modeling in Section 2 for Pb is based on maximum monthly and annual average emissions. The emission factor for the permitted fuel for Pb from the power boilers is 28 lb/MMMMBtu. Using this level would produce emissions of 0.019 lb/hr. Extending this figure to the monthly and annual averaging period is reasonable and permits the other Pb comparisons to go forward. The maximum annual emissions of Pb would be 0.083 TPY. These values appear in Table A-2 (as well as in Tables A-5, A-10, and 1-3, as appropriate) and were modeled in the analyses described in Section 2.

A.2.4.2 Bark Boilers

The modeling in Section 2 for Pb is based on maximum monthly and annual average emissions. The emission factor for Pb from the bark boiler is 28 lb/MMMMBtu for oil and 76 lb/MMMMbtu for bark. Since the emission factor for bark is higher, it was used to calculate the maximum allowable monthly Pb emissions. Using this level would produce emissions of 0.029 lb/hr. Extending this figure to the annual averaging period is reasonable and permits the other Pb comparisons to go forward. The maximum annual emissions of Pb would be 0.13 TPY. These

values appear in Tables A-3 and A-4 (as well as in Tables A-5, A-10, and 1-3, as appropriate) and were modeled in the analyses described in Section 2.

A.2.5 NO_x

A.2.5.1 Power Boilers

The modeling in Section 2 for NO_x is based on maximum annual average emissions. The emission factor for NO_x from the power boilers is 0.447 lb/MMBtu. Using this level would produce emissions of 303 lb/hr for NO_x, and the annual rate is 1325 TPY. These values appear in Table A-2 (as well as in Tables A-5, A-10, and 1-3, as appropriate) and were modeled in the analyses described in Section 2.

A.2.5.2 Bark Boilers

The modeling in Section 2 for NO_x is based on maximum annual average emissions. The emission factor for NO_x from the bark boilers is 0.447 lb/MMBtu for oil and is 0.39 lb/MMBtu for bark. Since the emission factor for oil is higher, the maximum emissions would be calculated based on maximum oil firing. Using this level would produce emissions of 172 lb/hr for NO_x, and the annual rate is 756 TPY. However, for the reasons stated above with respect to SO_2 emissions, ENSR used the emission factor resulting from a 50/50 bark/oil mixture, which is 0.42 lb/MMBtu. This factor yields emissions of 162 lb/hr and 708 TPY. These values appear in Tables A-3 and A-4 (as well as in Tables A-5, A-10, and 1-3, as appropriate) and were modeled in the analyses described in Section 2.

A.2.6 VOCs

A.2.6.1 Power Boilers

Though not required in the air quality modeling of Section 2, VOC emissions from the power boilers were tracked for purposes of the comparison of annual emissions in Tables 1-3. The emission factor for VOCs is 0.0051 lb/MMBtu. Using this level would produce emissions of 3.5 lb/hr for VOC, and the annual rate is 15 TPY. These values appear in Table A-2 (as well as in Tables A-5, A-10, and 1-3, as appropriate).

A.2.6.2 Bark Boilers

Though not required in the air quality modeling in Section 2, VOC emissions from the bark boilers were tracked for purposes of the comparison of annual emissions in Table 1-3. The emission

factor for VOC is 0.0051 lb/MMBtu for oil and 0.26 lb/MMBtu for bark. Since the emission factor for bark is higher, it was used to calculate the maximum VOC emissions. This factor yields emissions of 100 lb/hr and 440 TPY. These values appear in Tables A-3 and A-4 (as well as in Tables A-5, A-10, and 1-3, as appropriate).

A.2.7 Other Pollutants

A.2.7.1 Power Boilers

The other regulated pollutants emitted by the power boilers are mercury, beryllium, fluorides, and sulfuric acid mist; and the unregulated pollutants emitted by the power boilers are the many trace pollutants listed in Table A-6. Tables A-2 and A-6 present the emission factors in lb/MMMMBtu that ENSR estimated on the basis of oil firing for these two sets of pollutants, respectively.

A.2.7.2 Bark Boilers

The other regulated pollutants emitted by the bark boilers are mercury, beryllium, fluorides, and sulfuric acid mist; and the unregulated pollutants emitted by the bark boilers are the many trace pollutants listed in Tables A-7 and A-8. Tables A-3, A-4, A-7, and A-8 present the emission factors in lb/MMMMBtu that ENSR estimated on the basis of oil and bark firing for these two sets of pollutants, respectively.

The emission factors for the unregulated pollutants are further tabulated in Table A-9 for all boiler types and fuels, along with entries for the oil/bark, 50/50 fuel mix, which averages the emission factors for the two fuels.

A.2.8 Spread Sheets for Emissions

All emission factors are presented along with heat input values for each boiler configuration and fuel choice as appropriate in Table A-10 and extended to hourly and annual emission rates. The necessary sums are then taken, and summary information are presented in Tables 1-3 and 1-4 of the text of this report. The necessary emission rates are modeled in Section 2 with the non-criteria pollutants modeled as a group because none of their emission factors are very large and none of them has an ambient standard.

This spread sheet indicates that ENSR's conservative assessment of emissions from the power and bark boilers at full load totaled 9985 TPY and that this total -- the one that ENSR actually modeled for Section 2 and presented in Section 1 -- is 8651 TPY less than could have been used for this purpose. This conservatism takes into account the use of a fuel mix in the bark boilers,

SO_2 removal by the PM scrubber on the bark boilers, and the use of 1% sulfur oil in all five boilers.

A.3 Partial Load

This section addresses the emissions from SKC's five existing boilers when they operate to generate 640,000 lb/hr. While SKC states that its existing boilers can supply the partial load through various combinations of heat input rates to the different boilers, the modeling analysis in Section 2 requires, among other things, maximum emissions for short-term averaging times for each pollutant. The specification of those emissions requires, for example for 3 hour averages of SO_2, a comparison of the permitted conditions and reasonable emission factors for SO_2 for each fuel at each boiler type and the selection of that combination of boiler loading and fuels that is associated with the highest SO_2 emissions.

In other words, for those pollutants whose emission factor is higher from bark than from oil, the maximum emissions result from full use of the bark boilers firing 100% bark. In that case, the load allocation would be as follows:

	Steam Flow	Heat Input	Fuel
PB-1	100,000	137	oil
PB-2	145,000	198	oil
PB-3	145,000	198	oil
Totals	390,000	533	
BB-1	125,000	193	bark
BB-2	125,000	193	bark
Totals	250,000	386	

Thus, to calculate maximum emissions of each pollutant for this case, the emission factors for each pollutant from the power boilers (in lb/MMBtu) would be multiplied by 533 MMBtu/hr and the emission factors for each pollutant from the bark boilers firing bark would be multiplied by 386 MMBtu/hr to produce the hourly emission rates.

Similarly, for those pollutants whose emission factor is higher from oil than from bark, the maximum emissions result from full use of the power boilers. In that case, the load allocation would be as follows:

	Steam Flow	Heat Input	Fuel
PB-1	135,000	185	oil
PB-2	180,000	246	oil
PB-3	180,000	246	oil
Totals	495,000	677	
BB-1	72,500	112	oil
BB-2	72,500	112	oil
Totals	150,000	224	

(As noted above, the conservatism regarding total annual emissions and oil firing in the bark boilers is appropriate for the partial load case.) Thus, to calculate maximum hourly emission rates of each pollutant in this load allocation scenario, the emission factors for each pollutant from the power boilers (in lb/MMBtu) would be multiplied by 677 MMBtu/hr and the maximum emission factors for each pollutant from the bark boilers would be multiplied by 224 MMBtu/hr. These data are summarized in Tables A-11 and A-12.

As above, the emission factors for regulated pollutants emitted by the power boilers, bark boilers on oil and bark boilers on bark for the partial load case are presented in Tables A-2, A-3, and A-4, respectively, along with references describing their sources. These emission factors for both boiler types and all fuels are presented in Table A-5, along with entries for the oil/bark, 50/50 fuel mix, which averages the heat input based emission factors for the two fuels. The emission factors for unregulated pollutants emitted by the power and bark boilers are presented in Tables A-6, A-7, and A-8, respectively, along with references describing their sources. The emission factors for unregulated pollutants from both boiler types and all fuels are presented in Table A-9, along with entries for the oil/bark, 50/50 mix, which averages the heat input based emission factors for the two fuels. These figures are then presented with heat input values for each boiler configuration and fuel choice as appropriate in Table A-13 and extended to hourly and annual emission rates. The necessary sums are then taken, and summary information are presented in Tables 1-1 and 1-2 of the text of this report with individual pollutant emission rates modeled in Section 2.

A.3.1 SO_2

The SO_2 emission factor for the 3-hour average for 2.27% oil is 2.48 lb/MMBtu and for 1% S oil is 1.1 lb/MMBtu. Since either rate is higher than the maximum SO_2 emission factor from the bark boilers of 0.057 lb/MMBtu, the maximum SO_2 emissions are calculated by operating the power boilers at full load and the balance of the energy from the bark boilers firing oil.

TABLE A-11

Stack Parameters for SKC Existing Sources at Partial Load to Produce 640,000 lb/hr of Steam with the Power Boilers at 100% Capacity and Emitted through a Combined Stack

	PB1	PB2	PB3	BB1	BB2	Totals
Steam Flow (lb/hr)	135,000	180,000	180,000	72,500	72,500	640,000
Heat Input (MMBtu/hr)	185	246	246	112	112	901
		Combined Stack				
Stack height (ft)		125		136	136	
Stack diameter (ft)		10.50		8.08	8.08	
Flow rate (acfm)		298,000		76,601	76,601	
Temperature (deg.F)		338		138	138	
Velocity (fps)		57.36		24.90	24.90	
Stack height (m)		38.1		41.5	41.5	
Stack diameter (m)		3.20		2.46	2.46	
Temperature (deg.K)		443		332	332	
Velocity (m/s)		17.48		7.59	7.59	

Basis: 1991 stack tests provided by SKC

SKC: Steam Flow, Heat Input, Stack Height, Stack Diameter

TABLE A-12

Stack Parameters for SKC Existing Sources at Partial Load to Produce 640,000 lb/hr of Steam with the Bark Boilers at 100% Capacity and a Combined Stack for the Power Boilers

	PB1	PB2	PB3	BB1	BB2	Totals
Steam Flow (lb/hr)	100,000	145,000	145,000	125,000	125,000	640,000
Heat Input (MMBtu/hr)	137	198	198	193	193	919
		Combined Stack				
Stack height (ft)		125		136	136	
Stack diameter (ft)		10.50		8.08	8.08	
Flow rate (acfm)		234,836		132,000	132,000	
Temperature (deg.F)		337		138	138	
Velocity (fps)		45.20		42.91	42.91	
Stack height (m)		38.1		41.5	41.5	
Stack diameter (m)		3.20		2.46	2.46	
Temperature (deg.K)		443		332	332	
Velocity (m/s)		13.78		13.08	13.08	

Basis: 1991 stack tests provided by SKC

SKC: Steam Flow, Heat Input, Stack Height, Stack Diameter

TABLE A-13

Conservative Estimate of the Maximum Emissions from the Power and Bark Boilers Generating 640,000 lb/hr of Steam, Using Alternative Fuels

		Power Boilers				Bark Boilers				
		Heat Input	EF (lb/MMBtu)	Mass Emissions lb/hr	Mass Emissions TPY	Heat Input	EF (lb/MMBtu)	Mass Emissions lb/hr	Mass Emissions TPY	Total TPY
Particulate (TSP)		533	0.1	53.3	233	386	0.2 b	77.2	338	572
Particulate (PM10)		533	0.071	37.8	166	386	0.174 b	67.2	294	460
Sulfur Dioxide (2.27%)		677	2.48	1679.0	7354	224	2.48 d	555.5	2333	9687 e
Sulfur Dioxide (2.27%)		677	2.48	1679.0	7354	224	1.2685 c	284.1	1245	8598 e
Sulfur Dioxide (1%)		677	1.1	744.7	3262	224	0.5785 c	129.6	568	3829 e
Sulfur Dioxide (1%)	a	677	1.1	744.7	3262	224	0.3035 c	68.0	298	3560
Nitrogen Oxides		677	0.447	302.6	1325	224	0.4185 c	93.7	411	1736
Carbon Monoxide		533	0.033	17.6	77	386	1.7 b	656.2	2874	2951 e
Carbon Monoxide		533	0.033	17.6	77	386	1.25 b	482.5	2113	2190
Volatile Organic Compounds		533	0.0051	2.7	12	386	0.26 b	100.4	440	451
			(lb/MMMMBtu)				(lb/MMMMBtu)			
Lead		533	28	0.014924	0.065367	386	76 b	0.029336	0.128491	0.193858
Mercury		533	3.2	0.001705	0.007470	386	2.4 b	0.000926	0.004057	0.011528
Beryllium		677	4.2	0.002843	0.012454	224	0.125 c	0.000028	0.000122	0.012576
Fluorides		533	118	0.062894	0.275475	386	120000 b	46.32	202.8816	203.1570
Sulfuric Acid Mist (2.27%)		677	55000	37.235	163.0893	224	29850 c	6.6864	29.28643	192.3757 e
Sulfuric Acid Mist (1%)		677	24000	16.248	71.16624	224	14350 c	3.2144	14.07907	85.24531
Unregulated Substances			(lb/MMMMBtu)				(lb/MMMMBtu)			
Antimony (Sb)		677	14.4	0.009748	0.042699	224	7.2 c	0.001612	0.007064	0.049763
Arsenic (As)		677	19	0.012863	0.056339	224	0.95 c	0.000212	0.000932	0.057272
Barium (Ba)		533	14.4	0.007675	0.033617	386	430 b	0.16598	0.726992	0.760609
Bromine (Br)		533	7	0.003731	0.016341	386	9346.6 b	3.607787	15.80210	15.81845
Cadmium (Cd)		533	15.7	0.008368	0.036652	386	12 b	0.004632	0.020288	0.056940
Hydrogen Chloride		533	660	0.35178	1.540796	386	12000 b	4.632	20.28816	21.82895
Chromium VI (Cr)		533	0.21	0.000111	0.000490	386	0.26 b	0.000100	0.000439	0.000929
Cobalt (Co)		533	26	0.013858	0.060698	386	3100 b	1.1966	5.241108	5.301806
Copper (Cu)		533	278	0.148174	0.649002	386	40 b	0.01544	0.067627	0.716629
Formaldehyde		533	405	0.215865	0.945488	386	850 b	0.3281	1.437078	2.382566

TABLE A-13 (Cont'd)

Conservative Estimate of the Maximum Emissions from the Power and Bark Boilers Generating 640,000 lb/hr of Steam, Using Alternative Fuels

	Power Boilers				Bark Boilers				Total
	Heat Input	EF (lb/MMBtu	Mass Emissions lb/hr	TPY	Heat Input	EF (lb/MMBtu)	Mass Emissions lb/hr	TPY	TPY
Unregulated Substances		(lb/MMMMBtu)				(lb/MMMMBtu)			
Indium (In)	533	15.2	0.008101	0.035485	386	801.1 b	0.309224	1.354403	1.389888
Manganese (Mn)	533	26	0.013858	0.060698	386	68 b	0.026248	0.114966	0.175664
Molybdenum (Mo)	533	48.8	0.026010	0.113925	386	1602.3 b	0.618487	2.708976	2.822902
Nickel (Ni)	533	1260	0.67158	2.941520	386	90 b	0.03474	0.152161	3.093681
Phosphorous (P)	533	58	0.030914	0.135403	386	360 b	0.13896	0.608644	0.744048
Polycyclic Organic Matter (POM)	533	9.2	0.004903	0.021477	386	250 b	0.0965	0.42267	0.444147
Selenium (Se)	677	2.4	0.001624	0.007116	224	1.2 c	0.000268	0.001177	0.008293
Tin (Sn)	533	330	0.17589	0.770398	386	1014.8 b	0.391712	1.715702	2.486100
Vanadium (V)	677	3515	2.379655	10.42288	224	541.45 c	0.121284	0.531227	10.95411
Zinc (Zn)	533	77	0.041041	0.179759	386	870 b	0.33582	1.470891	1.650651
TOTALS									9328 f

a Assumes 50% reduction in the PM scrubber on the bark boilers
b Bark boiler firing bark 8760 hours per year
c Bark boiler firing 50/50 bark-oil mix 8760 hours per year
d Bark boiler firing oil 8400 hours per year
e Not used in totals
f Emissions not used in total: 6995 TPY

A.3.1.1 Power Boilers

The modeling in Section 2 for SO_2 is based on maximum 3-hour, 24-hour, and annual average emissions. Estimating the 3-hour SO_2 emissions starts with the identification of the emission factor for the permitted fuel oil for the power boilers. Initially, the power boilers were permitted to fire oil with a 2.27% sulfur content. Currently, however, they are permitted to burn 1.0% sulfur oil until SKC demonstrates that they can meet the applicable PM limit with a higher sulfur oil. The emission factor associated with 2.27% sulfur oil is 2.48 lb/MMBtu. If a 2.27% S oil could be found with the PM emission characteristics that enabled the power boilers to burn it and to satisfy their PM limit, the maximum SO_2 emission factor for the 3-hour average would be 2.48 lb/MMBtu, which would yield emissions of 1679 lb/hr. Using this value for the 24-hour averaging and the annual averaging periods, as well, would be reasonable under this contingency and would permit the other SO_2 comparisons to go forward. This rate converts into annual emissions of 7354 TPY, using 677 MMBtu/hr as the heat input to the power boilers since they must be operated at full load to produce the maximum SO_2 emissions.

To be conservative, ENSR also analyzed a 1.0% sulfur content fuel. The SO_2 emission factor for 1.0 % sulfur oil is 1.1 lb/MMBtu, which yields emissions of 745 lb/hr. With this emission factor, the annual emissions for all three power boilers is 3262 TPY, using 677 MMBtu/hr as the heat input to the power boilers since they must be operated at full load to produce the maximum SO_2 emissions for the Section 2 modeling. These values appear in Table A-2 (as well as in Tables A-5, A-13, and 1-1, as appropriate) and were modeled in the analyses described in Section 2.

A.3.1.2 Bark Boilers

The modeling in Section 2 for SO_2 is based on maximum 3-hour, 24-hour, and annual average emissions. The bark boilers are permitted to fire oil with a 2.27% sulfur content; they are not subject to the same 1.0% S ceiling that applies to the power boilers, because the bark boilers have a scrubber to control PM emissions. Thus, the SO_2 emission factor for the permitted fuel for the 3-hour average is the 2.48 lb/MMBtu factor associated with 2.27% sulfur oil. The SO_2 emission factor resulting from burning 100% bark is 0.055 lb/MMBtu. Since the emission factor resulting from firing oil is higher than from firing bark, the former was used for further analysis. Using this emission factor yields SO_2 emissions of 555 lb/hr from the bark boilers. Extending this emission rate to the 24-hour and the annual averaging periods is reasonable and permits the other SO_2 comparisons to go forward. This rate converts into annual emissions of 2433 TPY, using the heat input of 224 MMBtu/hr for the partial use of the bark boilers in this case.

To be conservative, ENSR also considered other issues. First, according to SKC, the bark boilers do not operate well now exclusively on oil; a 50/50 mixture is preferable. The emission factor

associated with such a mix is 1.27 lb/MMBtu (based on an average of the oil and bark emission factors according to the permit), yielding emissions of 284 lb/hr and 1245 TPY, (based on 224 MMBtu/hr). Second, the oil now being used in the bark boilers is the same oil as that fired at the power boilers, which has a 1% S content. Using this fuel in a 50/50 mix with bark would produce an emission factor of 0.58 lb/MMBtu, yielding emissions of 130 lb/hr, and 568 TPY (based on 224 MMBtu/hr). Third, there may be some reduction of SO_2 as a result of the operation of the PM scrubbers. While there is basis for concluding that the percentage reduction is very small, SKC has recommended a conservative estimate of 50% removal. Combining this assumption with the use of 1.0% S oil and a 50/50 mix with bark results in an emission factor of 0.30 lb/MMBtu. This factor yields emissions of 68 lb/hr, and 298 TPY (based on 224 MMBtu/hr) for SO_2 from the two bark boilers.

The emission factors appear in Tables A-3 and A-4 (as well as in Tables A-5, A-13, and 1-1, as appropriate) and were modeled in the analyses described in Section 2.

A.3.2 TSP

On a 24-hour basis, the maximum permitted emission rate for the power boilers firing oil is 0.1 lb/MMBtu for TSP while the maximum permitted emission rate for TSP from the bark boilers on oil is 0.1 lb/MMBtu and for bark is 0.2 lb/MMBtu. Thus, the maximum 24-hour TSP emission rate from SKC would be with full load from the bark boilers firing bark and the balance of the energy from the power boilers.

A.3.2.1 Power Boilers

The modeling in Section 2 for PM is based on maximum allowable 24-hour and annual average emissions. On a 24-hour basis, the maximum permitted emission rate for the power boilers is 0.1 lb/MMBtu for TSP. Using this emission rate would produce emissions of 53.3 lb/hr for TSP for the 24-hour averaging period. Extending this figure to the annual averaging period is reasonable and permits the other TSP comparisons to go forward. The maximum annual emissions for TSP would be 233 TPY, using 533 MMBtu/hr as the heat input to the power boilers since they must be operated at partial load to produce the maximum TSP emissions for the Section 2 modeling. These values appear in Table A-2 (as well as in Tables A-5, A-13, and 1-1, as appropriate) and were modeled in the analyses described in Section 2.

A.3.2.2 Bark Boilers

The modeling in Section 2 for PM is based on maximum 24-hour and annual average emissions. The permitted emission rate for TSP on oil is 0.1 lb/MMBtu and for bark is 0.2 lb/MMBtu. Since

the emission rate for bark is higher, it was used to calculate the maximum allowable 24-hour average TSP emissions. This rate yields emissions of 77 lb/hr. Extending this figure to the annual averaging period is reasonable and permits the other TSP comparisons to go forward. The maximum annual emissions for TSP would be 338 TPY, using the heat input of 386 MMBtu/hr for the full loading of the bark boilers in this case. These values appear in Tables A-3 and A-4 (as well as in Tables A-5, A-13, and 1-1) and were modeled in the analyses described in Section 2.

A.3.3 PM-10

On a 24-hour basis, the emission factor for the power boilers firing oil is 0.071 lb/MMBtu for PM-10 while the emission factor for PM-10 from the bark boilers on oil is 0.1 lb/MMBtu and for bark is 0.174 lb/MMBtu. Thus, the maximum 24-hour PM-10 emission rate from SKC would be with full load from the bark boilers firing bark and the balance of the energy from the power boilers.

A.3.3.1 Power Boilers

The modeling in Section 2 for PM is based on maximum allowable 24-hour and annual average emissions. On a 24-hour basis, the emission factor for the power boilers is 0.071 lb/MMBtu for PM-10. Using this emission rate would produce emissions of 38 lb/hr for PM-10 for the 24-hour averaging period. Extending this figure to the annual averaging period is reasonable and permits the other PM-10 comparison to go forward. The maximum annual emissions for PM-10 would be 166 TPY, using 533 MMBtu/hr as the heat input to the power boilers since they must be operated at partial load to produce the maximum PM-10 emissions for the Section 2 modeling. These values appear in Table A-2 (as well as in Tables A-5, A-13, and 1-1, as appropriate) and were modeled in the analyses described in Section 2.

A.3.3.2 Bark Boilers

As with TSP, the modeling in Section 2 for PM-10 is based on maximum 24-hour and annual average emissions. The emission factor for PM-10 on oil is 0.1 lb/MMBtu and for bark is 0.174 lb/MMBtu. Since the emission factor for bark is higher, it was used to calculate the maximum 24-hour average PM-10 emissions. This rate yields emissions of 67 lb/hr. Extending this figure to the annual averaging period is reasonable and permits the other PM-10 comparisons to go forward. The maximum annual emissions for PM-10 would be 294 TPY, using the heat input of 386 MMBtu/hr for the full loading of the bark boilers in this case. These values appear in Tables A-3 and A-4 (as well as in Tables A-5, A-13, and 1-1) and were modeled in the analyses described in Section 2.

A.3.4 CO

On a 1-hour basis, the emission factor for the power boilers firing oil is 0.033 lb/MMBtu for CO while the emission factor for CO from the bark boilers on oil is 0.033 lb/MMBtu and for bark is 1.7 lb/MMBtu. Thus, the maximum hourly CO emission rate from SKC would be with full load from the bark boilers firing bark and the balance of the energy from the power boilers.

A.3.4.1 Power Boilers

The modeling in Section 2 for CO is based on maximum allowable 1- and 8-hour average emissions. The emission factor for CO from the power boilers is 0.033 lb/MMBtu. Using this level would produce emissions of 18 lb/hr. Extending this figure to the 8-hour and annual averaging periods is reasonable and permits the other CO comparisons to go forward. The estimated annual emissions of CO would thus be 77 TPY, using 533 MMBtu/hr as the heat input to the power boilers since they must be operated at partial load to produce the maximum CO emissions for the Section 2 modeling. These values appear in Table A-2 (as well as in Tables A-5, A-13, and 1-1, as appropriate) and were modeled in the analyses described in Section 2.

A.3.4.2 Bark Boilers

The modeling in Section 2 for CO is based on maximum allowable 1- and 8-hour average emissions. The emission factor for CO from the bark boilers is 0.033 lb/MMBtu for oil and 1.7 lb/MMBtu for bark. Since the emission factor for bark is higher, it was used to calculate the maximum hourly CO emissions. This factor yields emissions of 656 lb/hr. Extending this figure to the 8-hour and annual averaging periods is reasonable and permits the other CO comparisons to go forward. The maximum annual emissions of CO would be 2874 TPY, using the heat input of 386 MMBtu/hr for the full loading of the bark boilers in this case.

At this level, CO is the pollutant with the second highest emission rate. As such, it merited consideration for conservatism. Since the 1.7 factor just mentioned was the peak reported in stack tests and since there was more than one data point at a level of about 1.25 lb/MMBtu, ENSR used this lower level to estimate maximum hourly CO emissions. This factor yields emissions of 482 lb/hr. Extending this figure to the 8-hour and annual averaging periods is reasonable and permits the other CO comparisons to go forward. The maximum annual emissions of CO would be 2113 TPY, using the heat input of 386 MMBtu/hr for the full loading of the bark boilers in this case. These values appear in Tables A-3 and A-4 (as well as in Tables A-5, A-13, and 1-1, as appropriate) and were modeled in the analyses described in Section 2.

A.3.5 Pb

On a monthly basis, the emission factor for the power boilers firing oil is 28 lb/MMMMBtu for Pb while the maximum permitted emission rate for Pb from the bark boilers for oil is 28 lb/MMMMBtu and for bark is 76 lb/MMMMBtu. Thus, the maximum monthly Pb emission rate from SKC would be with full load from the bark boilers firing bark and the balance of the energy from the power boilers.

A.3.5.1 Power Boilers

The modeling in Section 2 for Pb is based on maximum monthly and annual average emissions. The emission factor for the permitted fuel for Pb from the power boilers is 28 lb/MMMMBtu. Using this level would produce emissions of 0.015 lb/hr. Extending this figure to the annual averaging period is reasonable and permits the other Pb comparisons to go forward. The maximum annual emissions of Pb would be 0.065 TPY, using 533 MMBtu/hr as the heat input to the power boilers since they must be operated at partial load to produce the maximum Pb emissions for the Section 2 modeling. These values appear in Table A-2 (as well as in Tables A-5, A-13, and 1-1, as appropriate) and were modeled in the analyses described in Section 2.

A.3.5.2 Bark Boilers

The modeling in Section 2 for Pb is based on maximum monthly and annual average emissions. The emission factor for Pb from the bark boiler is 28 lb/MMMMBtu for oil and 76 lb/MMMMbtu for bark. Since the emission factor for bark is higher, it was used to calculate the maximum allowable monthly Pb emissions. Using this level would produce emissions of 0.029 lb/hr. Extending this figure to the annual averaging period is reasonable and permits the other Pb comparisons to go forward. The maximum annual emissions of Pb would be 0.13 TPY, using the heat input of 386 MMBtu/hr for the full loading of the bark boilers in this case. These values appear in Tables A-3 and A-4 (as well as in Tables A-5, A-13, and 1-1, as appropriate) and were modeled in the analyses described in Section 2.

A.3.6 NO_x

The NO_x emission factor for oil in either boiler type is 0.447 lb/MMBtu while, for bark firing in the bark boilers, it is slightly lower at 0.39 lb/MMBtu. Thus, the maximum NO_x emissions are calculated by operating the power boilers at full load and the balance of the energy from the bark boilers firing oil.

A.3.6.1 Power Boilers

The modeling in Section 2 for NO_x is based on maximum annual average emissions. The emission factor for NO_x from the power boilers is 0.447 lb/MMBtu. Using this level would produce emissions of 303 lb/hr for NO_x, and the annual rate is 1325 TPY, using 677 MMBtu/hr as the heat input to the power boilers since they must be operated at full load to produce the maximum NO_x emissions for the Section 2 modeling. These values appear in Table A-2 (as well as in Tables A-5, A-13, and 1-1, as appropriate) and were modeled in the analyses described in Section 2.

A.3.6.2 Bark Boilers

The modeling in Section 2 for NO_x is based on maximum annual average emissions. The emission factor for NO_x from the bark boilers is 0.447 lb/MMBtu for oil and is 0.39 lb/MMBtu for bark. Since the emission factor for oil is higher, the maximum emissions would be calculated based on maximum oil firing. Using this level would produce emissions of 100 lb/hr for NO_x, and the annual rate is 438 TPY. However, for the reasons stated above with respect to SO_2 emissions, ENSR used the emission factor resulting from a 50/50 bark/oil mixture, which is 0.42 lb/MMBtu. This factor yields emissions of 94 lb/hr and 411 TPY, using the heat input of 224 MMBtu/hr for the partial use of the bark boilers in this case. These values appear in Tables A-3 and A-4 (as well as in Tables A-5, A-13, and 1-1, as appropriate) and were modeled in the analyses described in Section 2.

A.2.7 VOCs

On an hourly basis, the emission factor for VOCs from the power boilers firing oil is 0.0051 lb/MMBtu while the emission factor for VOCs from the bark boilers on oil is 0.0051 lb/MMBtu and for bark is 0.17 lb/MMBtu. Thus, the maximum hourly VOC emission rate from SKC would be with full load from the bark boilers firing bark and the balance of the energy from the power boilers.

A.3.7.1 Power Boilers

Though not required in the air quality modeling of Section 2, VOC emissions from the power boilers were tracked for purposes of the comparison of annual emissions in Table 1-1. The emission factor for VOCs is 0.0051 lb/MMBtu. Using this level would produce emissions of 2.7 lb/hr for VOC, and the annual rate is 12 TPY, using 533 MMBtu/hr as the heat input to the power boilers since they must be operated at partial load to produce the maximum VOC emissions. These values appear in Table A-2 (as well as in Tables A-5, A-13, and 1-1, as appropriate) and were modeled in the analyses described in Section 2.

A.3.7.2 Bark Boilers

Though not required in the air quality modeling in Section 2, VOC emissions from the bark boilers were tracked for purposes of the comparison of annual emissions in Table 1-1. The emission factor for VOC is 0.0051 lb/MMBtu for oil and 0.26 lb/MMBtu for bark. Since the emission factor for bark is higher, it was used to calculate the maximum VOC emissions. This factor yields emissions of 100 lb/hr and 440 TPY, using the heat input of 386 MMBtu/hr for the full loading of the bark boilers in this case. These values appear in Tables A-3 and A-4 (as well as in Tables A-5, A-13, and 1-1, as appropriate).

A.3.8 Other Pollutants

The other regulated pollutants emitted by the power boilers are mercury, beryllium, fluorides, and sulfuric acid mist; and the unregulated pollutants emitted by the power boilers are the many trace pollutants listed in Table A-6. Tables A-2 and A-6 present the emission factors in lb/MMMMBtu that ENSR estimated on the basis of oil firing for these two sets of pollutants, respectively.

A.3.8.1 Power Boilers

The other regulated pollutants emitted by the bark boilers are mercury, beryllium, fluorides, and sulfuric acid mist; and the unregulated pollutants emitted by the bark boilers are the many trace pollutants listed in Tables A-7 and A-8. Tables A-3, A-4, A-7, and A-8 present the emission factors in lb/MMMMBtu that ENSR estimated on the basis of oil and bark firing for these two sets of pollutants.

A.3.8.2 Bark Boilers

The emission factors for the unregulated pollutants are further tabulated in Table A-9 for all boiler types and fuels, along with entries for the oil/bark, 50/50 fuel mix, which averages the emission factors for the two fuels.

A.3.9 Spread Sheets for Emissions

A.3.9.1 Estimating TPY

All emission factors are presented along with heat input values for each boiler configuration and fuel choice as appropriate in Table A-13 and extended to hourly and annual emission rates. The necessary sums are then taken, and summary information are presented in Tables 1-1 and 1-2 of the text of this report. The necessary emission rates are modeled in Section 2 with the non-

criteria pollutants modeled as a group because none of their emission factors are very large and none of them has an ambient standard.

Table A-13 indicates that ENSR's conservative assessment of emissions from the power and bark boilers at partial load totaled 9328 TPY and that this total -- the one that ENSR actually modeled for Section 2 and presented in Section 1 -- is 7095 TPY less than could have been used for this purpose. This conservatism takes into account the use of a fuel mix in the bark boilers, SO_2 removal by the PM scrubber on the bark boilers, and the use of 1% sulfur oil in all five boilers.

A.3.9.2 Maximum Emissions for a Realistic Fuel Scenario

As just described, to provide the data needed for Section 2's comparisons of the maximum ambient impacts of the combination of the CBCP and the proposed package boilers with SKC's five existing boilers, this appendix has developed a full set of emission data for an internally consistent set of comparisons. This approach is taken to follow the standard procedure of estimating maximum emissions for modeling analysis.

While this approach is very sensible for the ambient impacts for both short- and long-term averaging times, when the annual emissions are added together for SKC's five existing boilers, there is implicit in the total the anomaly that, for some pollutants, the bark boilers must fire an oil/bark mixture for the year and, for the other pollutants, the bark boilers must fire 100% bark for the year. Since either case can occur in a year, both cases need to be modeled for comparison with the "With CBCP" case. However, both cases cannot occur in the same year.

To assure fairness in the analysis, ENSR ascertained that there was a single fuel scenario for SKC's power and bark boilers that is associated with total emissions in a year in excess of those presented in Table A-13. As noted above, the total aggregated emissions from SKC's existing boilers in the partial-load case used in ENSR's modeling is 9328 TPY and that this figure is depressed by conservatism. If one were to assess maximum emissions from SKC's 5 boilers in the same fashion that those emissions were estimated for the CBCP by reliance on language in permits and reasonable emission factors, the result would be a figure of total annual emissions from SKC's five existing boilers of about 9451 TPY, as presented in the spread sheets in Table A-14, which calls for the power boilers firing oil at a rate of 533 MMBtu/hr and the bark boilers firing bark at the rate of 386 MMBtu/hr. Even this figure is somewhat conservative since it is based on 1% sulfur oil for all boilers and a bark/oil, 50/50 fuel mix in the bark boilers. By doing so, 5270 TPY go uncounted.

The same exercise can be performed for the full-load case to show that there is a full load case whose maximum emissions are 10598 TPY, which are 613 TPY greater than the emissions used

TABLE A-14

Conservative Estimate of the Maximum Emissions from the Power and Bark Boilers Generating 640,000 lb/hr of Steam, Using a Specific Fuel Scenario

	Power Boilers				Bark Boilers				Total
	Heat Input	EF (lb/MMBtu	Mass Emissions lb/hr	TPY	Heat Input	EF c (lb/MMBtu)	Mass Emissions lb/hr	TPY	TPY
Particulate (TSP)	533	0.1	53.3	233	386	0.15	57.9	254	487
Particulate (PM10)	533	0.071	37.8	166	386	0.137	52.9	232	397
Sulfur Dioxide (2.27%)	533	2.48	1321.8	5790	386	2.48 d	957.3	4021	9810 e
Sulfur Dioxide (2.27%)	533	2.48	1321.8	5790	386	1.2685	489.6	2145	7934 e
Sulfur Dioxide (1%/2.27%)	533	1.1	586.3	2568	386	1.2685	489.6	2145	4713
Nitrogen Oxides	533	0.447	238.3	1044	386	0.4185	161.5	708	1751
Carbon Monoxide	533	0.033	17.6	77	386	0.8665	334.5	1465	1542
Volatile Organic Compounds	533	0.0051	2.7	12	386	0.13255	51.2	224	236
		(lb/MMMMBtu)				(lb/MMMMBtu)			
Lead	533	28	0.014924	0.065367	386	52	0.020072	0.087915	0.153282
Mercury	533	3.2	0.001705	0.007470	386	1.615	0.000623	0.002730	0.010200
Beryllium	533	4.2	0.002238	0.009805	386	0.125	0.000048	0.000211	0.010016
Fluorides	533	118	0.062894	0.275475	386	60059	23.18277	101.5405	101.8160
Sulfuric Acid Mist (2.27%)	533	55000	29.315	128.3997	386	29850	11.5221	50.46679	178.8664
Unregulated Substances		(lb/MMMMBtu)				(lb/MMMMBtu)			
Antimony (Sb)	533	14.4	0.007675	0.033617	386	7.2	0.002779	0.012172	0.045790
Arsenic (As)	533	19	0.010127	0.044356	386	0.95	0.000366	0.001606	0.045962
Barium (Ba)	533	14.4	0.007675	0.033617	386	222.2	0.085769	0.375669	0.409286
Bromine (Br)	533	7	0.003731	0.016341	386	4676.8	1.805244	7.906972	7.923314
Cadmium (Cd)	533	15.7	0.008368	0.036652	386	7.98	0.003080	0.013491	0.050143
Hydrogen Chloride	533	660	0.35178	1.540796	386	6165	2.37969	10.42304	11.96383
Chromium VI (Cr)	533	0.21	0.000111	0.000490	386	0.1384	0.000053	0.000233	0.000724
Cobalt (Co)	533	26	0.013858	0.060698	386	1563	0.603318	2.642532	2.703230
Copper (Cu)	533	278	0.148174	0.649002	386	32.6	0.012583	0.055116	0.704118
Formaldehyde	533	405	0.215865	0.945488	386	627.5	0.242215	1.060901	2.006390
Indium (In)	533	15.2	0.008101	0.035485	386	408.15	0.157545	0.690051	0.725536
Manganese (Mn)	533	26	0.013858	0.060698	386	35.43	0.013675	0.059900	0.120598

TABLE A-14 (Cont'd)

Conservative Estimate of the Maximum Emissions from the Power and Bark Boilers Generating 640,000 lb/hr of Steam, Using a Specific Fuel Scenario

	Power Boilers				Bark Boilers				Total
	Heat Input	EF (lb/MMBtu	Mass Emissions lb/hr	TPY	Heat Input	EF c (lb/MMBtu)	Mass Emissions lb/hr	TPY	TPY
Unregulated Substances		(lb/MMMMBtu)				(lb/MMMMBtu)			
Molybdenum (Mo)	533	48.8	0.026010	0.113925	386	825.55	0.318662	1.395740	1.509666
Nickel (Ni)	533	1260	0.67158	2.941520	386	70.2	0.027097	0.118685	3.060206
Phosphorous (P)	533	50	0.030914	0.135403	386	209	0.080674	0.353352	0.488755
Polycyclic Organic Matter (POM)	533	9.2	0.004903	0.021477	386	129.6	0.050025	0.219112	0.240589
Selenium (Se)	533	2.4	0.001279	0.005602	386	1.2	0.000463	0.002028	0.007631
Tin (Sn)	533	330	0.17589	0.770398	386	672.4	0.259546	1.136813	1.907211
Vanadium (V)	533	3515	1.873495	8.205908	386	541.45	0.208999	0.915418	9.121326
Zinc (Zn)	533	77	0.041041	0.179759	386	473.5	0.182771	0.800536	0.980296
TOTALS									9451 f

c Bark boiler firing 50/50 bark-oil mix 8760 hours per year except d
d Bark boiler firing oil 8400 hours per year
e Not used in total
f Emissions not used in total: 5098 TPY

by ENSR in its Sections 1 and 2 comparisons, as presented in Table A-10. The spread sheet for this full load case is in Table A-15 and indicates that even the 10598 TPY, single fuel scenario case uses 1% sulfur oil for all boilers and a bark/oil, 50/50 fuel mix in the bark boilers. By doing so, 5270 TPY go uncounted.

TABLE A-15

Conservative Estimate of the Maximum Emissions from the Power and Bark Boilers at Full Load Generating 745,000 lb/hr of Steam, Using a Specific Fuel Scenario

	Power Boilers				Bark Boilers				Total
	Heat Input	EF (lb/MMBtu	Mass Emissions lb/hr	TPY	Heat Input	EF c (lb/MMBtu)	Mass Emissions lb/hr	TPY	TPY
Particulate (TSP)	677	0.1	67.7	297	386	0.15	57.9	254	550
Particulate (PM10)	677	0.071	48.1	211	386	0.137	52.9	232	442
Sulfur Dioxide (2.27%)	677	2.48	1679.0	7354	386	2.48 d	957.3	4021	11374 e
Sulfur Dioxide (2.27%)	677	2.48	1679.0	7354	386	1.2685	489.6	2145	9498 e
Sulfur Dioxide (1%/2.27%)	677	1.1	744.7	3262	386	1.2685	489.6	2145	5406
Nitrogen Oxides	677	0.447	302.6	1325	386	0.4185	161.5	708	2033
Carbon Monoxide	677	0.033	22.3	98	386	0.8665	334.5	1465	1563
Volatile Organic Compounds	677	0.0051	3.5	15	386	0.13255	51.2	224	239
		(lb/MMMMBtu)				(lb/MMMMBtu)			
Lead	677	28	0.018956	0.083027	386	52	0.020072	0.087915	0.170942
Mercury	677	3.2	0.002166	0.009488	386	1.615	0.000623	0.002730	0.012219
Beryllium	677	4.2	0.002843	0.012454	386	0.125	0.000048	0.000211	0.012665
Fluorides	677	118	0.079886	0.349900	386	60059	23.18277	101.5405	101.8904
Sulfuric Acid Mist (2.27%)	677	55000	37.235	163.0893	386	29850	11.5221	50.46679	213.5560
Unregulated Substances		(lb/MMMMBtu)				(lb/MMMMBtu)			
Antimony (Sb)	677	14.4	0.009748	0.042699	386	7.2	0.002779	0.012172	0.054872
Arsenic (As)	677	19	0.012863	0.056339	386	0.95	0.000366	0.001606	0.057946
Barium (Ba)	677	14.4	0.009748	0.042699	386	222.2	0.085769	0.375669	0.418368
Bromine (Br)	677	7	0.004739	0.020756	386	4676.8	1.805244	7.906972	7.927729
Cadmium (Cd)	677	15.7	0.010628	0.046554	386	7.98	0.003080	0.013491	0.060046
Hydrogen Chloride	677	660	0.44682	1.957071	386	6165	2.37969	10.42304	12.38011
Chromium VI (Cr)	677	0.21	0.000142	0.000622	386	0.1384	0.000053	0.000233	0.000856
Cobalt (Co)	677	26	0.017602	0.077096	386	1563	0.603318	2.642532	2.719629
Copper (Cu)	677	278	0.188206	0.824342	386	32.6	0.012583	0.055116	0.879458
Formaldehyde	677	405	0.274185	1.200930	386	627.5	0.242215	1.060901	2.261832
Indium (In)	677	15.2	0.010290	0.045071	386	408.15	0.157545	0.690051	0.735122
Manganese (Mn)	677	26	0.017602	0.077096	386	35.43	0.013675	0.059900	0.136997

TABLE A-15 (Cont'd)

Conservative Estimate of the Maximum Emissions from the Power and Bark Boilers at Full Load Generating 745,000 lb/hr of Steam, Using a Specific Fuel Scenario

	Power Boilers				Bark Boilers				Total
	Heat Input	EF (lb/MMBtu	Mass Emissions lb/hr	TPY	Heat Input	EF c (lb/MMBtu)	Mass Emissions lb/hr	TPY	TPY
Unregulated Substances		(lb/MMMMBtu)				(lb/MMMMBtu)			
Molybdenum (Mo)	677	48.8	0.033037	0.144704	386	825.55	0.318662	1.395740	1.540445
Nickel (Ni)	677	1260	0.85302	3.736227	386	70.2	0.027097	0.118685	3.854913
Phosphorous (P)	677	58	0.039266	0.171985	386	209	0.080674	0.353352	0.525337
Polycyclic Organic Matter (POM)	677	9.2	0.006228	0.027280	386	129.6	0.050025	0.219112	0.246392
Selenium (Se)	677	2.4	0.001624	0.007116	386	1.2	0.000463	0.002028	0.009145
Tin (Sn)	677	330	0.22341	0.978535	386	672.4	0.259546	1.136813	2.115349
Vanadium (V)	677	3515	2.379655	10.42288	386	541.45	0.208999	0.915418	11.33830
Zinc (Zn)	677	77	0.052129	0.228325	386	473.5	0.182771	0.800536	1.028862
TOTALS									10598

c Bark boiler firing 50/50 bark-oil mix 8760 hours per year except d
d Bark boiler firing oil 8400 hours per year
e Not used in total
f Emissions not used in total: 5968 TPY

APPENDIX B

PARTICULATE EMISSIONS FROM COOLING TOWER OPERATIONS AND AGGREGATE MATERIALS HANDLING AND STORAGE

APPENDIX B

PARTICULATE EMISSIONS FROM COOLING TOWER OPERATIONS AND AGGREGATE MATERIALS HANDLING AND STORAGE

B.1 Particulate Emissions From Cooling Tower Operations

The DER, in their March 11, 1991 Technical Evaluation and Preliminary Determination for the CBCP air permit noted that "dissolved and suspended solids in the small droplet fraction (less than 50 microns diameter) of cooling tower drift would be considered fugitive dust..." To pursue this approach to calculate particulate emissions, one must start with the concentration of total solids (dissolved and suspended) and with the drift loss rate. Table B-1 lists the data and assumptions used to calculate a TSP/PM-10 emission rate for the cooling tower at the CBCP for both the "as certified" and "as proposed to be modified" cases.

B.2 Particulate Emissions from Aggregate Materials Handling and Storage Operations

This section of Appendix B presents the calculations of particulate emissions associated with aggregate materials handling and storage operations at the CBCP as proposed to be modified, and SKC's future recycling operation. At the CBCP there will be several operations pertaining to coal, limestone, and ash handling and storage that can generate airborne dust particles. Various control measures will be employed to reduce these emissions (see Section 4). For purposes of the annual emissions comparison presented in Section 1 and of the dispersion modeling of air quality impacts presented in Sections 2 and 3, it is necessary to quantify the emission rates of TSP and PM-10 from these operations. For those sources controlled via dust collectors, the outlet grain loadings provide the means for calculating emission rates. For those sources controlled by means other than dust collection, it is necessary to calculate the uncontrolled fugitive emissions and then to estimate the effect of the various control measures. EPA's Compilation of Air Pollutant Emission Factors (AP-42) provides TSP and PM-10 emission factor equations for these types of fugitive dust sources. These emission factor equations were used to derive TSP and PM-10 emission rates from several coal and limestone handling activities at the CBCP, as proposed to be modified.

Tables B-2 through B-10 present the data and assumptions employed in calculating emission rates of TSP and PM-10 from all the aggregate material handling and storage operations. For each fugitive dust emitting operation, the AP-42 emission factor equation used to calculate emissions is identified along with the emission factor derived from the equation. Calculated

TABLE B-1

Cooling Tower Particulate Emissions

Parameter	Cedar Bay as Certified	Cedar Bay as Proposed to be Modified
Total Water Flow (gpm)[a]	160,000	160,000
Drift Elimination Efficiency (%)	.002[a]	.001[b]
Drift Loss Rate (gpm)[c]	3.2	1.6
Total Dissolved Solids[d]	13,000 ppm	13,000 ppm
Total Suspended Solids[d]	50 ppm	50 ppm
% Drift <50 microns[a]	54	54
Particulate Emission Rate (lb/hr)[e]	11.29	5.64

[a]Source: Black & Veatch Memorandum from A.L. Carson to M.A. Perry, 10/14/92.
[b]Proposed improvement by Cedar Bay Cogeneration Project
[c]Calculated from total water flow and drift elimination efficiency
[d]Assumed upper limit
[e]Calculated from drift loss rate and total solids

TABLE B-2

Parameters Used in Fugitive Dust Emissions Calculations Coal Handling and Storage at the CBCP as Proposed to be Modified

Annual Consumption[a,b]	1,030,570 tons/year
Maximum Daily Reclaim[a,b]	3,770 tons/day
Maximum Daily Unloading[a]	9,000 tons/day
Weight of Mobile Loader[a]	30 tons
Speed of Mobile Loader[a]	1.5 mph
No. of Wheels on Mobile Loader[a]	4
Annual Miles Traveled[a]	5,760 miles/year
Maximum Daily Miles Traveled[a]	19 miles/day
Coal Silt Content[a]	2.2%
Coal Moisture Content[a,b]	5%
Climatological Values	
Average Wind Speed[c]	7.8 mph
No. hours with wind velocity above 21 knots[c,d]	18 hours/year 3 hours/day (worst-case)
No. days per year with more than 0.01 inch precipitation[e]	115

[a]Source: Correspondence from A. Nawaz, Bechtel, to M. Carney, U.S. Generating, 2-2-93

[b]For "Best Coal" which has the highest fugitive dust emissions since it has the lowest moisture content compared to "Performance Coal" and "Worst Coal".

[c]From Jacksonville International Airport meteorological data (1983-87).

[d]Based on threshold friction velocity of 1.12 m/s, wind erosion was found to occur only for the highest of the six climatological wind speed categories, i.e., wind speed > 21 knots (10.8 m/s).

[e]For Jacksonville International Airport (1951-80), Climates of the States, Third Edition, Gale Research Company, Detroit, MI, p. 215.

TABLE B-3

Sources, Controls and Calculated Emissions of TSP from Coal Handling at the CBCP as Proposed to be Modified

Location	Operation	TSP Emission Factor	AP-42 Equation	Use Rate	Uncontrolled TSP Emissions	Controls	Control[b] Efficiency	Controlled TSP Emissions
Coal Unloading Bldg	Railcar to Feeder 1	1.17 E-03 lb/ton	Material Handling	1030570 tons/yr 9000 tons/day	0.603 tons/yr 0.44 lb/hr	Enclosure Wet Suppression	70% 70%	0.054 tons/yr 0.039 lb/hr
	Feeder 1 to Conveyor 1	1.17 E-03 lb/ton	Material Handling	1030570 tons/yr 9000 tons/day	0.603 tons/yr 0.44 lb/hr	Enclosure Wet Suppression	70% 70%	0.054 tons/yr 0.039 lb/hr
	Conveyor 1 to Conveyor 2	1.17 E-03 lb/ton	Material Handling	1030570 tons/yr 9000 tons/day	0.603 tons/yr 0.44 lb/hr	Enclosure Wet Suppression	70% 70%	0.054 tons/yr 0.039 lb/hr
Receiving Pile	Conv. 2 to Lowering Well	1.17 E-03 lb/ton	Material Handling	1030570 tons/yr 9000 tons/day	0.603 tons/yr 0.44 lb/hr	Enclosure	50%	0.301 tons/yr 0.219 lb/hr
	Wind Erosion[a]	9.60 E-02 lb/hr	Wind Erosion	18 hours/yr 3 hours/day	0.0009 tons/yr 0.0120 lb/hr	None	-	0.0009 tons/yr 0.0120 lb/hr
Storage Pile	Wind Erosion[a]	4.97E-01 lb/hr	Wind Erosion	18 hours/yr 3 hours/day	0.0045 tons/yr 0.0621 lb/hr	None	-	0.0045 tons/yr 0.0621 lb/hr
Unpaved Road	Coal Reclaim by Loader	1.49E-01 lb/VMT	Unpaved Road	5760 VMT/yr 19 VMT/day	0.429 tons/yr 0.118 lb/hr	Watering	75%	0.107 tons/yr 0.029 lb/hr
Reclaim Hopper	Mobile Loader to Feeder 2	1.17E-03 lb/ton	Material Handling	1030570 tons/yr 3770 tons/day	0.603 tons/yr 0.18 lb/hr	Enclosure	70%	0.181 tons/yr 0.055 lb/hr
Conveyor Transfer	Feeder 2 to Conveyor 3	1.17E-03 lb/ton	Material Handling	1030570 tons/yr 3770 tons/day	0.603 tons/yr 0.18 lb/hr	Enclosure	70%	0.181 tons/yr 0.055 lb/hr
Coal Crusher Building[c]	Conveyor 3 to Crusher Coal Crushing Crusher to Conveyor 4	3.00E-03 gr/cf	N/A	14336 ACFM 2808 hr/yr 8 hr/day	- -	Dust Collection Dust Collection	- -	0.518 tons/yr 0.123 lb/hr
Conveyor Transfer	Conveyor 4 to Conveyor 5	1.17E-03 lb/ton	Material Handling	1030570 tons/yr 3770 tons/day	0.603 tons/yr 0.18 lb/hr	Enclosure	70%	0.181 tons/yr 0.055 lb/hr
Coal Silo Area[c]	Conveyor 5 to Coal Silo	3.00E-03 gr/cf	N/A	23175 ACFM 2808 hr/yr 8 hr/day	- -	Dust Collection Dust Collection	- -	0.837 tons/yr 0.199 lb/hr

[a] emission factor shown is the emission rate only when wind speeds exceed the wind erosion threshold, as shown under "use rate"
N/A = not applicable
[b] see Table B-10
[c] Correspondence from A. Nawaz, Bechtel, to G. Weidinger, U.S. Generating, 11-13-02.

TABLE B-4

Sources, Controls and Calculated Emissions of PM-10 from Coal Handling at the CBCP as Proposed to be Modified

Location	Operation	PM-10 Emission Factor	AP-42 Equation	Use Rate	Uncontrolled PM-10 Emissions	Controls	Control Efficiency[b]	Controlled PM-10 Emissions
Coal Unloading Bldg	Railcar to Feeder 1	5.54 E-04 lb/ton	Material Handling	1030570 tons/yr 9000 tons/day	0.285 tons/yr 0.21 lb/hr	Enclosure Wet Suppression	70% 70%	0.026 tons/yr 0.019 lb/hr
	Feeder 1 to Conveyor 1	5.54 E-04 lb/ton	Material Handling	1030570 tons/yr 9000 tons/day	0.285 tons/yr 0.21 lb/hr	Enclosure Wet Suppression	70% 70%	0.026 tons/yr 0.019 lb/hr
	Conveyor 1 to Conveyor 2	5.54 E-04 lb/ton	Material Handling	1030570 tons/yr 9000 tons/day	0.285 tons/yr 0.21 lb/hr	Enclosure Wet Suppression	70% 70%	0.026 tons/yr 0.019 lb/hr
Receiving Pile	Conv. 2 to Lowering Well	5.54 E-04 lb/ton	Material Handling	1030570 tons/yr 9000 tons/day	0.285 tons/yr 0.21 lb/hr	Enclosure	50%	0.143 tons/yr 0.104 lb/hr
	Wind Erosion[a]	4.80 E-02 lb/hr	Wind Erosion	18 hours/yr 3 hours/day	0.0004 tons/yr 0.006 lb/hr	None	-	0.0004 tons/yr 0.006 lb/hr
Storage Pile	Wind Erosion[a]	2.49 E-01 lb/hr	Wind Erosion	18 hours/yr 3 hours/day	0.0022 tons/yr 0.0311 lb/hr	None	-	0.0022 tons/yr 0.0311 lb/hr
Unpaved Road	Coal Reclaim by Loader	6.68E-02 lb/VMT	Unpaved Road	5760 VMT/yr 19 VMT/day	0.192 tons/yr 0.053 lb/hr	Watering	75%	0.048 tons/yr 0.013 lb/hr
Reclaim Hopper	Mobile Loader to Feeder 2	5.54E-04 lb/ton	Material Handling	1030570 tons/yr 3770 tons/day	0.285 tons/yr 0.09 lb/hr	Enclosure	70%	0.086 tons/yr 0.026 lb/hr
Conveyor Transfer	Feeder 2 to Conveyor 3	5.54E-04 lb/ton	Material Handling	1030570 tons/yr 3770 tons/day	0.285 tons/yr 0.09 lb/hr	Enclosure	70%	0.086 tons/yr 0.026 lb/hr
Coal Crusher Building[c]	Conveyor 3 to Crusher Coal Crushing Crusher to Conveyor 4	3.00E-03 gr/cf	N/A	14336 ACFM 2808 hr/yr 8 hr/day	- -	Dust Collection Dust Collection	- -	0.518 tons/yr 0.123 lb/hr
Conveyor Transfer	Conveyor 4 to Conveyor 5	5.54E-04 lb/ton	Material Handling	1030570 tons/yr 3770 tons/day	0.285 tons/yr 0.09 lb/hr	Enclosure	70%	0.086 tons/yr 0.026 lb/yr
Coal Silo Area[c]	Conveyor 5 to Coal Silo	3.00E-03 gr/cf	N/A	23175 ACFM 2808 hr/yr 8 hr/day	- -	Dust Collection Dust Collection	- -	0.837 tons/yr 0.199 lb/hr

[a] emission factor shown is the emission rate only when wind speeds exceed the wind erosion threshold, as shown under "use rate"
N/A = not applicable
[b] see Table B-10
[c] Correspondence from A. Nawaz, Bechtel, to G. Weitzinger, U.S. Generating, 11-13-92

TABLE B-5

Parameters used in Fugitive Dust Emissions Calculations Limestone Handling at the CBCP as Proposed to be Modified

Annual Consumption[a,b]	74,400 tons/year
Maximum Daily Reclaim[a,b]	360 tons/day
Maximum Daily Delivery[a,b]	504 tons/day
Weight of Delivery Trucks[a]	50 tons full, 20 tons empty
No. of Lanes (paved road)[a]	2
Surface Silt Content[a]	12.5%
Dust Loading[a]	1750 lb/mile
Annual Miles Traveled[a]	619 miles/year full 619 miles/year empty
Maximum Daily Miles Traveled[a]	3.94 miles/day full 3.94 miles/day empty
Weight of Mobile Loader[a]	30 tons
Speed of Mobile Loader[a]	1.5 mph
No. of Wheels on Mobile Loader[a]	4
Annual Miles Traveled[a]	300 miles/year
Maximum Daily Miles Traveled[a]	0.85 miles/day
Limestone Silt Content[a]	1.6%
Limestone Moisture Content[a]	7%
Climatological Values	
Average Wind Speed[c]	7.8 mph
No. hours with wind velocity above 21 knots[c,d]	18 hours/yr 3 hours/day (worst-case)
No. days per year with more than 0.01 inch precipitation[e]	115

[a] Source: Correspondence from A. Nawaz, Bechtel, to M. Carney, U.S. Generating, 2-2-93.
[b] For limestone handling when "Best Coal" is being fired. The total particulate emissions due to material handling are highest for "Best Coal" since it has the lowest moisture content compared to "Performance Coal" and "Worst Coal".
[c] From Jacksonville International Airport meteorological data (1983-87).
[d] Based on a threshold friction velocity of 1.12 m/sec, wind erosion was found to occur only for the highest of the six climatological wind speed categories, i.e., wind speed > 21 knots (10.8 m/s).
[e] For Jacksonville International Airport (1951-80), Climates of the States, Third Edition, Gale Research Company, Detroit, MI, p. 215.

TABLE B-6

Sources, Controls and Calculated Emissions of TSP from Limestone Handling at the CBCP as Proposed to be Modified

Location	Operation	TSP Emission Factor	AP-42 Equation	Use Rate	Uncontrolled TSP Emissions	Controls	Control Efficiency[b]	Controlled TSP Emissions
Paved Road	Limestone Delivery	3.68E+00 lb/VMT	Paved Road	619 VMT/yr 3.94 VMT/day	1.139 tons/yr 0.604 lb/hr	Water Flushing	70%	0.342 tons/yr 0.181 lb/hr
Limestone Dump	Dumping from Truck	7.31E-04 lb/ton	Material Handling	74400 tons/yr 504 tons/day	0.027 tons/yr 0.015 lb/hr	None	-	0.027 tons/yr 0.015 lb/hr
Limestone Pile	Wind Erosion[a]	6.40E-02 lb/hr	Wind Erosion	18 hours/yr 3 hours/day	0.0006 tons/yr 0.0080 lb/hr	None	-	0.0006 tons/yr 0.0080 lb/hr
Unpaved Road	Reclaim by Mobile Loader	1.08E-01 lb/VMT	Unpaved Road	300 VMT/yr 0.85 VMT/day	0.016 tons/yr 0.004 lb/hr	Watering	75%	0.0041 tons/yr 0.0010 lb/hr
Dozer Traps	Mobile Loader to Conveyor	7.31E-04 lb/ton	Material Handling	74400 tons/yr 360 tons/day	0.027 tons/yr 0.011 lb/hr	None	-	0.027 tons/yr 0.011 lb/hr
Limestone Pulverizer[c]	Conveyor to Pulverizer Limestone Pulverizing	3.00E-03 gr/cf	N/A	98000 ACFM 2808 hr/yr 8 hr/day	- -	Dust Collection Dust Collection	- -	3.54 tons/yr 0.84 lb/hr
Storage Bin Vent[c]	Drop into Storage Bins	3.00E-03 gr/cf	N/A	6400 ACFM 2808 hr/yr 8 hr/day	- -	Dust Collection Dust Collection	- -	0.23 tons/yr 0.055 lb/hr

[a] emission factor shown is the emission rate only when wind speeds exceed the wind erosion threshold, as shown under "use rate"
N/A = not applicable
[b] see Table B-10
[c] Correspondence from A. Nawaz, Bechtel, to G. Weidinger, U.S. Generating, 11-13-92

TABLE B-7

Sources, Controls and Calculated Emissions of PM-10 from Limestone Handling at the CBCP as Proposed to be Modified

Location	Operation	PM-10 Emission Factor	AP-42 Equation	Use Rate	Uncontrolled PM-10 Emissions	Controls	Control Efficiency[b]	Controlled PM-10 Emissions
Paved Road	Limestone Delivery	7.70E-01 lb/VMT	Paved Road	619 VMT/yr 3.94 VMT/day	0.238 tons/yr 0.126 lb/hr	Water Flushing	70%	0.071 tons/yr 0.038 lb/hr
Limestone Dump	Dumping from Truck	3.46E-04 lb/ton	Material Handling	74400 tons/yr 504 tons/day	0.013 tons/yr 0.007 lb/hr	None	-	0.013 tons/yr 0.007 lb/hr
Limestone Pile	Wind Erosion[a]	3.20E-02 lb/hr	Wind erosion	18 hours/yr 3 hours/day	0.0003 tons/yr 0.0040 lb/hr	None	-	0.0003 tons/yr 0.0040 lb/hr
Unpaved Road	Reclaim by Mobile Loader	4.86E-02 lb/VMT	Unpaved Road	300 VMT/yr 0.85 VMT/day	0.007 tons/yr 0.002 lb/hr	Watering	75%	0.0018 tons/yr 0.0004 lb/hr
Dozer Traps	Mobile Loader to Conveyor	3.46E-04 lb/ton	Material Handling	74400 tons/yr 360 tons/day	0.013 tons/yr 0.005 lb/hr	None	-	0.013 tons/yr 0.005 lb/hr
Limestone Pulverizer[c]	Conveyor to Pulverizer Limestone Pulverizing	3.00E-03 gr/cf	N/A	98000 ACFM 2808 hr/yr 8 hr/day	- -	Dust Collection Dust Collection	- -	3.54 tons/yr 0.84 lb/hr
Storage Bin Vent[c]	Drop into Storage Bins	3.00E-03 gr/cf	N/A	6400 ACFM 2808 hr/yr 8 hr/day	- -	Dust Collection Dust Collection	- -	0.23 tons/yr 0.055 lb/hr

[a] emission factor shown is the emission rate only when wind speeds exceed the wind erosion threshold, as shown under "use rate"
N/A = not applicable
[b] see Table B-10
[c] Correspondence from A. Nawaz, Bechtel, to G. Weidinger, U.S. Generating, 11-13-92

TABLE B-8

Sources, Controls and Calculated TSP/PM-10 Emissions from Ash Handling at the CBCP as Proposed to be Modified[a]

Control Location	Control Method	PM-10 Emission Factor	Flow Rate	Hours of Operation	Controlled TSP & PM-10 Emissions
Bed Ash Hopper	Vent Filter	3.00E-03 gr/cf	670 ACFM	8424 hr/yr 24 hr/day	0.073 tons/yr 0.017 lb/hr
Fly Ash/Bed Ash Silo	Baghouse Filter	3.00E-03 gr/cf	3000 ACFM	8424 hr/yr 24 hr/day	0.325 tons/yr 0.077 lb/hr
Fly Ash Silo	Vent Filter	3.00E-03 gr/cf	3700 ACFM	8424 hr/yr 24 hr/day	0.401 tons/yr 0.095 lb/hr
Bed Ash Silo	Vent Filter	3.00E-03 gr/cf	1800 ACFM	8424 hr/yr 24 hr/day	0.195 tons/yr 0.046 lb/hr

[a] Correspondence from A. Nawaz, Bechtel, to G. Weidinger, U.S. Generating, 11-13-92

TABLE B-9

Sources, Controls and Calculated Emissions of TSP/PM-10 from Ash Pelletizing at the CBCP as Proposed to be Modified[a]

Control Location	Control Method	PM-10 Emission Factor	Flow Rate	Hours of Operation	Controlled TSP & PM-10 Emissions
Bed Ash Bin	Vent Filter	3.00E-03 gr/cf	4000 ACFM	2920 hr/yr 8 hr/day	0.15 tons/yr 0.034 lb/hr
Fly Ash Bin	Vent Filter	3.00E-03 gr/cf	3800 ACFM	2920 hr/yr 8 hr/day	0.14 tons/yr 0.033 lb/hr
Pelletizing Ash Recycle Tank	Dust Collector	3.00E-03 gr/cf	1000 ACFM	2920 hr/yr 8 hr/day	0.038 tons/yr 0.0086 lb/hr
Pelletizing Recycle Hopper	Dust Collector	3.00E-03 gr/cf	500 ACFM	2920 hr/yr 8 hr/day	0.019 tons/yr 0.0043 lb/hr
Pelletizing Pan	Impingement Scrubber	3.00E-03 gr/cf	14740 ACFM	2920 hr/yr 8 hr/day	0.553 tons/yr 0.126 lb/hr
Pellet Recycle Conveyor Discharge	Dust Collector	3.00E-03 gr/cf	1000 ACFM	2920 hr/yr 8 hr/day	0.038 tons/yr 0.0086 lb/hr
Vibratory Screen	Dust Collector	3.00E-03 gr/cf	15000 ACFM	2920 hr/yr 8 hr/day	0.56 tons/yr 0.129 lb/hr
Pellet Curing Silo Outlet Conveyor	Vent Filter	3.00E-03 gr/cf	2100 ACFM	2920 hr/yr 8 hr/day	0.079 tons/yr 0.018 lb/hr
Pellet Hydrator	Venturi Scrubber	3.00E-03 gr/cf	13500 ACFM	2920 hr/yr 8 hr/day	0.507 tons/yr 0.116 lb/hr
Pellet Curing Silo	Impingement Scrubber	3.00E-03 gr/cf	5940 ACFM	2920 hr/yr 8 hr/day	0.223 tons/yr 0.051 lb/hr
Cured Pellet Conveyor	Dust Collector	3.00E-03 gr/cf	4500 ACFM	2920 hr/yr 8 hr/day	0.17 tons/yr 0.039 lb/hr

[a] Correspondence from A. Nawaz, Bechtel, to G. Weidinger, U.S. Generating, 11-13-92

TABLE B-10

Control Efficiencies[a] for Various Control Measures Used in Estimating Controlled TSP and PM-10 Emissions at the CBCP as Proposed to be Modified

Control Measure	Control Efficiency	Page Number[b]	Remarks
Enclosure	70%	4-26	60-80% control is achieved by enclosing the source with 3-sided windbreaks equal in length and height to the source and placed 3-source heights upwind. Greater control will be achieved for fully enclosed sources such as fully enclosed conveyor transfer points.
Wet Suppression	70%	4-30	Table 4-10, 56-87% control is achieved by 8 water sprays at 2.5 gal/min.
Watering on Unpaved Roads	75%	3-14	Figure 3-3, 75% control is achieved if uncontrolled surface moisture content is doubled by watering.
Water Flushing of Paved Roads	70%	2-7	Table 2-4, approximately 70% control is achieved by applying water at 0.48 gal/yd^2 every hour during the 8-hour delivery period per day (assuming 8 truck passes per hour).
Lowering Well at Coal Receiving Pile	50%	--	Lowering well was considered as a partial enclosure with 50% control.

[a]Source: EPA-450/3-88-008, "Control of Open Fugitive Dust Sources", September 1988.
[b]Page Number of the document in footnote (a).

uncontrolled emissions are given, controls and efficiencies listed, followed by the calculated controlled emission rates on a maximum daily and annual average basis. For sources controlled by dust collection, the outlet grain loadings and calculated emissions are presented. The calculations of emission factors using equations from AP-42 for sources without dust collection are also presented below.

Aggregate Material Handling and Storage Emission Factor Calculations:

1. COAL HANDLING AND STORAGE

a) Material Handling

The following equation for material handling from AP-42 (Section 11.2.3, p11.2.3-3, dated 9/88) was used for conveyor drop, conveyor transfer, and mobile loader dump operations,

$$E = k\,(0.0032)\,\frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}} \qquad (1)$$

where, E = Emission factor, lb/ton

k = Aerodynamic particle size multiplier = 0.74 (AP-42, Table 11.2.3-2, p11.2.3-3, dated 9/88, particles ≤ 30 μm)

U = Mean wind speed = 7.8 mph (see Table B-2)

M = Moisture content = 5% (see Table B-2)

Therefore, from equation 1, the TSP emission factor is,

$E = 1.17 \times 10^{-3}$ lb/ton

For PM_{10}, k=0.35 (AP-42, Table 11.2.3-2, p11.2.3-3, dated 9/88). Therefore, the PM_{10} emission factor is,

$E = 5.54 \times 10^{-4}$ lb/ton

b) Unpaved Road

The following equation for unpaved road from AP-42 (Section 11.2.1, p11.2.1-1, dated 9/88) was used for coal reclaim by mobile loader,

$$E = k\,(5.9)\left(\frac{s}{12}\right)\left(\frac{S}{30}\right)\left(\frac{W}{3}\right)^{0.7}\left(\frac{w}{4}\right)^{0.5}\left(\frac{365-p}{365}\right) \qquad (2)$$

where, E = Emission factor, lb/VMT (VMT = Vehicle Miles Traveled)

k = Aerodynamic particle size multiplier = 0.8 (AP-42, Section 11.2.1.2, p11.2.1-3, dated 9/88, particles ≤ 30μm)

s = Silt content = 2.2% for coal (see Table B-2)

S = Mean vehicle speed = 1.5 mph (see Table B-2)

W = Mean vehicle weight = 30 tons (see Table B-2)

w = Mean number of wheels = 4 (see Table B-2)

p = Number of days per year with at least 0.01 inch precipitation = 115 (see Table B-2)

Therefore, from equation 2, the TSP emission factor is,

E = 0.149 lb/VMT

For PM_{10}, k=0.36 (AP-42, Section 11.2.1.2, p11.2.1-3, dated 9/88). Therefore, the PM_{10} emission factor is,

E = 0.0668 lb/VMT

c) Wind Erosion

The following equations for wind erosion from AP-42 (Section 11.2.7.3, eqs. 2 & 3, p11.2.7-2 & 11.2.7-4, dated 9/90) were used for estimating emissions due to wind erosion from the coal receiving and storage piles,

$$E = k \sum_{i=1}^{N} P_i \qquad (3)$$

$$P_1 = \begin{cases} 58\,(u_* - u_{*t})^2 + 25\,(u_* - u_{*t}) & \text{for } u_* > u_{*t} \\ 0 & \text{for } u_* \le u_{*t} \end{cases} \quad (4)$$

where, E = Emission factor, g/m^2/yr

k = Aerodynamic particle size multiplier = 1.0 (AP-42, Section 11.2.7.3, p11.2.7-2, dated 9/90, particles ≤ 30μm)

N = Number of disturbances per year = 365 (AP-42, Section 11.2.7.3, p11.2.7-2, dated 9/90, assuming pile surfaces are disturbed daily)

P_1 = Erosion potential, g/m^2

u_* = Friction velocity (m/s) (see below for calculation of u_*)

u_{*t} = Threshold friction velocity = 1.12 m/s (AP-42, Table 11.2.7-2, p11.2.7-6, dated 9/90, uncrusted coal pile)

i) Calculation of u_*

The following equations from AP-42 (Section 11.2.7.3, eqs. 5, 6 and 7, p11.2.7-6 & 11.2.7-7, dated 9/90) were used for calculating u_*,

$$u_{10}^+ = u^+ \frac{\ln(10/0.005)}{\ln(z/0.005)} \quad (5)$$

$$u_s^+ = \frac{u_s}{u_r} u_{10}^+ \quad (6)$$

$$u_* = \frac{0.4\, u_s^+}{\ln(25/0.5)} = 0.10\, u_s^+ \quad (7)$$

where, u^+ = Measured wind speed at Jacksonville airport, m/s

z = Anemometer height at Jacksonville airport = 6.1 m (20 feet)

u_{10}^+ = Wind speed scaled to a reference height of 10 m, m/s

u_s^+ = Surface wind speed distribution, m/s
u_s = Surface wind speed, m/s
u_r = Approach wind speed, m/s
u_s/u_r = Ratio of surface to approach wind speeds (determined from AP-42, Figure 11.2.7-2, p11.2.7-8, dated 9/90, Pile A for receiving pile which is conical and Pile B1 for storage pile which is most closely represented by an oval shape with flat top)

In order to determine erosion potential for all wind speeds, u. was calculated for all six climatological wind speed categories as shown in Table B-11. From the table it can be seen that u. was found to exceed u_t only for the highest wind speed category and areas of the pile where the u_s/u_r ratio is 0.9 (u.=1.24m/s). Hence wind erosion potential exists for only small areas of the piles near the top on the windward side (see Figure 11.2.7-2, Piles A and B1). The calculation of these areas is discussed below.

ii) Calculation of pile surface areas

The total areas for the receiving and storage piles were determined from the CBCP plot plan as 2287 and 10086 m^2, respectively. Table B-12 shows the calculation of the surface area for each u_s/u_r ratio. The percent surface area values were obtained from AP-42 (Table 11.2.7-3, p11.2.7-9, dated 9/90, Pile A for receiving pile and Pile B1 for storage pile). It can be seen from the table that 274 m^2 area of the receiving pile and 1412 m^2 area of the storage pile has a potential for wind erosion.

Therefore, after substituting these values in equation 4, the wind erosion potential can be calculated as,

$$P_i = 58\ (1.24\text{-}1.12)^2 + 25\ (1.24\text{-}1.12) = 3.835\ g/m^2$$

Hence,

$P_i = 3.835\ g/m^2 * 274\ m^2 = 1050.8\ g$ (receiving pile)
$P_i = 3.835\ g/m^2 * 1414\ m^2 = 5415\ g$ (storage pile)

Conservatively assuming piles are disturbed daily and the erosion potential is the same every day, the TSP emission factors can be calculated using equation 3 as,

TABLE B-11

Calculation of Friction Velocity Used in Estimation of Emissions Due to Wind Erosion

					Friction Velocity, u_* (m/s)		
Wind Speed Category	Wind Speed Range (Knots)	Average Wind Speed, u^* (Knots)	Average Wind Speed, u^* (m/s)	10 meter Wind Speed, u^*_{10} (m/s)	$u_e/u_r = 0.2$	$u_e/u_r = 0.6$	$u_e/u_r = 0.9$
1	1-3	2	1.03	1.10	0.02	0.07	0.10
2	4-6	5	2.57	2.75	0.06	0.17	0.25
3	7-10	8.5	4.37	4.68	0.09	0.28	0.42
4	11-16	13.5	6.94	7.43	0.15	0.45	0.67
5	17-21	19	9.77	10.45	0.21	0.63	0.94
6	>21	25	12.86	13.76	0.28	0.83	1.24

TABLE B-12

Calculation of Coal Pile Surface Areas Used in Estimation of Emissions Due to Wind Erosion

	Coal Receiving Pile		Coal Storage Pile	
Regime (u_*/u_t Ratio)	% of Total Area	Area (m^2)	% of Total Area	Area (m^2)
0.2	40	915	36	3631
0.6	48	1098	50	5043
0.9	12	274	14	1412
TOTAL	100	2287	100	10086

$$E = 1.0 * \sum_{i=1}^{365} (1050.8) = 365 * 1050.8 = 383542 \text{ g/yr} = 0.096 \text{ lb/hr} \quad \text{(receiving pile)}$$

$$E = 1.0 * \sum_{i=1}^{365} (5415) = 365 * 5415 = 1976475 \text{ g/yr} = 0.497 \text{ lb/hr} \quad \text{(storage pile)}$$

For PM_{10}, k=0.5 (AP-42, Section 11.2.7.3, p11.2.7-2, dated 9/90). Therefore, the PM_{10} emission factors are,

E = 0.048 lb/hr (receiving pile)
E = 0.249 lb/hr (storage pile)

2. LIMESTONE HANDLING AND STORAGE

a) Material Handling

The following equation for material handling from AP-42 (Section 11.2.3, p11.2.3-3, dated 9/88) was used for delivery truck dump and mobile loader dump operations,

$$E = k\,(0.0032)\,\frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}} \qquad (8)$$

where, E = Emission factor, lb/ton
k = Aerodynamic particle size multiplier = 0.74 (AP-42, Table 11.2.3-2, p11.2.3-3, dated 9/88, particles ≤ 30 μm)
U = Mean wind speed = 7.8 mph (see Table B-5)
M = Moisture content = 7% (see Table B-5)

Therefore, from equation 8, the TSP emission factor is,

$E = 7.31 \times 10^{-4}$ lb/ton

For PM_{10}, k=0.35 (AP-42, Table 11.2.3-2, p11.2.3-3, dated 9/88). Therefore, the PM_{10} emission factor is,

$E = 3.46 \times 10^{-4}$ lb/ton

b) Unpaved Road

The following equation for unpaved road from AP-42 (Section 11.2.1, p11.2.1-1, dated 9/88) was used for limestone reclaim by mobile loader,

$$E = k\,(5.9)\left(\frac{s}{12}\right)\left(\frac{S}{30}\right)\left(\frac{W}{3}\right)^{0.7}\left(\frac{w}{4}\right)^{0.5}\left(\frac{365-p}{365}\right) \qquad (9)$$

where, E = Emission factor, lb/VMT (VMT = Vehicle Miles Traveled)
k = Aerodynamic particle size multiplier = 0.8 (AP-42, Section 11.2.1.2, p11.2.1-3, dated 9/88, particles ≤ 30μm)
s = Silt content = 1.6% (see Table B-5)
S = Mean vehicle speed = 1.5 mph (see Table B-5)
W = Mean vehicle weight = 30 tons (see Table B-5)
w = Mean number of wheels = 4 (see Table B-5)
p = Number of days per year with at least 0.01 inch precipitation = 115 (see Table B-5)

Therefore, from equation 9, the TSP emission factor is,

E = 0.108 lb/VMT

For PM_{10}, k=0.36 (AP-42, Section 11.2.1.2, p11.2.1-3, dated 9/88). Therefore, the PM_{10} emission factor is,

E = 0.0486 lb/VMT

c) Paved Road

The following equation for industrial paved roads from AP-42 (Section 11.2.6.3, eq. 1, p11.2.6-1, dated 11/88) was used for estimating emissions due to limestone delivery trucks traveling on paved road,

$$E = 0.077\,(I)\left(\frac{4}{n}\right)\left(\frac{s}{10}\right)\left(\frac{L}{1000}\right)\left(\frac{W}{3}\right)^{0.7} \qquad (10)$$

where, E = Emission factor, lb/VMT

I = Industrial augmentation factor = 1.0 (AP-42, Section 11.2.6.3, p11.2.6-3, dated 9/88, assuming traffic travels only on paved areas)

n = Number of traffic lanes = 2 (see Table B-5)

s = Surface material silt content = 12.5% (AP-42, Table 11.2.6-1, p11.2.6-2, dated 9/88, paved roads at iron and steel production industry)

L = Surface dust loading = 1750 lb/mile (AP-42, Table 11.2.6-1, p11.2.6-2, dated 9/88, paved roads at iron and steel production industry)

W = Average vehicle weight = 50 tons full, 20 tons empty (see Table B-5)

Therefore, from equation 10, the TSP emission factor is,

E = 3.68 lb/VMT

For PM_{10}, the following equation from AP-42 (Section 11.2.6.3, eq. 2, p11.2.6-3, dated 9/88) was used,

$$E = k(3.5)\left(\frac{sL}{0.35}\right)^{0.3} \qquad (11)$$

where, E = Emission factor, lb/VMT

k = Aerodynamic particle size multiplier = 0.22 (AP-42, Section 11.2.6.3, p11.2.6-3, dated 9/88, particles ≤ 10μm)

sL = Road surface silt loading = 12 g/m^2 = 0.35 oz/yd^2 (AP-42, Table 11.2.6-1,p11.2.6-2, dated 9/88, paved roads at iron and steel production industry)

Therefore, from equation 11, the PM_{10} emission factor is,

E = 0.77 lb/VMT

d) Wind Erosion

The following equations for wind erosion from AP-42 (Section 11.2.7.3, eqs. 2 & 3, p11.2.7-2 & 11.2.7-4, dated 9/90) were used for estimating emissions due to wind erosion from the limestone pile,

$$E = k \sum_{i=1}^{N} P_i \qquad (12)$$

$$P_i = \begin{cases} 58\,(u_* - u_{*t})^2 + 25\,(u_* - u_{*t}) & \text{for } u_* > u_{*t} \\ 0 & \text{for } u_* \le u_{*t} \end{cases} \qquad (13)$$

where, E = Emission factor, g/m^2/yr

k = Aerodynamic particle size multiplier = 1.0 (AP-42, Section 11.2.7.3, p11.2.7-2, dated 9/90, particles ≤ 30μm)

N = Number of disturbances per year = 365 (AP-42, Section 11.2.7.3, p11.2.7-2, dated 9/90, assuming pile surface is disturbed daily)

P_i = Erosion potential, g/m^2

u_* = Friction velocity (m/s) (see below for calculation of u_*)

u_{*t} = Threshold friction velocity = 1.12 m/s (AP-42, Table 11.2.7-2, p11.2.7-6, dated 9/90, uncrusted coal pile)

(Note: Since a value of u_{*t} was not available for limestone piles, the value for uncrusted coal pile was first used to calculate P_i and then P_i was scaled by the ratio of limestone to coal silt contents to more closely represent erosion from a limestone pile.)

i) Calculation of u_*

The following equations from AP-42 (Section 11.2.7.3, eqs. 5, 6 and 7, p11.2.7-6 & 11.2.7-7, dated 9/90) were used for calculating u_*,

$$u_{10}^{+} = u^{+} \frac{\ln(10/0.005)}{\ln(z/0.005)} \quad (14)$$

$$u_s^{+} = \frac{u_s}{u_r} u_{10}^{+} \quad (15)$$

$$u_* = \frac{0.4\, u_s^{+}}{\ln(25/0.5)} = 0.10\, u_s^{+} \quad (16)$$

where, u^+ = Measured wind speed at Jacksonville airport, m/s
z = Anemometer height at Jacksonville airport = 6.1 m (20 feet)
u_{10}^+ = Wind speed scaled to a reference height of 10 m, m/s
u_s^+ = Surface wind speed distribution, m/s
u_s = Surface wind speed, m/s
u_r = Approach wind speed, m/s
u_s/u_r = Ratio of surface to approach wind speeds (determined from AP-42, Figure 11.2.7-2, p11.2.7-8, dated 9/90, Pile B1 since the limestone pile can be closely represented by an oval shape with flat top)

In order to determine erosion potential for all wind speeds, u_* was calculated for all six climatological wind speed categories as shown in Table B-11. From the table it can be seen that u_* was found to exceed u_{*t} only for the highest wind speed category and areas of the pile where u_s/u_r ratio is 0.9 (u_*=1.24m/s). Hence, wind erosion potential exists for only a small area of the pile near the top on the windward side (see Figure 11.2.7-2, Pile B1). The calculation of this area is discussed below.

ii) Calculation of pile surface area

The total area for the limestone pile was determined from the CBCP plot plan as 1793 m^2. Table B-13 shows the calculation of the surface area for each u_s/u_r ratio. The percent surface area values were obtained from AP-42 (Table 11.2.7-3, p11.2.7-9, dated 9/90, Pile B1). It can be seen from the table that 251 m^2 area of the limestone pile has a potential for wind erosion.

TABLE B-13

Calculation of Limestone Pile Surface Areas Used in Estimation of Emissions Due to Wind Erosion

	Limestone Pile	
Regime (u_t/u, Ratio)	% of Total Area	Area (m^2)
0.2	36	645
0.6	50	897
0.9	14	251
TOTAL	100	1793

Therefore, after substituting these values in equation 13, the wind erosion potential can be calculated as,

$$P_i = 58\ (1.24\text{-}1.12)^2 + 25\ (1.24\text{-}1.12) = 3.835\ g/m^2$$

Since the threshold friction velocity used in this calculation is for a coal pile, P_i was scaled by the ratio of limestone to coal silt contents in order to more closely represent erosion from a limestone pile (ratio = 1.6/2.2 = 0.727). Scaling by the ratio of silt contents is based on the assumption that the erosion potential is directly related to the amount of silt in the aggregate material. Therefore,

$$P_i = 3.835 * 0.727 = 2.788\ g/m^2$$

Hence,

$$P_i = 2.788\ g/m^2 * 251\ m^2 = 699.8\ g$$

Assuming pile is disturbed daily and the erosion potential is the same every day, the emission factor can be calculated using equation 12 as,

$$E = 1.0 * \sum_{i=1}^{365} (699.8) = 365 * 699.8 = 255427\ g/yr = 0.064\ lb/hr$$

For PM_{10}, k=0.5 (AP-42, Section 11.2.7.3, p11.2.7-2, dated 9/90). Therefore, the PM_{10} emission factor is,

$$E = 0.032\ lb/hr$$

APPENDIX C

MODELED EMISSION RATES (g/sec) FOR SKC'S POWER, BARK, AND PACKAGE BOILERS AND THE CBCP'S CFBs AND LIMESTONE DRYERS

APPENDIX C

MODELED EMISSION RATES (g/sec) FOR SKC'S POWER, BARK, AND PACKAGE BOILERS AND THE CBCP'S CFBs AND LIMESTONE DRYERS

The modeling analyses conducted in support of the results presented in Sections 2, 3, and 5 of this report utilized input emission rates for the various sources of concern in units of gram per second for a variety of averaging periods. In order to facilitate review of ENSR's modeling analyses, the tables in this appendix present a complete summary of emissions for SKC's power boilers, bark boilers, and package boilers and for the CBCP's CFBs and limestone dryers as was input to models in the modeling analyses. Emission rates that vary according to the averaging period under consideration are presented. The g/sec values were converted from data presented elsewhere in the report as noted in the tables.

The g/sec emissions for other sources modeled in this analysis including material handling emissions, SKC's baseline emissions and source inventory emissions are presented in the corresponding emissions tables in Sections 2 and 3.

TABLE C-1

Emission Rates for SKC Power Boilers and Bark Boilers in Future Recycling Mode at 640,000 lb/hr Steam As Used in Modeling Analyses For All Averaging Periods

Pollutant	Emissions (g/sec)		
	Total Power Boilers[a]	Bark Boiler #1	Bark Boiler #2
SO_2	93.83	4.28	4.28
NO_x	38.13	5.90	5.90
CO	2.24	30.40	30.40
PM_{10}	4.76	4.23	4.23
Lead	1.88e-03	1.85e-03	1.85e-03
Total Air Toxics	2.58	3.88	3.88

[a]Power boilers exhausted through new common stack

TABLE C-2

Emission Rates for SKC Power Boilers and Bark Boilers in Future Recycling Mode at 745,000 lb/hr Total Steam As Used in Modeling Analyses For All Averaging Periods

Pollutant	Emissions (g/sec)		
	Total Power Boilers[a]	Bark Boiler #1	Bark Boiler #2
SO_2	93.83	7.38	7.38
NO_x	38.13	10.17	10.17
CO	2.85	30.40	30.40
PM_{10}	6.06	4.23	4.23
Lead	2.39e-03	1.85e-03	1.85e-03
Total Air Toxics	2.64	4.03	4.03

[a]Power boilers exhausted through new common stack

TABLE C-3

Emission Rates for Cedar Bay as Certified[a] as Used in Modeling Analyses

Pollutant	Total CFBs				Each Limestone Dryer	
	Short-Term		Long-Term			
	(lb/MMBtu)	(g/sec)	(lb/MMBtu)	(g/sec)	(lb/hr)	(g/sec)
SO_2	0.6[b]	241.1	0.31	115.8	5.0	0.63
NO_x	0.29	---	0.29	108.4	2.4	3.02e-01
CO	0.19	76.34	0.19	---	0.6	7.56e-02
TSP	0.020	8.04	0.020	7.47	0.25	3.15e-02
PM_{10}	0.020	8.04	0.020	7.47	0.25	3.15e-02
Lead	0.007	---	0.007	2.62	1.52e-04	1.92e-05
Mercury	0.00026	1.04e-01	0.00026	9.72e-02	5.11e-05	6.44e-06
Beryllium	0.00011	4.42e-02	0.00011	4.11e-02	4.26e-05	5.37e-06
Fluoride	0.086	34.56	0.086	32.14	5.45e-04	6.87e-05
H_2SO_4 Mist	0.024	9.64	0.024	8.97	0.20	2.52e-02
Antimony	1.58e-05	6.35e-03	1.06e-05	3.96e-03	6.82e-05	8.59e-06
Arsenic	2.35e-04	9.44e-02	1.44e-04	5.38e-02	7.16e-05	9.02e-06
Barium	9.36e-04	3.76e-01	6.11e-04	2.28e-01	4.60e-05	5.80e-06
Bromine	-	-	-	-	1.19e-04	1.50e-05
Cadmium	5.54e-05	2.23e-02	3.15e-05	1.18e-02	1.79e-04	2.26e-05
Cobalt	5.52e-05	2.22e-02	3.78e-05	1.41e-02	1.07e-03	1.34e-04
HCl	1.81e-03	7.27e-01	1.81e-03	6.76e-01	1.12e-02	1.42e-03
Indium	2.11e-07	8.48e-05	1.40e-07	5.23e-05	0	0
Chromium VI	1.66e-06	6.67e-04	1.06e-06	3.96e-04	3.41e-06	4.3e-07
Copper	1.21e-04	4.86e-02	8.04e-05	3.00e-02	4.77e-03	6.01e-04

TABLE C-3 (Cont'd)

Emission Rates for Cedar Bay as Certified[a] as Used in Modeling Analyses

Pollutant	Total CFBs				Each Limestone Dryer	
	Short-Term		Long-Term			
	(lb/MMBtu)	(g/sec)	(lb/MMBtu)	(g/sec)	(lb/hr)	(g/sec)
Formaldehyde	1.30e-04	5.22e-02	1.30e-04	4.86e-02	6.90e-03	8.69e-04
Manganese	7.6e-04	3.05e-01	5.00e-04	1.87e-01	1.79e-04	2.26e-05
Molybdenum	1.56e-04	6.27e-02	1.00e-04	3.74e-02	8.32e-04	1.05e-04
Nickel	1.24e-04	4.98e-02	8.08e-05	3.02e-02	2.90e-03	3.65e-04
Phosphorous	5.09e-04	2.05e-01	3.35e-04	1.25e-01	1.81e-03	2.28e-04
POM	1.86e-05	7.47e-03	1.86e-05	6.95e-03	3.83e-04	4.83e-05
Selenium	2.18e-05	8.76e-03	1.58e-05	5.90e-03	1.93e-04	2.43e-05
Tin	6.13e-05	2.46e-02	3.94e-05	1.47e-02	5.62e-03	7.08e-04
Vanadium	3.86e-04	1.55e-01	3.21-04	1.20e-01	1.28e-02	1.61e-03
Zinc	6.21e-03	2.50	3.73e-03	1.39	2.56e-03	3.22e-04
Pyridine, Phenol, Acetic Acid, Acetaldehyde[d]	0.01	4.02	0.01	3.47	0.17	0.02
Total Air Toxics[c]	-	53.04	-	47.70	-	5.18e-02

(a) Derived from emissions data presented in Section 1. Short-term values used for all averaging periods of 24-hours or less.

(b) Source: Final Order and Certification PA-88-24 (2/11/91) and Final Determination AES/Cedar Bay Cogeneration Project, Duval County, FL Permit No. PSD-FL-137 (3/28/91).

(c) Non-criteria

(d) The 0.01 lb/MMBtu emission factor represents total organics. Pyridine, phenol, acetic acid and acetaldehyde represent an unknown percentage of this total. However, this emission factor was conservatively assumed for these substances in the modeling analyses in Sections 2 and 3.

TABLE C-4

Emission Rates for Cedar Bay CFBs as Modified as Used in Modeling Analyses (a)

Pollutant	CFB Emissions			
	Short-Term		Long-Term	
	(lb/MMBtu)	(g/sec)	(lb/MMBtu)	(g/sec)
SO_2	0.24	96.44	0.20	74.74
NO_x	0.17	68.31	0.17	63.53
CO	0.175	70.32	0.175	-
TSP	0.018	7.23	0.018	6.73
PM_{10}	0.018	7.23	0.018	6.73
Lead	6.38e-05	2.56e-02	6.03e-05	2.25e-02
Mercury	4.72e-05	1.90e-02	2.89e-05	1.08e-02
Beryllium	1.25e-05	5.02e-03	8.70e-06	3.25e-03
Fluorides	8.54e-04	3.43e-01	7.44e-04	2.78e-01
H_2SO_4 Mist	4.66e-04	1.87e-01	4.66e-04	1.74e-01
Antimony	1.58e-05	6.35e-03	1.06e-05	3.96e-03
Arsenic	2.35e-04	9.44e-02	1.44e-04	5.38e-02
Barium	9.36e-04	3.76e-01	6.11e-04	2.28e-01
Bromine	-	-	-	-
Cadmium	5.54e-05	2.23e-02	3.15e-05	1.18e-02
Cobalt	5.52e-05	2.22e-02	3.78e-05	1.41e-02
HCL	1.81e-03	7.27e-01	1.81e-03	6.76e-01
Indium	2.11e-07	8.48e-05	1.40e-07	5.23e-05
Chromium VI	1.66e-06	6.67e-04	1.06e-06	3.96e-04
Copper	1.21e-04	4.86e-02	8.04e-05	3.00e-02
Formaldehyde	1.30e-04	5.22e-02	1.30e-04	4.86e-02

TABLE C-4 (Cont'd)

Emission Rates for Cedar Bay CFBs as Modified as Used in Modeling Analyses [a]

Pollutant	CFB Emissions			
	Short-Term		Long-Term	
	(lb/MMBtu)	(g/sec)	(lb/MMBtu)	(g/sec)
Manganese	7.6e-04	3.05e-01	5.00e-04	1.87e-01
Molybdenum	1.56e-04	6.27e-02	1.00e-04	3.74e-02
Nickel	1.24e-04	4.98e-02	8.08e-05	3.02e-02
Phosphorous	5.09e-04	2.05e-01	3.35e-04	1.25e-01
POM	1.86e-05	7.47e-03	1.86e-05	6.95e-03
Selenium	2.18e-05	8.76e-03	1.58e-05	5.90e-03
Tin	6.13e-05	2.46e-02	3.94e-05	1.47e-02
Vanadium	3.86e-04	1.55e-01	3.21e-04	1.20e-01
Zinc	6.21e-03	2.50	3.73e-03	1.39
Pyridine, Phenol, Acedic Acid, . Acetaldehyde[c]	0.01	4.02	0.01	3.74
Total Air Toxics[b]		9.24		7.19

(a) Derived from emissions data presented in Section 1. Short-term values used for all averaging periods of 24-hours or less.

(b) Non-criteria

(c) The 0.01 lb/MMBtu emission factor represents total organics. Pyridine, phenol, acetic acid and acetaldehyde represent an unknown percentage of this total. However, this emission factor was conservatively assumed for these substances in the modeling analyses in Sections 2 and 3.

TABLE C-5

Emission Rates for Cedar Bay as Modified Limestone Dryers as Used in Modeling Analyses [a]

Pollutant	Limestone Dryer Emissions		
	Short-Term		Long-Term
	lb/hr	(g/sec)	(g/sec)
SO_2	5.0	0.63	0.21
NO_x	2.4	0.30	0.10
CO	0.6	7.56e-02	2.52e-02
TSP	0.25	---	1.05e-02
PM_{10}	0.25	---	1.05e-02
Lead	1.52e-04	1.92e-05	6.38e-06
Mercury	5.11e-05	6.44e-06	2.15e-06
Beryllium	4.26e-05	5.37e-06	1.79e-06
Fluorides	5.45e-04	6.87e-05	2.29e-05
H_2SO_4 Mist	0.20	2.52e-02	8.40e-03
Antimony	6.82e-05	8.59e-06	2.86e-06
Arsenic	7.16e-05	9.02e-06	3.01e-06
Barium	4.60e-05	5.80e-06	1.93e-06
Bromine	1.19e-04	1.50e-05	5.01e-06
Cadmium	1.79e-04	2.26e-05	7.52e-06
Cobalt	1.07e-03	1.35e-04	4.49e-05
HCl	1.12e-02	1.42e-03	4.72e-04
Indium	-	-	-
Chromium VI	3.41e-06	4.30e-07	1.43e-07
Copper	4.77e-03	6.01e-04	2.00e-04
Formaldehyde	6.90e-03	8.69e-04	2.90e-04

TABLE C-5 (Cont'd)

Emission Rates for Cedar Bay as Modified Limestone Dryers as Used in Modeling Analyses [a]

Pollutant	Limestone Dryer Emissions		
	Short-Term		Long-Term
	lb/hr	(g/sec)	(g/sec)
Manganese	1.79e-04	2.26e-05	7.52e-06
Molybdenum	8.32e-04	1.05e-04	3.49e-05
Nickel	2.90e-03	3.65e-04	1.22e-04
Phosphorous	1.81e-03	2.28e-04	7.60e-05
POM	3.83e-04	4.83e-05	1.61e-05
Selenium	1.93e-04	2.43e-05	8.11e-06
Tin	5.62e-03	7.08e-04	2.36e-04
Vanadium	1.28e-02	1.61e-03	5.37e-04
Zinc	2.56e-03	3.22e-04	1.07e-04
Pyridine, Phenol, Acetic Acid[c]	1.70e-01	2.14e-02	7.14e-03
Total Air Toxics[b]		5.32e-02	1.77e-02

(a) Derived from emissions data presented in Section 1. Short-term values used for all averaging periods of 8-hours or less. Values represent emission limits for each of two limestone dryers. Annual emissions assume each dryer operates 8 hr/day 365 days/year.

(b) non-criteria

(c) The 1.70e-01 lb/hr emission rate represents a total organics emissions rate. Pyridine, phenol and acetic acid represent an unknown percentage of this total. However, this emission rates was conservatively assumed for these substances in the modeling analyses in Sections 2 and 3.

TABLE C-6

Emission Rates for SKC Package Boilers at 260,000 lb/hr Steam as Used in Modeling Analyses[a]

Pollutant	Package Boiler Emissions			
	Firing Distillate Oil		Firing Natural Gas	
	(lb/hr)	(g/sec)	(lb/hr)	(g/sec)
SO_2	57.0 (short-term) 34.2 (ann. avg.)	21.55 12.93	0.1	3.78e-02 3.78e-02
NO_x	22.8	8.62	24.3	9.19
CO	42	15.84	43.4	16.41
TSP	5.71	2.16	0.6	0.23
PM_{10}	2.85	1.08	0.6	0.23
Lead	1.0e-03	3.78e-04	0	0
Mercury	3.9e-04	1.47e-04	1.7e-06	6.43e-07
Beryllium	2.8e-04	1.06e-04	0	0
Fluorides	3.7e-03	1.40e-03	0	0
H_2SO_4 Mist	1.7	0.64	0	0
Antimony	4.6e-04	1.74e-04	0	0
Arsenic	4.8e-04	1.81e-04	0	0
Barium	3.1e-04	1.17e-04	0	0
Bromine	8.0e-04	3.02e-04	0	0
Cadmium	1.2e-03	4.54e-04	0	0
Cobalt	1.0e-03	3.78e-04	0	0
HCL	7.52e-02	2.84e-02	0	0
Indium	1.73e-03	6.54e-04	0	0
Chromium VI	5.0e-05	1.89e-05	0	0
Copper	3.19e-02	1.21e-02	0	0
Formaldehyde	4.61e-02	1.74e-02	0	0

TABLE C-6 (Cont'd)

Emission Rates for SKC Package Boilers at 260,000 lb/hr Steam as Used in Modeling Analyses [a]

Pollutant	Package Boiler Emissions			
	Firing Distillate Oil		Firing Natural Gas	
	(lb/hr)	(g/sec)	(lb/hr)	(g/sec)
Manganese	1.1e-03	4.16e-04	0	0
Molybdenum	5.6e-03	2.12e-03	0	0
Nickel	1.94e-02	7.33e-03	0	0
Phosphorous	1.21e-02	4.57e-03	0	0
POM	3.0e-05	1.13e-05	0	0
Selenium	1.3e-03	4.91e-04	0	0
Tin	3.76e-02	1.42e-02	0	0
Vanadium	5.13e-02	1.94e-02	0	0
Zinc	1.12e-02	4.23e-03	0	0
Total Air Toxics[b]		0.75		6.43-07

[a] Derived from data presented in Section 1.

lb/hr values for each of 3 boilers
g/sec values for total of 3 boilers

TABLE C-7

Emission Rates for SKC Package Boilers at 375,000 lb/hr Steam as Used in Modeling Analyses [a]

Pollutant	Package Boiler Emissions			
	Firing Distillate Oil		Firing Natural Gas	
	(lb/hr)	(g/sec)	(lb/hr)	(g/sec)
SO_2	82.25 (short-term) 49.35 (ann. avg.)	31.09 18.65	0.1	3.78e-02 3.78e-02
NO_x	32.90	12.44	34.94	13.21
CO	61.04	23.07	62.4	23.59
TSP	8.23	3.11	0.87	0.33
PM_{10}	4.11	1.55	0.87	0.33
Lead	1.46e-03	5.52e-04	0	0
Mercury	5.59e-04	2.11e-04	2.4e-06	9.07e-07
Beryllium	4.11e-04	1.55e-04	0	0
Fluorides	5.3e-03	2.00e-03	0	0
H_2SO_4 Mist	2.47	0.93	0	0
Antimony	6.6e-04	2.49e-04	0	0
Arsenic	7.0e-04	2.65e-04	0	0
Barium	4.0e-04	1.51e-04	0	0
Bromine	1.2e-03	4.54e-04	0	0
Cadmium	1.7e-03	6.43e-04	0	0
Cobalt	1.45e-03	5.48e-04	0	0
HCl	1.09e-01	4.12e-02	0	0
Chromium VI	8.0e-05	3.02e-05	0	0
Copper	4.61e-02	1.74e-02	0	0
Formaldehyde	6.66e-02	2.52e-02	0	0

TABLE C-7 (Cont'd)

Emission Rates for SKC Package Boilers at 375,000 lb/hr Steam as Used in Modeling Analyses [a]

Pollutant	Package Boiler Emissions			
	Firing Distillate Oil		Firing Natural Gas	
	(lb/hr)	(g/sec)	(lb/hr)	(g/sec)
Indium	2.5e-03	9.45e-04	0	0
Manganese	1.6e-03	6.05e-04	0	0
Molybdenum	8.0e-03	3.02e-03	0	0
Nickel	2.8e-02	1.06e-02	0	0
Phosphorous	1.74e-02	6.58e-03	0	0
POM	5.0e-05	1.89e-05	0	0
Selenium	1.9e-03	7.18e-04	0	0
Tin	5.43e-02	2.05e-02	0	0
Vanadium	7.4e-02	2.80e-02	0	0
Zinc	1.61e-02	6.09e-03	0	0
Total Air Toxics[b]		1.09		9.07e-07

[a] Derived from data presented in Section 1

lb/hr values for each of 3 boilers
g/sec values for total of 3 boilers

[b] Non-criteria

APPENDIX D

THE CBCP's AND SKC's CONTRIBUTIONS TO PREDICTED EXCEEDANCES OF THE AAQS AND PSD INCREMENTS

APPENDIX D

THE CBCP's AND SKC's CONTRIBUTIONS TO PREDICTED EXCEEDANCES OF THE AAQS AND PSD INCREMENTS

Sections 3.5 (AAQS Compliance) and 3.6 (PSD Increment Compliance) of this report state that although many exceedances of the SO_2 and PM_{10} AAQS and SO_2 PSD increments were predicted in the modeling analysis, the CBCP was found not to contribute significantly to any exceedances of either the AAQS or PSD increments. This appendix presents a full summary of the CBCP's and SKC's Package Boilers' contributions to each predicted exceedance in support of the conclusions reached in Section 3.

For short-term (3-, and 24-hour) averaging periods, the ISC2 Short-Term EVENT model (ISCEV2) was used to perform source contribution analyses for short-term average events (i.e., predicted exceedances). Long-term (annual) source contribution analyses were conducted through a thorough review of ISC2 output files.

For each pollutant and applicable averaging period, concentration thresholds were identified above which an "event" would occur. For the AAQS compliance analysis that threshold was set at the ambient standard minus the measured background concentration (see Table 3-20) since the measured background concentration was not included directly in the model runs. The PSD thresholds were set at the allowable increments (see Table 3-2).

Threshold exceedances were predicted for the following cases:

Case	# of Exceedances				
	1983	1984	1985	1986	1987
3-Hr SO_2 AAQS	87	109	88	104	70
24-Hr SO_2 AAQS	168	233	208	204	174
Annual SO_2 AAQS	8	7	9	10	6
24-Hr PM_{10} AAQS	10	10	10	6	12
Annual PM_{10} AAQS	1	1	1	1	1
24-Hr SO_2 PSD	3	7	3	1	3

Tables D-1 through D-30 summarize source contributions for all predicted exceedances as follows:

- Tables D-1 through D-5 - 1983 through 1987 3-Hr SO_2 AAQS;
- Tables D-6 through D-10 - 1983 through 1987 24-Hr SO_2 AAQS;
- Tables D-11 through D-15 - 1983 through 1987 annual SO_2 AAQS;
- Tables D-16 through D-20 - 1983 through 1987 24-Hr PM_{10} AAQS;
- Tables D-21 through D-25 - 1983 through 1987 annual PM_{10} AAQS; and
- Tables D-26 through D-30 - 1983 through 1987 24-Hr SO_2 PSD

The tables, for short term (3- and 24-hr) averaging periods, identify for each event (exceedance) the period ending (month/day/hour) for which the event was predicted, the receptor location, the total concentrations, contributions to the total from the CBCP's CFBs and each limestone dryer, a total CBCP contribution, and the contribution from SKC's package boilers. The tables presenting annual averages include a contribution from the CBCP and SKC's package boilers.

TABLE D-1

ISCEV2 Modeling Summary
3-Hour SO_2 AAQS Compliance Analysis
1983 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH030001	1/30/ 3	437851.19	3366908.00	4773.02	0.00	0.00	0.00	0.00	0.00
TH030002	2/ 1/24	437851.19	3366908.00	2575.32	0.00	0.00	0.00	0.00	0.00
TH030003	2/ 2/ 3	437851.19	3366908.00	1786.78	0.00	0.00	0.00	0.00	0.00
TH030004	2/ 6/12	437851.19	3366908.00	1587.58	0.00	0.00	0.00	0.00	0.00
TH030005	2/10/18	437851.19	3366908.00	1824.45	0.00	0.00	0.00	0.00	0.00
TH030006	2/22/21	437851.19	3366908.00	1697.39	0.00	0.00	0.00	0.00	0.00
TH030007	3/ 5/ 3	437851.19	3366908.00	2652.44	0.00	0.00	0.00	0.00	0.00
TH030008	3/ 5/12	437851.19	3366908.00	1583.46	0.00	0.00	0.00	0.00	0.00
TH030009	3/ 6/ 3	437851.19	3366908.00	2371.93	0.00	0.00	0.00	0.00	0.00
TH030010	3/ 6/ 6	437851.19	3366908.00	1598.26	0.00	0.00	0.00	0.00	0.00
TH030011	3/17/ 6	437851.19	3366908.00	2271.00	0.00	0.00	0.01	0.01	0.01
TH030012	3/17/12	437851.19	3366908.00	1703.60	0.00	0.00	0.00	0.00	0.00
TH030013	3/31/ 3	437851.19	3366908.00	1414.35	0.00	0.00	0.00	0.00	0.00
TH030014	4/ 1/24	437851.19	3366908.00	3259.76	0.00	0.00	0.00	0.00	0.00
TH030015	4/ 4/ 6	438321.09	3366737.00	2182.26	0.00	0.00	0.00	0.00	0.00
TH030016	4/ 5/ 9	437851.19	3366908.00	2236.06	0.00	0.00	0.00	0.00	0.00
TH030017	4/ 7/ 9	437851.19	3366908.00	2409.78	0.00	0.00	0.00	0.00	0.00
TH030018	4/ 9/ 3	437851.19	3366908.00	4932.18	0.00	0.00	0.00	0.00	0.00
TH030019	4/13/24	437381.41	3367079.00	1243.27	0.10	0.03	0.03	0.16	0.43
TH030020	4/14/ 9	437851.19	3366908.00	1297.02	0.00	0.00	0.00	0.00	0.00
TH030021	4/14/12	437851.19	3366908.00	2441.85	0.00	0.00	0.00	0.00	0.00
TH030022	4/14/24	437851.19	3366908.00	1711.63	0.00	0.00	0.00	0.00	0.00
TH030023	4/15/ 6	437851.19	3366908.00	2650.82	0.00	0.00	0.00	0.00	0.00
TH030024	4/22/24	437851.19	3366908.00	1283.02	0.00	0.00	0.00	0.00	0.00
TH030025	4/23/ 6	437851.19	3366908.00	2452.22	0.00	0.00	0.00	0.00	0.00
TH030026	4/23/ 9	437851.19	3366908.00	1415.13	0.00	0.00	0.00	0.00	0.00
TH030027	5/ 1/ 6	437851.19	3366908.00	3263.98	0.00	0.00	0.00	0.00	0.00
TH030028	5/ 1/12	437851.19	3366908.00	2022.46	0.00	0.00	0.00	0.00	0.00
TH030029	5/ 2/12	437851.19	3366908.00	1271.26	0.00	0.00	0.00	0.00	0.00
TH030030	5/13/24	437851.19	3366908.00	2172.05	0.00	0.00	0.00	0.00	0.00
TH030031	5/15/24	437851.19	3366908.00	1560.91	0.00	0.00	0.00	0.00	0.00
TH030032	5/19/15	437851.19	3366908.00	1504.75	0.00	0.00	0.00	0.00	0.01
TH030033	5/19/24	437851.19	3366908.00	1936.18	0.00	0.00	0.00	0.00	0.00
TH030034	5/20/ 9	437851.19	3366908.00	1416.97	0.00	0.00	0.00	0.00	0.00
TH030035	5/21/21	437851.19	3366908.00	2375.04	0.00	0.00	0.00	0.00	0.00
TH030036	5/21/24	437851.19	3366908.00	3160.12	0.00	0.00	0.00	0.00	0.00
TH030037	5/30/18	437851.19	3366908.00	1489.85	0.00	0.00	0.00	0.00	0.00
TH030038	6/ 5/21	437851.19	3366908.00	2504.24	0.00	0.00	0.00	0.00	0.00
TH030039	6/ 7/24	437851.19	3366908.00	2448.92	0.00	0.00	0.00	0.00	0.00
TH030040	6/27/ 9	437851.19	3366908.00	1271.05	0.00	0.00	0.00	0.00	0.00
TH030041	6/27/21	437851.19	3366908.00	1630.68	0.00	0.00	0.00	0.00	0.00
TH030042	7/ 2/24	437851.19	3366908.00	2023.95	0.00	0.00	0.00	0.00	0.00
TH030043	7/ 3/21	437851.19	3366908.00	3513.84	0.00	0.00	0.00	0.00	0.00
TH030044	7/10/21	437851.19	3366908.00	1634.74	0.17	0.33	0.32	0.82	2.94
TH030045	7/12/21	437851.19	3366908.00	1945.74	0.00	0.00	0.00	0.00	0.00
TH030046	7/27/ 3	438321.09	3366737.00	1498.36	0.00	0.00	0.00	0.00	0.00
TH030047	8/ 6/15	437851.19	3366908.00	1375.98	0.35	0.01	0.01	0.36	0.24
TH030048	8/19/21	437851.19	3366908.00	2329.35	0.00	0.00	0.00	0.00	0.00
TH030049	8/21/ 3	438321.09	3366737.00	1514.14	0.00	0.00	0.00	0.00	0.00
TH030050	8/22/24	437851.19	3366908.00	2364.66	0.00	0.00	0.00	0.00	0.00
TH030051	8/23/ 3	437851.19	3366908.00	2326.76	0.00	0.00	0.00	0.00	0.00
TH030052	9/ 4/ 6	437851.19	3366908.00	2958.29	0.00	0.00	0.00	0.00	0.00
TH030053	9/ 4/ 9	437851.19	3366908.00	3405.10	0.00	0.00	0.00	0.00	0.00
TH030054	9/ 4/21	437851.19	3366908.00	2734.26	0.00	0.00	0.00	0.00	0.00
TH030055	9/ 7/ 3	438321.09	3366737.00	1243.91	0.00	0.00	0.00	0.00	0.00

TABLE D-1 (Cont'd)

ISCEV2 Modeling Summary
3-Hour SO_2 AAQS Compliance Analysis
1983 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH030056	9/ 9/24	437851.19	3366908.00	1400.89	0.00	0.00	0.00	0.00	0.00
TH030057	9/10/24	438321.09	3366737.00	1332.98	0.00	0.00	0.00	0.00	0.00
TH030058	9/11/18	437851.19	3366908.00	1696.98	0.31	0.00	0.00	0.31	0.09
TH030059	9/11/21	437851.19	3366908.00	3330.89	0.00	0.00	0.00	0.00	0.00
TH030060	9/13/ 3	437851.19	3366908.00	1555.62	0.00	0.00	0.00	0.00	0.00
TH030061	9/20/12	437851.19	3366908.00	1666.09	0.00	0.00	0.00	0.00	0.00
TH030062	9/20/18	437851.19	3366908.00	1446.98	0.08	0.41	0.40	0.89	1.82
TH030063	9/21/ 3	437851.19	3366908.00	1227.84	0.00	0.00	0.00	0.00	0.00
TH030064	10/ 2/21	437851.19	3366908.00	2031.62	0.00	0.00	0.00	0.00	0.00
TH030065	10/12/21	437851.19	3366908.00	1634.76	0.00	0.00	0.00	0.00	0.00
TH030066	10/16/ 9	437670.81	3366235.00	1276.88	0.00	0.00	0.00	0.00	0.00
TH030067	10/19/ 9	437670.81	3366235.00	1313.67	0.00	0.00	0.00	0.00	0.00
TH030068	10/23/ 6	437851.19	3366908.00	2026.41	0.00	0.00	0.00	0.00	0.00
TH030069	10/23/15	438145.91	3367540.00	1321.17	0.00	0.00	0.00	0.00	0.00
TH030070	10/28/21	437851.19	3366908.00	1336.95	0.00	0.00	0.00	0.00	0.00
TH030071	11/14/24	437712.91	3367790.00	1344.50	0.00	0.00	0.00	0.00	0.00
TH030072	11/19/21	437851.19	3366908.00	1605.06	0.00	0.00	0.00	0.00	0.00
TH030073	11/20/ 6	437851.19	3366908.00	2469.98	0.00	0.00	0.00	0.00	0.00
TH030074	11/20/ 9	437851.19	3366908.00	2872.38	0.00	0.00	0.00	0.00	0.00
TH030075	11/20/15	437851.19	3366908.00	1356.94	0.00	0.00	0.00	0.00	0.00
TH030076	11/23/21	437851.19	3366908.00	2870.99	0.00	0.00	0.00	0.00	0.00
TH030077	11/23/24	437851.19	3366908.00	2008.72	0.00	0.00	0.00	0.00	0.00
TH030078	11/27/12	437851.19	3366908.00	2084.40	0.00	0.00	0.00	0.00	0.00
TH030079	11/27/24	437851.19	3366908.00	2467.78	0.00	0.00	0.00	0.00	0.00
TH030080	12/ 3/ 6	437851.19	3366908.00	2180.07	0.00	0.00	0.00	0.00	0.00
TH030081	12/11/12	437851.19	3366908.00	2774.59	0.00	0.00	0.00	0.00	0.00
TH030082	12/11/15	437851.19	3366908.00	1792.68	0.00	0.00	0.00	0.00	0.00
TH030083	12/12/ 3	437851.19	3366908.00	1802.97	0.00	0.00	0.00	0.00	0.00
TH030084	12/14/ 6	437851.19	3366908.00	1746.73	0.10	0.12	0.11	0.33	1.36
TH030085	12/21/12	437670.81	3366235.00	1391.02	0.00	0.00	0.00	0.00	0.00
TH030086	12/28/ 3	437851.19	3366908.00	3409.91	0.00	0.00	0.00	0.00	0.00
TH030087	12/28/ 6	437851.19	3366908.00	2019.78	0.00	0.00	0.00	0.00	0.00

TABLE D-2

ISCEV2 Modeling Summary
3-Hour SO_2 AAQS Compliance Analysis
1984 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH030001	1/10/18	438145.91	3367540.00	1479.21	0.00	0.00	0.00	0.00	0.00
TH030002	1/21/ 6	438163.19	3366148.00	1281.56	0.00	0.00	0.00	0.00	0.00
TH030003	1/24/12	437851.19	3366908.00	2989.73	0.00	0.00	0.00	0.00	0.00
TH030004	1/29/12	438321.09	3366737.00	1260.27	0.00	0.00	0.00	0.00	0.00
TH030005	1/29/18	438321.09	3366737.00	1314.04	0.00	0.00	0.00	0.00	0.00
TH030006	2/ 4/24	438321.09	3366737.00	1435.86	0.00	0.00	0.00	0.00	0.00
TH030007	2/13/ 6	437851.19	3366908.00	1579.63	0.00	0.00	0.00	0.00	0.00
TH030008	2/13/15	437851.19	3366908.00	1277.01	0.00	0.00	0.00	0.00	0.00
TH030009	2/19/21	437851.19	3366908.00	2620.48	0.00	0.00	0.00	0.00	0.00
TH030010	2/23/15	438321.09	3366737.00	1385.21	0.00	0.00	0.00	0.00	0.00
TH030011	2/27/ 9	437851.19	3366908.00	2275.03	0.00	0.00	0.00	0.00	0.00
TH030012	2/29/ 9	438321.09	3366737.00	1317.73	0.00	0.00	0.00	0.00	0.00
TH030013	3/ 4/15	437851.19	3366908.00	1373.14	0.16	0.21	0.22	0.59	2.41
TH030014	3/ 5/ 6	437851.19	3366908.00	1762.15	0.00	0.00	0.00	0.00	0.00
TH030015	3/ 5/21	437851.19	3366908.00	1634.35	0.00	0.00	0.00	0.00	0.00
TH030016	3/ 5/24	437851.19	3366908.00	1304.89	0.00	0.00	0.00	0.00	0.00
TH030017	3/12/24	437851.19	3366908.00	2125.36	0.00	0.00	0.00	0.00	0.00
TH030018	3/13/ 3	437851.19	3366908.00	1675.17	0.00	0.00	0.00	0.00	0.00
TH030019	3/14/21	437178.41	3366322.00	1305.31	0.01	0.18	0.31	0.50	0.33
TH030020	3/20/ 6	437851.19	3366908.00	3376.35	0.00	0.00	0.00	0.00	0.00
TH030021	3/20/ 9	437851.19	3366908.00	1408.46	0.00	0.00	0.00	0.00	0.00
TH030022	3/20/12	437851.19	3366908.00	1631.50	0.00	0.00	0.00	0.00	0.00
TH030023	3/20/15	437851.19	3366908.00	1342.75	0.00	0.00	0.00	0.00	0.00
TH030024	3/24/24	437851.19	3366908.00	2411.78	0.00	0.00	0.00	0.00	0.00
TH030025	3/25/ 3	437851.19	3366908.00	1483.94	0.00	0.00	0.00	0.00	0.00
TH030026	3/26/21	437851.19	3366908.00	3174.78	0.00	0.00	0.00	0.00	0.00
TH030027	3/27/12	437851.19	3366908.00	1521.57	0.00	0.00	0.00	0.00	0.00
TH030028	3/27/15	437851.19	3366908.00	1280.59	0.00	0.00	0.00	0.00	0.00
TH030029	4/ 3/15	437851.19	3366908.00	1601.19	0.48	0.03	0.03	0.54	0.71
TH030030	4/ 3/24	437851.19	3366908.00	1684.74	0.00	0.00	0.00	0.00	0.00
TH030031	4/ 6/18	438321.09	3366737.00	1330.49	0.00	0.00	0.00	0.00	0.00
TH030032	4/ 9/ 3	437851.19	3366908.00	1361.87	0.00	0.00	0.00	0.00	0.00
TH030033	4/ 9/15	437851.19	3366908.00	1448.02	0.40	0.34	0.33	1.06	4.55
TH030034	4/ 9/21	437851.19	3366908.00	1598.66	0.00	0.00	0.00	0.00	0.00
TH030035	4/13/ 3	437851.19	3366908.00	3165.51	0.00	0.00	0.00	0.00	0.00
TH030036	4/13/ 6	437851.19	3366908.00	3338.73	0.00	0.00	0.00	0.00	0.00
TH030037	4/20/24	437851.19	3366908.00	1877.58	0.00	0.00	0.00	0.00	0.00
TH030038	4/21/21	437851.19	3366908.00	1807.04	0.00	0.00	0.00	0.00	0.00
TH030039	4/21/24	437851.19	3366908.00	1767.26	0.00	0.00	0.00	0.00	0.00
TH030040	4/22/21	437851.19	3366908.00	1937.51	0.00	0.00	0.00	0.00	0.00
TH030041	4/25/18	437851.19	3366908.00	2645.35	0.00	0.00	0.00	0.00	0.00
TH030042	4/25/21	437851.19	3366908.00	4315.82	0.00	0.00	0.00	0.00	0.00
TH030043	4/26/21	437851.19	3366908.00	2208.79	0.00	0.00	0.00	0.00	0.00
TH030044	4/26/24	437851.19	3366908.00	1708.55	0.00	0.00	0.00	0.00	0.00
TH030045	4/27/ 6	437851.19	3366908.00	1289.71	0.00	0.00	0.00	0.00	0.00
TH030046	4/28/ 3	437851.19	3366908.00	2240.95	0.00	0.00	0.00	0.00	0.00
TH030047	4/30/ 6	437851.19	3366908.00	2888.29	0.00	0.00	0.00	0.00	0.00
TH030048	5/ 3/ 3	437851.19	3366908.00	2541.20	0.00	0.00	0.00	0.00	0.00
TH030049	5/ 3/ 6	437851.19	3366908.00	3366.02	0.00	0.00	0.00	0.00	0.00
TH030050	5/ 4/ 9	438578.91	3367290.00	1269.21	0.00	0.00	0.00	0.00	0.00
TH030051	5/13/18	437851.19	3366908.00	1643.53	0.00	0.00	0.00	0.00	0.00
TH030052	5/19/21	437851.19	3366908.00	4773.49	0.00	0.00	0.00	0.00	0.00
TH030053	5/19/24	437851.19	3366908.00	1298.64	0.00	0.00	0.00	0.00	0.00
TH030054	5/21/ 6	437851.19	3366908.00	2208.83	0.00	0.00	0.00	0.00	0.00
TH030055	5/21/24	437851.19	3366908.00	4141.13	0.00	0.00	0.00	0.00	0.00

TABLE D-2 (Cont'd)

ISCEV2 Modeling Summary
3-Hour SO_2 AAQS Compliance Analysis
1984 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH030056	5/22/ 3	437851.19	3366908.00	1379.69	0.00	0.00	0.00	0.00	0.00
TH030057	5/22/ 6	437851.19	3366908.00	1295.19	0.00	0.00	0.00	0.00	0.00
TH030058	5/22/24	437851.19	3366908.00	1586.02	0.00	0.00	0.00	0.00	0.00
TH030059	5/27/18	437851.19	3366908.00	2131.99	0.00	0.00	0.00	0.00	0.00
TH030060	5/27/24	437851.19	3366908.00	1771.51	0.00	0.00	0.00	0.00	0.00
TH030061	5/28/ 3	437851.19	3366908.00	1617.79	0.00	0.00	0.00	0.00	0.00
TH030062	5/28/ 9	437851.19	3366908.00	2213.03	0.00	0.00	0.00	0.00	0.00
TH030063	5/28/18	437851.19	3366908.00	1260.20	0.00	0.00	0.00	0.00	0.00
TH030064	5/29/18	437851.19	3366908.00	1748.23	0.00	0.00	0.00	0.00	0.00
TH030065	5/29/21	437851.19	3366908.00	2989.78	0.00	0.00	0.00	0.00	0.00
TH030066	6/ 1/21	437851.19	3366908.00	1437.03	0.00	0.00	0.00	0.00	0.00
TH030067	6/14/ 9	437851.19	3366908.00	1296.19	0.00	0.00	0.00	0.00	0.00
TH030068	6/14/12	437851.19	3366908.00	1754.55	0.00	0.00	0.00	0.00	0.00
TH030069	6/18/21	437851.19	3366908.00	2966.36	0.00	0.00	0.00	0.00	0.00
TH030070	6/19/18	437851.19	3366908.00	1390.61	2.25	0.02	0.02	2.29	0.97
TH030071	6/27/21	437851.19	3366908.00	1707.62	0.00	0.00	0.00	0.00	0.00
TH030072	7/ 4/21	437851.19	3366908.00	1653.09	0.00	0.00	0.00	0.00	0.00
TH030073	7/ 5/21	437851.19	3366908.00	1230.28	0.00	0.00	0.00	0.00	0.00
TH030074	7/ 5/24	437851.19	3366908.00	2241.22	0.00	0.00	0.00	0.00	0.00
TH030075	7/ 6/ 3	437851.19	3366908.00	2526.03	0.00	0.00	0.00	0.00	0.00
TH030076	7/11/24	437851.19	3366908.00	2542.65	0.00	0.00	0.00	0.00	0.00
TH030077	7/14/21	437851.19	3366908.00	2694.19	0.00	0.00	0.00	0.00	0.00
TH030078	7/16/21	437851.19	3366908.00	1580.67	0.00	0.00	0.00	0.00	0.00
TH030079	7/17/15	437851.19	3366908.00	1333.44	0.00	0.00	0.00	0.00	0.00
TH030080	7/21/21	437381.41	3367079.00	1400.37	0.06	0.79	0.79	1.64	1.91
TH030081	7/22/21	437851.19	3366908.00	1325.76	0.00	0.00	0.00	0.00	0.00
TH030082	7/27/15	437851.19	3366908.00	1414.56	0.00	0.00	0.00	0.00	0.00
TH030083	7/29/12	437851.19	3366908.00	1723.89	0.00	0.00	0.00	0.01	0.00
TH030084	8/ 1/15	437851.19	3366908.00	2176.87	0.00	0.00	0.00	0.00	0.00
TH030085	8/ 2/15	437851.19	3366908.00	1438.20	0.00	0.00	0.00	0.00	0.00
TH030086	8/ 2/18	437851.19	3366908.00	2045.95	0.00	0.00	0.00	0.00	0.00
TH030087	8/ 2/21	437851.19	3366908.00	4868.76	0.00	0.00	0.00	0.00	0.00
TH030088	8/ 2/24	437851.19	3366908.00	6179.27	0.00	0.00	0.00	0.00	0.00
TH030089	8/ 3/18	437851.19	3366908.00	1496.31	0.00	0.00	0.00	0.00	0.00
TH030090	8/13/21	437851.19	3366908.00	1260.78	0.00	0.00	0.00	0.00	0.00
TH030091	9/ 3/21	437851.19	3366908.00	2054.59	0.00	0.00	0.00	0.00	0.00
TH030092	9/30/21	437851.19	3366908.00	2209.26	0.00	0.00	0.00	0.00	0.00
TH030093	10/16/18	437381.41	3367079.00	1308.32	0.08	0.02	0.02	0.12	0.31
TH030094	10/17/24	437851.19	3366908.00	3384.41	0.00	0.00	0.00	0.00	0.00
TH030095	10/20/24	437851.19	3366908.00	1735.79	0.00	0.00	0.00	0.00	0.00
TH030096	10/22/ 6	437851.19	3366908.00	1735.78	0.00	0.00	0.00	0.00	0.00
TH030097	10/22/15	437851.19	3366908.00	1710.92	0.00	0.00	0.00	0.00	0.00
TH030098	10/22/24	437851.19	3366908.00	2030.06	0.00	0.00	0.00	0.00	0.00
TH030099	10/28/ 6	437851.19	3366908.00	3948.53	0.00	0.00	0.00	0.00	0.00
TH030100	10/28/ 9	437851.19	3366908.00	1856.22	0.00	0.00	0.00	0.00	0.00
TH030101	10/28/15	437851.19	3366908.00	1719.57	0.00	0.00	0.00	0.00	0.00
TH030102	10/28/24	437381.41	3367079.00	1515.25	0.00	0.00	0.00	0.00	0.00
TH030103	11/18/21	437851.19	3366908.00	2568.38	0.00	0.00	0.00	0.00	0.00
TH030104	11/27/12	437851.19	3366908.00	1524.20	0.70	0.01	0.01	0.71	0.29
TH030105	12/ 8/ 9	438321.09	3366737.00	1682.81	0.00	0.00	0.00	0.00	0.00
TH030106	12/ 9/18	437851.19	3366908.00	1313.63	0.00	0.00	0.00	0.00	0.00
TH030107	12/12/18	437851.19	3366908.00	1256.53	0.00	0.00	0.00	0.00	0.00
TH030108	12/29/18	437381.41	3367079.00	1433.90	0.00	0.00	0.00	0.01	0.01
TH030109	12/31/24	437851.19	3366908.00	3383.94	0.00	0.00	0.00	0.00	0.00

TABLE D-3

ISCEV2 Modeling Summary
3-Hour SO_2 AAQS Compliance Analysis
1985 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH030001	1/ 1/12	437851.19	3366908.00	1789.71	0.00	0.00	0.00	0.00	0.00
TH030002	1/ 1/24	437851.19	3366908.00	2103.15	0.00	0.00	0.00	0.00	0.00
TH030003	1/ 2/18	437851.19	3366908.00	1579.36	0.02	0.01	0.01	0.04	0.11
TH030004	1/ 2/21	437851.19	3366908.00	2231.77	0.00	0.00	0.00	0.00	0.00
TH030005	1/ 3/ 6	437851.19	3366908.00	1282.28	0.00	0.00	0.00	0.00	0.00
TH030006	1/ 3/21	437851.19	3366908.00	2896.20	0.00	0.91	0.91	1.82	0.46
TH030007	1/ 3/24	437851.19	3366908.00	1640.01	0.00	0.00	0.00	0.00	0.00
TH030008	1/ 4/ 3	437851.19	3366908.00	2693.41	0.00	0.00	0.00	0.00	0.00
TH030009	1/15/ 3	438321.09	3366737.00	1679.86	0.00	0.00	0.00	0.00	0.00
TH030010	1/15/ 9	438321.09	3366737.00	1553.28	0.00	0.00	0.00	0.00	0.00
TH030011	1/17/ 3	437851.19	3366908.00	2253.48	0.00	0.00	0.00	0.00	0.00
TH030012	1/22/21	438321.09	3366737.00	1668.32	0.00	0.00	0.00	0.00	0.00
TH030013	1/25/18	438321.09	3366737.00	1265.50	0.00	0.00	0.00	0.00	0.00
TH030014	2/ 6/ 6	438145.91	3367540.00	1300.72	0.00	0.00	0.00	0.00	0.00
TH030015	2/11/ 9	437851.19	3366908.00	1413.90	0.00	0.00	0.00	0.00	0.00
TH030016	2/11/18	437851.19	3366908.00	1402.21	0.00	0.00	0.00	0.00	0.00
TH030017	2/12/ 6	438321.09	3366737.00	1269.80	0.00	0.00	0.00	0.00	0.00
TH030018	2/19/21	437851.19	3366908.00	1579.10	0.00	0.00	0.00	0.00	0.00
TH030019	2/23/24	437851.19	3366908.00	1623.70	0.00	0.00	0.00	0.00	0.00
TH030020	2/24/ 6	437851.19	3366908.00	2224.89	0.00	0.00	0.00	0.00	0.00
TH030021	2/24/ 9	437851.19	3366908.00	1680.69	0.00	0.00	0.00	0.00	0.00
TH030022	2/24/21	437851.19	3366908.00	1934.20	0.00	0.00	0.00	0.00	0.00
TH030023	3/ 4/24	437712.91	3367790.00	1274.59	0.00	0.00	0.00	0.00	0.00
TH030024	3/11/21	437851.19	3366908.00	3084.91	0.00	0.00	0.00	0.00	0.00
TH030025	3/20/12	437851.19	3366908.00	2645.09	0.01	0.00	0.00	0.01	0.00
TH030026	3/27/ 3	437851.19	3366908.00	3258.47	0.00	0.00	0.00	0.00	0.00
TH030027	3/27/21	437851.19	3366908.00	1923.89	0.00	0.00	0.00	0.00	0.00
TH030028	3/29/21	437851.19	3366908.00	1387.05	0.00	0.00	0.00	0.00	0.00
TH030029	4/ 4/21	437851.19	3366908.00	1897.60	0.00	0.00	0.00	0.00	0.00
TH030030	4/23/24	437851.19	3366908.00	1760.62	0.00	0.00	0.00	0.00	0.00
TH030031	5/ 2/ 3	437851.19	3366908.00	1588.23	0.00	0.00	0.00	0.00	0.00
TH030032	5/ 2/21	437851.19	3366908.00	3429.05	0.00	0.00	0.00	0.00	0.00
TH030033	5/ 6/21	437851.19	3366908.00	1818.27	0.00	0.00	0.00	0.00	0.00
TH030034	5/ 9/18	437851.19	3366908.00	1609.96	0.29	0.56	0.56	1.40	5.59
TH030035	5/10/24	437851.19	3366908.00	1981.40	0.00	0.00	0.00	0.00	0.00
TH030036	5/11/24	437851.19	3366908.00	2033.15	0.00	0.00	0.00	0.00	0.00
TH030037	5/17/ 3	438321.09	3366737.00	2335.60	0.00	0.00	0.00	0.00	0.00
TH030038	5/30/21	437851.19	3366908.00	1781.61	0.00	0.00	0.00	0.00	0.00
TH030039	6/ 1/ 9	438321.09	3366737.00	1246.57	0.00	0.00	0.00	0.00	0.00
TH030040	6/ 1/12	438321.09	3366737.00	1369.49	0.00	0.00	0.00	0.00	0.00
TH030041	6/ 4/24	437851.19	3366908.00	7176.71	0.00	0.00	0.00	0.00	0.00
TH030042	6/ 5/ 6	437851.19	3366908.00	3929.08	0.00	0.00	0.00	0.00	0.00
TH030043	6/ 5/24	437712.91	3367790.00	1358.11	0.00	0.00	0.00	0.00	0.00
TH030044	6/ 6/ 3	437851.19	3366908.00	1248.51	0.00	0.00	0.00	0.00	0.00
TH030045	6/15/24	437851.19	3366908.00	2201.48	0.00	0.00	0.00	0.00	0.00
TH030046	6/16/ 6	437851.19	3366908.00	1472.04	0.00	0.00	0.00	0.00	0.00
TH030047	7/ 3/18	437851.19	3366908.00	1509.99	0.00	0.00	0.00	0.00	0.00
TH030048	7/10/21	437851.19	3366908.00	4891.98	0.00	0.00	0.00	0.00	0.00
TH030049	7/22/18	437851.19	3366908.00	1285.13	0.00	0.00	0.00	0.00	0.00
TH030050	7/22/24	437851.19	3366908.00	2625.73	0.00	0.00	0.00	0.00	0.00
TH030051	7/27/21	437851.19	3366908.00	1521.67	0.00	0.00	0.00	0.00	0.00
TH030052	7/30/24	437851.19	3366908.00	2631.66	0.00	0.00	0.00	0.00	0.00
TH030053	8/ 4/12	437851.19	3366908.00	1725.11	0.00	0.00	0.00	0.00	0.00
TH030054	8/ 8/ 3	437851.19	3366908.00	2036.55	0.00	0.00	0.00	0.00	0.00
TH030055	8/ 8/21	437712.91	3367790.00	1470.65	0.00	0.00	0.00	0.00	0.00

TABLE D-3 (Cont'd)

ISCEV2 Modeling Summary
3-Hour SO_2 AAQS Compliance Analysis
1985 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH030056	8/ 8/24	438145.91	3367540.00	1434.86	0.00	0.00	0.00	0.00	0.00
TH030057	8/14/12	437851.19	3366908.00	1642.91	0.67	0.36	0.36	1.39	5.63
TH030058	8/16/ 3	437851.19	3366908.00	1730.89	0.00	0.00	0.00	0.00	0.00
TH030059	8/22/21	437851.19	3366908.00	1839.02	0.00	0.00	0.00	0.00	0.00
TH030060	8/24/21	437851.19	3366908.00	4434.30	0.00	0.00	0.00	0.00	0.00
TH030061	8/25/24	437851.19	3366908.00	2664.71	0.00	0.00	0.00	0.00	0.00
TH030062	8/26/ 9	437851.19	3366908.00	1978.33	0.00	0.00	0.00	0.00	0.00
TH030063	8/26/12	437851.19	3366908.00	1314.30	0.00	0.00	0.00	0.00	0.00
TH030064	8/29/ 9	437381.41	3367079.00	1390.87	2.90	0.17	0.17	3.25	7.91
TH030065	8/30/ 9	437851.19	3366908.00	1302.88	0.00	0.00	0.00	0.00	0.00
TH030066	8/30/15	437851.19	3366908.00	1647.02	0.00	0.00	0.00	0.00	0.00
TH030067	9/ 1/18	437851.19	3366908.00	1339.79	0.00	0.00	0.00	0.00	0.00
TH030068	9/ 4/21	437851.19	3366908.00	2060.00	0.00	0.00	0.00	0.00	0.00
TH030069	9/ 9/24	437851.19	3366908.00	1544.23	0.00	0.00	0.00	0.00	0.00
TH030070	9/10/ 6	438145.91	3367540.00	1300.28	0.00	0.00	0.00	0.00	0.00
TH030071	10/ 1/18	437381.41	3367079.00	1574.25	0.31	0.10	0.09	0.50	1.50
TH030072	10/ 1/21	437851.19	3366908.00	1767.99	0.00	0.07	0.13	0.20	0.15
TH030073	10/ 1/24	437851.19	3366908.00	2056.30	0.00	0.00	0.00	0.00	0.00
TH030074	10/ 3/21	437851.19	3366908.00	2639.46	0.00	0.00	0.00	0.00	0.00
TH030075	10/24/12	437851.19	3366908.00	1296.55	0.00	0.00	0.00	0.00	0.00
TH030076	10/24/15	437851.19	3366908.00	2758.20	0.00	0.00	0.00	0.00	0.00
TH030077	10/30/21	437851.19	3366908.00	1940.50	0.00	0.00	0.00	0.00	0.00
TH030078	10/30/24	437851.19	3366908.00	1873.07	0.00	0.00	0.00	0.00	0.00
TH030079	10/31/ 9	437851.19	3366908.00	1678.06	0.00	0.00	0.00	0.00	0.00
TH030080	10/31/21	437851.19	3366908.00	4701.73	0.00	0.00	0.00	0.00	0.00
TH030081	10/31/24	437851.19	3366908.00	3135.22	0.00	0.00	0.00	0.00	0.00
TH030082	11/ 3/15	437851.19	3366908.00	1661.53	0.00	0.00	0.00	0.00	0.00
TH030083	11/25/15	437851.19	3366908.00	1306.63	0.00	0.00	0.00	0.00	0.00
TH030084	11/29/24	437851.19	3366908.00	1703.30	0.00	0.00	0.00	0.00	0.00
TH030085	12/11/12	437851.19	3366908.00	2605.24	0.00	0.00	0.00	0.00	0.00
TH030086	12/11/15	437851.19	3366908.00	2052.54	0.00	0.00	0.00	0.00	0.00
TH030087	12/11/21	437851.19	3366908.00	1797.90	0.00	0.00	0.00	0.00	0.00
TH030088	12/31/18	437851.19	3366908.00	1304.35	0.00	0.00	0.00	0.00	0.00
TH030088	12/31/18	437851.19	3366908.00	1304.35	0.00	0.00	0.00	0.00	0.00

TABLE D-4

ISCEV2 Modeling Summary
3-Hour SO_2 AAQS Compliance Analysis
1986 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH030001	1/ 6/18	437851.19	3366908.00	1638.18	0.00	0.00	0.00	0.00	0.00
TH030002	2/ 3/18	437851.19	3366908.00	1732.85	0.00	0.00	0.00	0.00	0.00
TH030003	2/ 3/24	437851.19	3366908.00	4825.92	0.00	0.00	0.00	0.00	0.00
TH030004	2/ 4/21	437851.19	3366908.00	1999.74	0.00	0.00	0.00	0.00	0.00
TH030005	2/ 6/ 3	437851.19	3366908.00	2493.16	0.00	0.00	0.00	0.00	0.00
TH030006	2/ 6/ 6	437851.19	3366908.00	1928.36	0.00	0.00	0.00	0.00	0.00
TH030007	2/ 9/24	437851.19	3366908.00	1994.58	0.00	0.00	0.00	0.00	0.00
TH030008	2/10/21	437851.19	3366908.00	2165.62	0.03	0.73	0.74	1.50	2.43
TH030009	2/16/15	437851.19	3366908.00	1242.70	10.94	0.22	0.22	11.39	7.39
TH030010	2/17/18	437851.19	3366908.00	1646.63	0.00	0.00	0.00	0.00	0.00
TH030011	2/17/21	437851.19	3366908.00	1807.32	0.00	0.00	0.00	0.00	0.00
TH030012	3/ 2/ 3	438321.09	3366737.00	1638.52	0.00	0.00	0.00	0.00	0.00
TH030013	3/ 2/ 6	438321.09	3366737.00	1881.46	0.00	0.00	0.00	0.00	0.00
TH030014	3/10/ 6	437851.19	3366908.00	2144.61	0.00	0.00	0.00	0.00	0.00
TH030015	3/10/ 9	437851.19	3366908.00	1598.65	0.00	0.00	0.00	0.00	0.00
TH030016	3/11/24	437851.19	3366908.00	1733.53	0.00	0.00	0.00	0.00	0.00
TH030017	3/13/ 3	437851.19	3366908.00	1352.77	0.00	0.00	0.00	0.00	0.00
TH030018	3/13/ 6	437851.19	3366908.00	1622.06	0.00	0.00	0.00	0.00	0.00
TH030019	3/13/12	437851.19	3366908.00	2485.07	0.00	0.00	0.00	0.00	0.00
TH030020	3/18/21	437851.19	3366908.00	1507.35	0.00	0.00	0.00	0.00	0.00
TH030021	3/18/24	437851.19	3366908.00	3966.40	0.00	0.00	0.00	0.00	0.00
TH030022	3/19/ 3	437851.19	3366908.00	2951.63	0.00	0.00	0.00	0.00	0.00
TH030023	3/19/ 6	437851.19	3366908.00	1792.36	0.00	0.00	0.00	0.00	0.00
TH030024	3/30/24	437851.19	3366908.00	2558.01	0.00	0.00	0.00	0.00	0.00
TH030025	4/ 4/24	437851.19	3366908.00	2019.48	0.00	0.00	0.00	0.00	0.00
TH030026	4/14/21	437851.19	3366908.00	3491.27	0.00	0.00	0.00	0.00	0.00
TH030027	4/14/24	437851.19	3366908.00	2600.32	0.00	0.00	0.00	0.00	0.00
TH030028	4/20/12	437851.19	3366908.00	1363.41	0.00	0.00	0.00	0.00	0.00
TH030029	4/20/24	437851.19	3366908.00	2226.13	0.00	0.00	0.00	0.00	0.00
TH030030	4/27/ 3	439011.91	3367040.00	1313.30	0.00	0.00	0.00	0.00	0.00
TH030031	4/27/ 3	439694.91	3367147.00	1305.25	0.00	0.00	0.00	0.00	0.00
TH030032	4/28/ 3	438321.09	3366737.00	1446.80	0.00	0.00	0.00	0.00	0.00
TH030033	4/28/21	437851.19	3366908.00	2970.70	0.00	0.00	0.00	0.00	0.00
TH030034	4/29/ 6	438321.09	3366737.00	1487.01	0.00	0.00	0.00	0.00	0.00
TH030035	4/30/24	437851.19	3366908.00	1895.22	0.00	0.00	0.00	0.00	0.00
TH030036	5/ 5/21	437851.19	3366908.00	1384.17	0.00	0.00	0.00	0.00	0.00
TH030037	5/ 5/24	437851.19	3366908.00	2141.36	0.00	0.00	0.00	0.00	0.00
TH030038	5/ 6/ 3	437851.19	3366908.00	2525.38	0.00	0.00	0.00	0.00	0.00
TH030039	5/11/21	437851.19	3366908.00	6263.28	0.00	0.00	0.00	0.00	0.00
TH030040	5/18/18	437851.19	3366908.00	1361.18	0.10	0.01	0.01	0.12	0.29
TH030041	5/18/24	437851.19	3366908.00	1803.19	0.00	0.00	0.00	0.00	0.00
TH030042	5/19/ 3	437851.19	3366908.00	1428.38	0.00	0.00	0.00	0.00	0.00
TH030043	5/19/21	437851.19	3366908.00	1264.84	0.00	0.00	0.00	0.00	0.00
TH030044	5/23/21	437851.19	3366908.00	1949.71	0.00	0.00	0.00	0.00	0.00
TH030045	5/23/24	437851.19	3366908.00	1255.08	0.00	0.00	0.00	0.00	0.00
TH030046	5/25/24	437851.19	3366908.00	2600.84	0.00	0.00	0.00	0.00	0.00
TH030047	5/27/ 3	437851.19	3366908.00	2619.28	0.00	0.00	0.00	0.00	0.00
TH030048	5/27/ 9	437851.19	3366908.00	2700.12	0.00	0.00	0.00	0.00	0.00
TH030049	5/27/24	437851.19	3366908.00	1774.40	0.00	0.00	0.00	0.00	0.00
TH030050	5/28/ 3	437851.19	3366908.00	2086.07	0.00	0.00	0.00	0.00	0.00
TH030051	5/28/24	437851.19	3366908.00	1319.10	0.00	0.00	0.00	0.00	0.00
TH030052	6/ 1/ 3	437851.19	3366908.00	1594.22	0.00	0.00	0.00	0.00	0.00
TH030053	6/ 1/24	437851.19	3366908.00	2934.70	0.00	0.00	0.00	0.00	0.00
TH030054	6/ 3/ 3	437851.19	3366908.00	1596.65	0.00	0.00	0.00	0.00	0.00
TH030055	6/ 6/24	437851.19	3366908.00	2042.67	0.00	0.00	0.00	0.00	0.00

TABLE D-4 (Cont'd)

ISCEV2 Modeling Summary
3-Hour SO_2 AAQS Compliance Analysis
1986 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH030056	6/ 7/21	437851.19	3366908.00	1886.89	0.02	0.94	0.96	1.92	1.98
TH030057	6/13/24	437851.19	3366908.00	1523.58	0.00	0.00	0.00	0.00	0.00
TH030058	6/15/15	437851.19	3366908.00	1610.89	5.78	0.19	0.19	6.17	5.57
TH030059	6/15/24	437851.19	3366908.00	1351.09	0.00	0.00	0.00	0.00	0.00
TH030060	6/27/21	437851.19	3366908.00	2163.79	0.00	0.00	0.00	0.00	0.00
TH030061	6/27/24	437851.19	3366908.00	1851.39	0.00	0.00	0.00	0.00	0.00
TH030062	6/28/21	437851.19	3366908.00	2341.57	0.00	0.00	0.00	0.00	0.00
TH030063	6/30/21	437851.19	3366908.00	1629.18	0.00	0.00	0.00	0.00	0.00
TH030064	7/ 7/24	437851.19	3366908.00	5783.27	0.00	0.00	0.00	0.00	0.00
TH030065	7/ 8/21	437851.19	3366908.00	2419.25	0.00	0.00	0.00	0.00	0.00
TH030066	7/26/21	437851.19	3366908.00	1819.10	0.00	0.00	0.00	0.00	0.00
TH030067	7/31/18	437851.19	3366908.00	1353.76	0.00	0.00	0.00	0.00	0.00
TH030068	8/ 3/21	437851.19	3366908.00	1821.67	0.00	0.00	0.00	0.00	0.00
TH030069	8/ 4/24	437851.19	3366908.00	1592.24	0.00	0.00	0.00	0.00	0.00
TH030070	8/10/24	437851.19	3366908.00	1777.37	0.00	0.00	0.00	0.00	0.00
TH030071	8/11/ 3	437851.19	3366908.00	1775.01	0.00	0.00	0.00	0.00	0.00
TH030072	8/11/18	437851.19	3366908.00	1684.17	0.00	0.00	0.00	0.00	0.00
TH030073	8/13/12	437851.19	3366908.00	1599.58	0.00	0.00	0.00	0.00	0.00
TH030074	8/13/21	437851.19	3366908.00	3747.33	0.00	0.00	0.00	0.00	0.00
TH030075	8/20/24	437851.19	3366908.00	4333.99	0.00	0.00	0.00	0.00	0.00
TH030076	9/11/12	437851.19	3366908.00	1670.02	0.00	0.00	0.00	0.00	0.00
TH030077	9/12/18	438321.09	3366737.00	1371.98	0.00	0.00	0.00	0.00	0.00
TH030078	9/21/21	437851.19	3366908.00	3289.25	0.00	0.00	0.00	0.00	0.00
TH030079	9/23/18	437381.41	3367079.00	1293.69	0.01	0.00	0.00	0.01	0.03
TH030080	9/25/18	437381.41	3367079.00	1511.46	0.73	0.01	0.01	0.76	0.38
TH030081	9/26/18	437381.41	3367079.00	1276.54	12.26	0.23	0.23	12.72	7.74
TH030082	9/27/21	437851.19	3366908.00	1454.22	0.00	0.00	0.00	0.00	0.00
TH030083	10/ 1/24	437851.19	3366908.00	2067.47	0.00	0.00	0.00	0.00	0.00
TH030084	10/ 2/21	437851.19	3366908.00	2228.34	0.00	0.00	0.00	0.00	0.00
TH030085	10/ 5/ 6	438321.09	3366737.00	1873.87	0.00	0.00	0.00	0.00	0.00
TH030086	10/ 7/15	437381.41	3367079.00	1237.24	0.51	0.57	0.57	1.65	6.33
TH030087	10/13/21	437851.19	3366908.00	1601.10	0.00	0.00	0.00	0.00	0.00
TH030088	10/25/ 6	437851.19	3366908.00	2476.68	0.00	0.00	0.00	0.00	0.00
TH030089	10/25/ 9	437851.19	3366908.00	1239.90	0.00	0.00	0.00	0.00	0.00
TH030090	10/25/18	437851.19	3366908.00	1757.85	0.00	0.00	0.00	0.00	0.00
TH030091	10/25/21	437851.19	3366908.00	3177.40	0.00	0.00	0.00	0.00	0.00
TH030092	10/25/24	437712.91	3367790.00	1277.11	0.00	0.00	0.00	0.00	0.00
TH030093	10/26/ 3	437851.19	3366908.00	1436.67	0.00	0.00	0.00	0.00	0.00
TH030094	11/ 7/15	437851.19	3366908.00	1337.10	0.01	0.00	0.00	0.01	0.02
TH030095	11/ 8/18	437381.41	3367079.00	1436.42	0.09	0.01	0.01	0.11	0.26
TH030096	11/ 8/24	437851.19	3366908.00	1735.31	0.00	0.00	0.00	0.00	0.00
TH030097	11/11/18	437381.41	3367079.00	1551.16	3.57	0.05	0.05	3.66	1.72
TH030098	11/12/ 3	437851.19	3366908.00	2885.59	0.00	0.00	0.00	0.00	0.00
TH030099	11/24/12	437851.19	3366908.00	1738.88	0.00	0.00	0.00	0.00	0.00
TH030100	11/25/12	437851.19	3366908.00	2133.48	0.00	0.00	0.00	0.00	0.00
TH030101	11/26/ 3	437851.19	3366908.00	1711.73	0.00	0.00	0.00	0.00	0.00
TH030102	12/ 9/ 6	437851.19	3366908.00	2019.50	0.00	0.00	0.00	0.00	0.00
TH030103	12/ 9/15	437851.19	3366908.00	2417.42	0.00	0.00	0.00	0.00	0.00
TH030104	12/ 9/21	437851.19	3366908.00	5292.55	0.00	0.00	0.00	0.00	0.00

TABLE D-5

ISCEV2 Modeling Summary
3-Hour SO_2 AAQS Compliance Analysis
1987 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH030001	1/ 2/12	438321.09	3366737.00	1372.82	0.00	0.00	0.00	0.00	0.00
TH030002	1/12/ 6	439011.91	3367040.00	1367.64	0.00	0.00	0.00	0.00	0.00
TH030003	1/16/ 3	437851.19	3366908.00	2765.84	0.00	0.00	0.00	0.00	0.00
TH030004	1/18/24	437851.19	3366908.00	3365.57	0.00	0.00	0.00	0.00	0.00
TH030005	1/19/ 6	437851.19	3366908.00	1814.96	0.00	0.00	0.00	0.00	0.00
TH030006	1/25/12	437851.19	3366908.00	1681.66	0.00	0.00	0.00	0.00	0.00
TH030007	1/29/18	437851.19	3366908.00	3761.34	0.00	0.00	0.00	0.00	0.00
TH030008	2/ 2/ 9	437851.19	3366908.00	2172.39	0.00	0.00	0.00	0.00	0.00
TH030009	2/16/ 6	437851.19	3366908.00	1453.35	0.00	0.00	0.00	0.00	0.00
TH030010	2/22/21	437851.19	3366908.00	1683.70	0.00	0.00	0.00	0.00	0.00
TH030011	2/26/24	437670.81	3366235.00	1436.50	0.00	0.00	0.00	0.00	0.00
TH030012	2/28/15	437851.19	3366908.00	1287.06	0.00	0.00	0.00	0.00	0.00
TH030013	2/28/18	437851.19	3366908.00	1858.29	0.00	0.00	0.00	0.00	0.00
TH030014	3/ 1/ 3	437851.19	3366908.00	2479.47	0.00	0.00	0.00	0.00	0.00
TH030015	3/10/ 3	438321.09	3366737.00	1950.40	0.00	0.00	0.00	0.00	0.00
TH030016	3/10/ 6	438321.09	3366737.00	1246.79	0.00	0.00	0.00	0.00	0.00
TH030017	3/18/12	437851.19	3366908.00	1462.42	0.01	0.00	0.00	0.01	0.02
TH030018	3/18/21	437851.19	3366908.00	1506.53	0.00	0.00	0.00	0.00	0.00
TH030019	3/25/ 3	437851.19	3366908.00	2977.96	0.00	0.00	0.00	0.00	0.00
TH030020	3/25/ 6	437851.19	3366908.00	1612.53	0.00	0.00	0.00	0.00	0.00
TH030021	3/27/21	437851.19	3366908.00	1505.34	0.00	0.00	0.00	0.00	0.00
TH030022	3/29/15	437851.19	3366908.00	1724.30	0.00	0.00	0.00	0.00	0.00
TH030023	3/29/21	437851.19	3366908.00	1634.28	0.00	0.00	0.00	0.00	0.00
TH030024	3/30/24	437851.19	3366908.00	1641.78	0.00	0.00	0.00	0.00	0.00
TH030025	4/ 2/24	437851.19	3366908.00	1258.64	0.00	0.00	0.00	0.00	0.00
TH030026	4/ 6/ 3	438321.09	3366737.00	1527.58	0.00	0.00	0.00	0.00	0.00
TH030027	4/14/ 3	437851.19	3366908.00	1635.80	0.00	0.00	0.00	0.00	0.00
TH030028	4/17/ 6	438321.09	3366737.00	3127.03	0.00	0.00	0.00	0.00	0.00
TH030029	5/12/24	437851.19	3366908.00	1503.56	0.00	0.00	0.00	0.00	0.00
TH030030	5/19/18	437851.19	3366908.00	1517.08	0.00	0.00	0.00	0.00	0.00
TH030031	5/19/21	437851.19	3366908.00	1826.16	0.00	0.00	0.00	0.00	0.00
TH030032	6/ 1/24	437851.19	3366908.00	2765.41	0.00	0.00	0.00	0.00	0.00
TH030033	6/ 2/24	437851.19	3366908.00	3211.39	0.00	0.00	0.00	0.00	0.00
TH030034	6/ 3/24	437712.91	3367790.00	1356.23	0.00	0.00	0.00	0.00	0.00
TH030035	6/ 9/24	437851.19	3366908.00	1977.33	0.00	0.00	0.00	0.00	0.00
TH030036	6/12/24	437851.19	3366908.00	2133.83	0.00	0.00	0.00	0.00	0.00
TH030037	6/19/21	437851.19	3366908.00	1366.27	0.00	0.00	0.00	0.00	0.00
TH030038	6/19/24	437851.19	3366908.00	3780.25	0.00	0.00	0.00	0.00	0.00
TH030039	6/30/21	437851.19	3366908.00	1502.48	0.00	0.00	0.00	0.00	0.00
TH030040	7/ 2/24	437851.19	3366908.00	3055.55	0.00	0.00	0.00	0.00	0.00
TH030041	7/ 4/21	437851.19	3366908.00	1748.09	0.00	0.00	0.00	0.00	0.00
TH030042	8/ 3/24	438145.91	3367540.00	1655.77	0.00	0.00	0.00	0.00	0.00
TH030043	8/ 4/ 6	438145.91	3367540.00	1243.49	0.00	0.00	0.00	0.00	0.00
TH030044	8/ 6/21	437851.19	3366908.00	1861.44	0.00	0.00	0.00	0.00	0.00
TH030045	8/19/24	437851.19	3366908.00	1627.93	0.00	0.00	0.00	0.00	0.00
TH030046	8/20/18	437851.19	3366908.00	1484.21	0.39	0.00	0.00	0.39	0.09
TH030047	8/24/ 3	438578.91	3367290.00	1242.56	0.00	0.00	0.00	0.00	0.00
TH030048	8/29/21	437851.19	3366908.00	5150.39	0.00	0.00	0.00	0.00	0.00
TH030049	8/29/24	437851.19	3366908.00	1358.93	0.00	0.00	0.00	0.00	0.00
TH030050	9/ 8/ 9	438321.09	3366737.00	1339.81	0.00	0.00	0.00	0.00	0.00
TH030051	9/ 9/21	437851.19	3366908.00	1340.77	0.00	0.00	0.00	0.00	0.00
TH030052	9/10/24	437851.19	3366908.00	2457.72	0.00	0.00	0.00	0.00	0.00
TH030053	9/17/21	437851.19	3366908.00	2315.72	0.00	0.00	0.00	0.00	0.00
TH030054	10/ 7/ 6	438321.09	3366737.00	1727.22	0.00	0.00	0.00	0.00	0.00
TH030055	11/11/ 6	438321.09	3366737.00	1291.71	0.00	0.00	0.00	0.00	0.00

TABLE D-5 (Cont'd)

ISCEV2 Modeling Summary
3-Hour SO_2 AAQS Compliance Analysis
1987 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH030056	11/17/ 6	437851.19	3366908.00	1414.64	0.00	0.00	0.00	0.00	0.00
TH030057	11/17/ 9	437851.19	3366908.00	3284.80	0.00	0.00	0.00	0.00	0.00
TH030058	11/17/12	437851.19	3366908.00	3226.17	0.00	0.00	0.00	0.00	0.00
TH030059	11/30/ 6	438321.09	3366737.00	2104.82	0.00	0.00	0.00	0.00	0.00
TH030060	11/30/24	438578.91	3367290.00	1308.40	0.00	0.00	0.00	0.00	0.00
TH030061	12/14/15	437851.19	3366908.00	1675.26	0.00	0.00	0.00	0.00	0.00
TH030062	12/14/24	437851.19	3366908.00	2317.62	0.00	0.00	0.00	0.00	0.00
TH030063	12/15/ 3	437851.19	3366908.00	1623.42	0.00	0.00	0.00	0.00	0.00
TH030064	12/15/ 9	437851.19	3366908.00	1508.98	0.00	0.00	0.00	0.00	0.00
TH030065	12/15/12	437851.19	3366908.00	1327.13	0.00	0.00	0.00	0.00	0.00
TH030066	12/20/ 9	437851.19	3366908.00	3296.12	0.00	0.00	0.00	0.00	0.00
TH030067	12/24/21	437851.19	3366908.00	1711.39	0.00	0.00	0.00	0.00	0.00
TH030068	12/24/24	437851.19	3366908.00	2750.36	0.00	0.00	0.00	0.00	0.00
TH030069	12/25/24	437851.19	3366908.00	2543.56	0.00	0.00	0.00	0.00	0.00
TH030070	12/27/24	437712.91	3367790.00	1731.01	0.00	0.00	0.00	0.00	0.00

TABLE D-6

ISCEV2 Modeling Summary
24-Hour SO_2 AAQS Compliance Analysis
1983 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH240001	1/ 1/24	437670.81	3366235.00	258.60	0.00	0.00	0.00	0.00	0.00
TH240002	1/ 6/24	438655.59	3366061.00	278.58	0.00	0.00	0.00	0.00	0.00
TH240003	1/ 9/24	437178.41	3366322.00	322.17	0.00	0.00	0.00	0.00	0.00
TH240004	1/11/24	438655.59	3366061.00	233.90	0.00	0.00	0.00	0.00	0.00
TH240005	1/16/24	438321.09	3366737.00	242.15	0.00	0.00	0.00	0.00	0.00
TH240006	1/17/24	438321.09	3366737.00	278.18	0.00	0.00	0.00	0.00	0.00
TH240007	1/17/24	439011.91	3367040.00	259.35	0.00	0.00	0.00	0.00	0.00
TH240008	1/30/24	437851.19	3366908.00	691.85	0.00	0.00	0.00	0.00	0.00
TH240009	1/30/24	438578.91	3367290.00	250.11	0.00	0.00	0.00	0.00	0.00
TH240010	2/ 1/24	437851.19	3366908.00	551.55	0.00	0.00	0.00	0.00	0.00
TH240011	2/ 2/24	437851.19	3366908.00	273.36	0.00	0.00	0.00	0.00	0.00
TH240012	2/ 4/24	438655.59	3366061.00	246.46	0.00	0.00	0.00	0.00	0.00
TH240013	2/ 7/24	438655.59	3366061.00	237.32	0.00	0.00	0.00	0.00	0.00
TH240014	2/10/24	437851.19	3366908.00	373.69	0.15	0.00	0.00	0.15	0.08
TH240015	2/11/24	438321.09	3366737.00	264.20	0.00	0.00	0.00	0.00	0.00
TH240016	2/15/24	437381.41	3367079.00	255.11	1.09	0.05	0.05	1.19	1.50
TH240017	2/16/24	437381.41	3367079.00	311.73	0.39	0.07	0.07	0.54	3.11
TH240018	2/21/24	437178.41	3366322.00	333.29	0.00	0.00	0.00	0.00	0.00
TH240019	2/22/24	438396.09	3361710.00	235.34	0.00	0.00	0.00	0.00	0.00
TH240020	2/22/24	437851.19	3366908.00	480.09	0.00	0.00	0.00	0.00	0.02
TH240021	2/26/24	437178.41	3366322.00	233.43	0.00	0.00	0.00	0.00	0.00
TH240022	3/ 2/24	438321.09	3366737.00	238.77	0.00	0.00	0.00	0.00	0.00
TH240023	3/ 5/24	438396.09	3361710.00	304.51	0.00	0.00	0.00	0.00	0.00
TH240024	3/ 5/24	437779.81	3362326.00	235.94	0.00	0.00	0.00	0.00	0.00
TH240025	3/ 5/24	437851.19	3366908.00	640.27	0.00	0.00	0.00	0.00	0.00
TH240026	3/ 6/24	437851.19	3366908.00	968.18	0.02	0.03	0.03	0.07	0.52
TH240027	3/ 7/24	437851.19	3366908.00	247.05	0.04	0.03	0.04	0.11	0.76
TH240028	3/11/24	438321.09	3366737.00	354.11	0.00	0.00	0.00	0.00	0.00
TH240029	3/14/24	438578.91	3367290.00	311.32	0.00	0.00	0.00	0.00	0.00
TH240030	3/17/24	437851.19	3366908.00	528.25	0.03	0.02	0.03	0.08	0.63
TH240031	3/18/24	439011.91	3367040.00	250.71	0.00	0.00	0.00	0.00	0.00
TH240032	3/19/24	438321.09	3366737.00	391.31	0.00	0.00	0.00	0.00	0.00
TH240033	3/19/24	439444.91	3366790.00	345.52	0.00	0.00	0.00	0.00	0.00
TH240034	3/31/24	437851.19	3366908.00	258.90	0.00	0.00	0.00	0.00	0.00
TH240035	4/ 1/24	437851.19	3366908.00	515.54	0.90	0.03	0.03	0.95	1.68
TH240036	4/ 2/24	437851.19	3366908.00	282.96	0.00	0.00	0.00	0.00	0.00
TH240037	4/ 4/24	438321.09	3366737.00	362.66	0.80	0.04	0.04	0.88	1.55
TH240038	4/ 4/24	437381.41	3367079.00	240.08	0.92	0.03	0.03	0.97	1.35
TH240039	4/ 5/24	437851.19	3366908.00	391.21	1.69	0.01	0.01	1.70	0.80
TH240040	4/ 5/24	437381.41	3367079.00	360.20	1.58	0.01	0.01	1.59	0.68
TH240041	4/ 7/24	437851.19	3366908.00	359.87	0.36	0.00	0.00	0.36	0.28
TH240042	4/ 9/24	437851.19	3366908.00	749.89	0.00	0.00	0.00	0.00	0.00
TH240043	4/13/24	437381.41	3367079.00	478.72	1.44	0.03	0.03	1.51	1.60
TH240044	4/13/24	436911.50	3367250.00	328.88	1.37	0.03	0.03	1.43	1.53
TH240045	4/14/24	437851.19	3366908.00	942.39	0.00	0.00	0.00	0.00	0.00
TH240046	4/15/24	438321.09	3366737.00	246.66	0.00	0.00	0.00	0.00	0.00
TH240047	4/15/24	437851.19	3366908.00	594.90	0.00	0.00	0.00	0.00	0.00
TH240048	4/16/24	438655.59	3366061.00	286.96	0.00	0.00	0.00	0.00	0.00
TH240049	4/22/24	437851.19	3366908.00	363.01	0.14	0.02	0.02	0.18	0.95
TH240050	4/23/24	437851.19	3366908.00	617.71	0.00	0.00	0.00	0.00	0.00
TH240051	4/25/24	438321.09	3366737.00	337.41	0.00	0.00	0.00	0.00	0.00
TH240052	4/29/24	437851.19	3366908.00	509.75	1.51	0.02	0.02	1.55	1.46
TH240053	4/29/24	437381.41	3367079.00	355.04	1.47	0.02	0.02	1.51	1.34
TH240054	5/ 1/24	437851.19	3366908.00	1018.32	2.40	0.06	0.06	2.52	2.79
TH240055	5/ 1/24	437381.41	3367079.00	286.00	2.27	0.06	0.05	2.38	2.62

TABLE D-6 (Cont'd)

ISCEV2 Modeling Summary
24-Hour SO_2 AAQS Compliance Analysis
1983 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH240056	5/ 2/24	437851.19	3366908.00	435.30	1.22	0.01	0.02	1.25	0.94
TH240057	5/13/24	437851.19	3366908.00	686.55	2.09	0.01	0.01	2.11	0.91
TH240058	5/13/24	437381.41	3367079.00	255.10	1.90	0.01	0.01	1.91	0.77
TH240059	5/14/24	437851.19	3366908.00	547.27	1.03	0.01	0.01	1.06	0.94
TH240060	5/15/24	437851.19	3366908.00	582.24	0.00	0.00	0.00	0.00	0.00
TH240061	5/18/24	437381.41	3367079.00	257.83	0.46	0.05	0.05	0.56	1.96
TH240062	5/19/24	437851.19	3366908.00	457.73	0.02	0.01	0.01	0.04	0.28
TH240063	5/20/24	437851.19	3366908.00	377.50	0.28	0.02	0.02	0.32	0.77
TH240064	5/21/24	437851.19	3366908.00	958.72	0.08	0.01	0.01	0.09	0.37
TH240065	5/22/24	438578.91	3367290.00	240.12	0.01	0.00	0.00	0.01	0.04
TH240066	5/22/24	438145.91	3367540.00	255.39	0.01	0.00	0.00	0.01	0.04
TH240067	5/23/24	438578.91	3367290.00	232.61	0.00	0.00	0.00	0.00	0.00
TH240068	5/24/24	438321.09	3366737.00	316.02	0.00	0.00	0.00	0.00	0.00
TH240069	5/25/24	438321.09	3366737.00	235.26	0.86	0.00	0.00	0.86	0.43
TH240070	5/28/24	438321.09	3366737.00	249.76	0.13	0.03	0.05	0.20	0.51
TH240071	5/29/24	437712.91	3367790.00	289.43	0.00	0.00	0.00	0.00	0.00
TH240072	5/30/24	437851.19	3366908.00	394.77	0.00	0.00	0.00	0.00	0.00
TH240073	5/30/24	438145.91	3367540.00	242.94	0.00	0.00	0.00	0.00	0.00
TH240074	5/30/24	437712.91	3367790.00	386.31	0.00	0.00	0.00	0.00	0.00
TH240075	6/ 2/24	437178.41	3366322.00	326.63	0.01	0.00	0.00	0.01	0.07
TH240076	6/ 3/24	437381.41	3367079.00	237.60	3.59	0.02	0.02	3.64	2.33
TH240077	6/ 5/24	437851.19	3366908.00	532.66	0.00	0.00	0.00	0.00	0.00
TH240078	6/ 7/24	437851.19	3366908.00	640.06	0.00	0.01	0.02	0.03	0.14
TH240079	6/ 9/24	438163.19	3366148.00	244.86	0.00	0.00	0.00	0.00	0.00
TH240080	6/ 9/24	437178.41	3366322.00	240.84	0.00	0.00	0.00	0.00	0.00
TH240081	6/12/24	437178.41	3366322.00	609.28	0.00	0.00	0.00	0.00	0.00
TH240082	6/21/24	437381.41	3367079.00	274.56	0.01	0.06	0.06	0.12	0.12
TH240083	6/27/24	437851.19	3366908.00	797.36	1.21	0.01	0.01	1.23	0.76
TH240084	7/ 2/24	437851.19	3366908.00	387.63	0.04	0.00	0.00	0.04	0.01
TH240085	7/ 3/24	437851.19	3366908.00	753.57	0.09	0.00	0.00	0.09	0.02
TH240086	7/10/24	437851.19	3366908.00	485.72	0.03	0.02	0.02	0.06	0.49
TH240087	7/12/24	437851.19	3366908.00	372.45	1.77	0.01	0.01	1.79	1.16
TH240088	7/16/24	438321.09	3366737.00	301.01	0.00	0.00	0.00	0.00	0.00
TH240089	7/17/24	438321.09	3366737.00	281.05	0.00	0.00	0.00	0.00	0.00
TH240090	7/21/24	438321.09	3366737.00	305.42	0.88	0.00	0.00	0.89	0.39
TH240091	7/22/24	439681.59	3367838.00	245.48	0.00	0.00	0.00	0.00	0.00
TH240092	7/25/24	438578.91	3367290.00	267.97	0.00	0.00	0.00	0.00	0.00
TH240093	7/31/24	437851.19	3366908.00	339.38	1.40	0.07	0.07	1.54	1.74
TH240094	8/ 1/24	437381.41	3367079.00	435.36	3.71	0.14	0.14	3.99	5.31
TH240095	8/ 1/24	436911.50	3367250.00	307.41	3.59	0.12	0.12	3.84	5.05
TH240096	8/ 5/24	437381.41	3367079.00	276.62	0.14	0.02	0.02	0.19	0.72
TH240097	8/ 6/24	437851.19	3366908.00	274.35	0.28	0.00	0.00	0.29	0.24
TH240098	8/10/24	438321.09	3366737.00	270.62	0.00	0.00	0.00	0.00	0.00
TH240099	8/12/24	438578.91	3367290.00	312.47	0.00	0.00	0.00	0.00	0.00
TH240100	8/19/24	437851.19	3366908.00	414.13	0.00	0.00	0.00	0.00	0.00
TH240101	8/20/24	438321.09	3366737.00	235.81	0.00	0.00	0.00	0.00	0.00
TH240102	8/21/24	438321.09	3366737.00	523.73	0.00	0.00	0.00	0.00	0.00
TH240103	8/22/24	437851.19	3366908.00	414.66	1.23	0.01	0.01	1.25	0.79
TH240104	8/23/24	437851.19	3366908.00	391.72	0.26	0.01	0.01	0.29	0.60
TH240105	8/26/24	437381.41	3367079.00	353.54	1.10	0.06	0.05	1.21	1.84
TH240106	8/26/24	436911.50	3367250.00	261.85	1.08	0.05	0.05	1.18	1.76
TH240107	8/28/24	438321.09	3366737.00	278.63	0.00	0.00	0.00	0.00	0.00
TH240108	8/31/24	437381.41	3367079.00	238.00	2.36	0.01	0.01	2.38	1.03
TH240109	9/ 3/24	438162.81	3368433.00	239.61	0.00	0.00	0.00	0.00	0.00
TH240110	9/ 4/24	437851.19	3366908.00	1376.20	0.01	0.01	0.01	0.03	0.21
TH240111	9/ 4/24	437279.91	3368040.00	281.10	0.11	0.01	0.01	0.13	0.42
TH240112	9/ 7/24	438321.09	3366737.00	260.29	0.00	0.00	0.00	0.00	0.00
TH240113	9/ 8/24	438321.09	3366737.00	238.28	0.00	0.00	0.00	0.00	0.00
TH240114	9/ 9/24	437851.19	3366908.00	360.78	1.42	0.05	0.05	1.53	1.64
TH240115	9/ 9/24	437381.41	3367079.00	244.15	1.41	0.05	0.05	1.50	1.57
TH240116	9/10/24	438321.09	3366737.00	233.55	0.01	0.00	0.00	0.01	0.07
TH240117	9/11/24	437851.19	3366908.00	876.79	0.10	0.00	0.00	0.10	0.03
TH240118	9/13/24	437851.19	3366908.00	317.65	0.00	0.00	0.00	0.00	0.00
TH240119	9/13/24	438145.91	3367540.00	470.44	0.00	0.00	0.00	0.00	0.00
TH240120	9/13/24	438162.81	3368433.00	279.46	0.00	0.00	0.00	0.00	0.00
TH240121	9/15/24	437670.81	3366235.00	234.64	0.04	0.00	0.00	0.04	0.01

TABLE D-6 (Cont'd)

ISCEV2 Modeling Summary
24-Hour SO_2 AAQS Compliance Analysis
1983 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH240122	9/17/24	438321.09	3366737.00	255.15	0.57	0.01	0.01	0.58	0.55
TH240123	9/20/24	437851.19	3366908.00	565.74	0.26	0.02	0.02	0.30	0.43
TH240124	10/ 2/24	437851.19	3366908.00	373.12	1.16	0.02	0.02	1.19	1.04
TH240125	10/ 5/24	438321.09	3366737.00	305.32	0.00	0.00	0.00	0.00	0.00
TH240126	10/11/24	437670.81	3366235.00	263.47	0.00	0.00	0.00	0.00	0.00
TH240127	10/12/24	437851.19	3366908.00	464.11	0.00	0.00	0.00	0.00	0.00
TH240128	10/14/24	437610.00	3365540.00	398.52	0.00	0.00	0.00	0.00	0.00
TH240129	10/15/24	437110.00	3365540.00	328.49	0.00	0.00	0.00	0.00	0.00
TH240130	10/15/24	437670.81	3366235.00	414.63	0.00	0.00	0.00	0.00	0.00
TH240131	10/16/24	437670.81	3366235.00	555.21	0.00	0.00	0.00	0.00	0.00
TH240132	10/19/24	437670.81	3366235.00	428.07	0.00	0.00	0.00	0.00	0.00
TH240133	10/21/24	437110.00	3365540.00	303.29	0.00	0.00	0.00	0.00	0.00
TH240134	10/21/24	437670.81	3366235.00	350.08	0.00	0.00	0.00	0.00	0.00
TH240135	10/22/24	437670.81	3366235.00	241.67	0.00	0.00	0.00	0.00	0.00
TH240136	10/23/24	437851.19	3366908.00	288.88	0.00	0.00	0.00	0.00	0.00
TH240137	10/23/24	438145.91	3367540.00	280.04	0.00	0.00	0.00	0.00	0.00
TH240138	10/25/24	438163.19	3366148.00	277.36	0.00	0.00	0.00	0.00	0.00
TH240139	10/26/24	438790.91	3366566.00	237.34	0.00	0.00	0.00	0.00	0.00
TH240140	10/28/24	437851.19	3366908.00	267.56	1.10	0.04	0.05	1.19	1.30
TH240141	10/30/24	437670.81	3366235.00	315.90	0.08	0.00	0.00	0.08	0.06
TH240142	11/ 2/24	437670.81	3366235.00	266.85	0.00	0.00	0.00	0.00	0.00
TH240143	11/ 8/24	437670.81	3366235.00	329.79	0.00	0.00	0.00	0.00	0.00
TH240144	11/11/24	438321.09	3366737.00	334.87	0.00	0.00	0.00	0.00	0.00
TH240145	11/14/24	437712.91	3367790.00	338.80	0.03	0.00	0.00	0.03	0.00
TH240146	11/19/24	437851.19	3366908.00	315.89	0.02	0.03	0.03	0.08	0.56
TH240147	11/20/24	437851.19	3366908.00	1146.97	0.00	0.00	0.00	0.00	0.00
TH240148	11/23/24	437851.19	3366908.00	1092.65	0.00	0.00	0.00	0.00	0.00
TH240149	11/27/24	437851.19	3366908.00	1013.38	0.00	0.00	0.00	0.00	0.02
TH240150	11/27/24	437381.41	3367079.00	234.55	0.00	0.00	0.00	0.00	0.02
TH240151	11/29/24	438321.09	3366737.00	276.35	0.00	0.00	0.00	0.00	0.00
TH240152	12/ 3/24	437851.19	3366908.00	358.37	0.00	0.00	0.00	0.00	0.00
TH240153	12/ 3/24	438145.91	3367540.00	265.85	0.00	0.00	0.00	0.00	0.00
TH240154	12/ 8/24	438321.09	3366737.00	510.69	0.00	0.00	0.00	0.00	0.00
TH240155	12/11/24	437851.19	3366908.00	874.71	0.00	0.00	0.00	0.00	0.00
TH240156	12/12/24	437851.19	3366908.00	233.41	0.00	0.00	0.00	0.00	0.00
TH240157	12/14/24	437851.19	3366908.00	256.92	0.01	0.00	0.00	0.02	0.17
TH240158	12/17/24	437670.81	3366235.00	327.79	0.00	0.00	0.00	0.00	0.00
TH240159	12/19/24	437670.81	3366235.00	504.71	0.00	0.00	0.00	0.00	0.00
TH240160	12/20/24	437110.00	3365540.00	235.99	0.00	0.00	0.00	0.00	0.00
TH240161	12/20/24	437670.81	3366235.00	358.36	0.00	0.00	0.00	0.00	0.00
TH240162	12/21/24	437670.81	3366235.00	266.36	0.00	0.00	0.00	0.00	0.00
TH240163	12/25/24	438655.59	3366061.00	293.59	0.00	0.00	0.00	0.00	0.00
TH240164	12/26/24	438163.19	3366148.00	235.63	0.00	0.00	0.00	0.00	0.00
TH240165	12/28/24	437851.19	3366908.00	842.24	0.00	0.00	0.00	0.00	0.00
TH240166	12/28/24	438145.91	3367540.00	286.53	0.00	0.00	0.00	0.00	0.00
TH240167	12/30/24	437610.00	3365540.00	272.21	0.00	0.00	0.00	0.00	0.00
TH240168	12/30/24	437670.81	3366235.00	354.03	0.00	0.00	0.00	0.00	0.00

TABLE D-7

ISCEV2 Modeling Summary
24-Hour SO_2 AAQS Compliance Analysis
1984 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Cedar Bay Cogen. Project Total	CFB	LSD1	LSD2	Total	SK Package Boilers
TH240001	1/ 6/24	444429.09	3366566.00	233.04	0.00	0.00	0.00	0.00	0.00
TH240002	1/ 6/24	444898.91	3366737.00	235.71	0.00	0.00	0.00	0.00	0.00
TH240003	1/ 6/24	444072.00	3365974.00	243.10	0.00	0.00	0.00	0.00	0.00
TH240004	1/ 6/24	444564.41	3366061.00	233.24	0.00	0.00	0.00	0.00	0.00
TH240005	1/ 6/24	444110.00	3365540.00	259.38	0.00	0.00	0.00	0.00	0.00
TH240006	1/ 6/24	443579.59	3365193.00	253.55	0.00	0.00	0.00	0.00	0.00
TH240007	1/ 6/24	443489.41	3364856.00	274.61	0.00	0.00	0.00	0.00	0.00
TH240008	1/ 6/24	443125.50	3364665.00	239.79	0.00	0.00	0.00	0.00	0.00
TH240009	1/ 6/24	443342.09	3364540.00	283.68	0.00	0.00	0.00	0.00	0.00
TH240010	1/ 6/24	442950.59	3364415.00	240.02	0.00	0.00	0.00	0.00	0.00
TH240011	1/ 6/24	443142.09	3364255.00	288.62	0.00	0.00	0.00	0.00	0.00
TH240012	1/ 6/24	442895.59	3364008.00	278.79	0.00	0.00	0.00	0.00	0.00
TH240013	1/ 6/24	442610.00	3363808.00	249.21	0.00	0.00	0.00	0.00	0.00
TH240014	1/ 6/24	442860.00	3363375.00	268.83	0.00	0.00	0.00	0.00	0.00
TH240015	1/ 6/24	442465.09	3363191.00	303.77	0.00	0.00	0.00	0.00	0.00
TH240016	1/ 6/24	442130.91	3362586.00	319.63	0.00	0.00	0.00	0.00	0.00
TH240017	1/ 6/24	442217.81	3362093.00	235.40	0.00	0.00	0.00	0.00	0.00
TH240018	1/ 6/24	441610.00	3362040.00	272.30	0.00	0.00	0.00	0.00	0.00
TH240019	1/ 6/24	441610.00	3361540.00	310.93	0.00	0.00	0.00	0.00	0.00
TH240020	1/ 6/24	438545.81	3368111.00	244.27	0.00	0.00	0.00	0.00	0.00
TH240021	1/ 6/24	439038.81	3368604.00	342.01	0.00	0.00	0.00	0.00	0.00
TH240022	1/ 8/24	437670.81	3366235.00	299.59	0.06	0.00	0.00	0.06	0.09
TH240023	1/ 9/24	437110.00	3365540.00	253.76	0.00	0.00	0.00	0.00	0.00
TH240024	1/10/24	442037.50	3364366.00	236.11	0.00	0.00	0.00	0.00	0.00
TH240025	1/10/24	441870.50	3364063.00	235.83	0.00	0.00	0.00	0.00	0.00
TH240026	1/10/24	441913.91	3363817.00	239.39	0.00	0.00	0.00	0.00	0.00
TH240027	1/10/24	441610.00	3364040.00	232.98	0.00	0.00	0.00	0.00	0.00
TH240028	1/10/24	441610.00	3363790.00	242.44	0.00	0.00	0.00	0.00	0.00
TH240029	1/10/24	441610.00	3363540.00	250.89	0.00	0.00	0.00	0.00	0.00
TH240030	1/10/24	441610.00	3363040.00	257.38	0.00	0.00	0.00	0.00	0.00
TH240031	1/10/24	441175.91	3363078.00	250.10	0.00	0.00	0.00	0.00	0.00
TH240032	1/10/24	441089.09	3362586.00	270.11	0.00	0.00	0.00	0.00	0.00
TH240033	1/10/24	441002.19	3362093.00	285.09	0.00	0.00	0.00	0.00	0.00
TH240034	1/10/24	440915.41	3361601.00	297.71	0.00	0.00	0.00	0.00	0.00
TH240035	1/10/24	440828.59	3361108.00	287.29	0.00	0.00	0.00	0.00	0.00
TH240036	1/10/24	438145.91	3367540.00	613.80	0.00	0.00	0.00	0.00	0.00
TH240037	1/10/24	438545.81	3368111.00	332.16	0.00	0.00	0.00	0.00	0.00
TH240038	1/12/24	438163.19	3366148.00	275.82	0.00	0.00	0.00	0.00	0.00
TH240039	1/13/24	438110.00	3365540.00	344.95	0.00	0.00	0.00	0.00	0.00
TH240040	1/13/24	438163.19	3366148.00	248.23	0.00	0.00	0.00	0.00	0.00
TH240041	1/14/24	438163.19	3366148.00	259.34	0.00	0.00	0.00	0.00	0.00
TH240042	1/15/24	438110.00	3365540.00	271.28	0.00	0.00	0.00	0.00	0.00
TH240043	1/20/24	438110.00	3365540.00	314.86	0.00	0.00	0.00	0.00	0.00
TH240044	1/20/24	438163.19	3366148.00	355.55	0.00	0.00	0.00	0.00	0.00
TH240045	1/21/24	438163.19	3366148.00	404.79	0.00	0.00	0.00	0.00	0.00
TH240046	1/22/24	438110.00	3365540.00	238.72	0.00	0.00	0.00	0.00	0.00
TH240047	1/23/24	437670.81	3366235.00	293.09	0.00	0.00	0.00	0.00	0.00
TH240048	1/24/24	437851.19	3366908.00	487.34	0.00	0.00	0.00	0.00	0.00
TH240049	1/27/24	438655.59	3366061.00	242.86	0.00	0.00	0.00	0.00	0.00
TH240050	1/28/24	438321.09	3366737.00	284.83	0.00	0.00	0.00	0.00	0.00
TH240051	1/29/24	438321.09	3366737.00	457.04	0.00	0.00	0.00	0.00	0.00
TH240052	1/30/24	438578.91	3367290.00	349.83	0.00	0.00	0.00	0.00	0.00
TH240053	1/31/24	438655.59	3366061.00	326.01	0.00	0.00	0.00	0.00	0.00
TH240054	2/ 4/24	439148.00	3365974.00	237.81	0.00	0.00	0.00	0.00	0.00
TH240055	2/ 4/24	438321.09	3366737.00	471.28	0.00	0.00	0.00	0.00	0.00

TABLE D-7 (Cont'd)

ISCEV2 Modeling Summary
24-Hour SO_2 AAQS Compliance Analysis
1984 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH240056	2/ 5/24	438321.09	3366737.00	319.72	0.00	0.00	0.00	0.00	0.00
TH240057	2/12/24	437381.41	3367079.00	495.03	0.04	0.02	0.02	0.09	0.46
TH240058	2/13/24	438396.09	3361710.00	246.35	0.00	0.00	0.00	0.00	0.00
TH240059	2/13/24	437851.19	3366908.00	544.43	0.00	0.00	0.00	0.00	0.00
TH240060	2/14/24	439610.00	3365540.00	235.81	0.00	0.00	0.00	0.00	0.00
TH240061	2/14/24	439148.00	3365974.00	256.13	0.00	0.00	0.00	0.00	0.00
TH240062	2/14/24	438321.09	3366737.00	241.26	0.00	0.00	0.00	0.00	0.00
TH240063	2/19/24	437851.19	3366908.00	461.95	0.00	0.00	0.00	0.00	0.00
TH240064	2/23/24	438321.09	3366737.00	524.11	0.00	0.00	0.00	0.00	0.00
TH240065	2/25/24	438321.09	3366737.00	287.72	0.00	0.00	0.00	0.00	0.00
TH240066	2/26/24	437381.41	3367079.00	261.12	0.33	0.00	0.00	0.33	0.11
TH240067	2/27/24	437851.19	3366908.00	321.71	0.00	0.00	0.00	0.00	0.00
TH240068	2/29/24	438321.09	3366737.00	719.22	0.00	0.00	0.00	0.00	0.00
TH240069	3/ 1/24	438321.09	3366737.00	276.10	0.00	0.00	0.00	0.00	0.00
TH240070	3/ 4/24	437851.19	3366908.00	390.88	0.17	0.03	0.03	0.22	0.88
TH240071	3/ 4/24	437381.41	3367079.00	253.76	0.18	0.02	0.02	0.22	0.78
TH240072	3/ 5/24	437851.19	3366908.00	702.73	0.00	0.00	0.00	0.00	0.00
TH240073	3/ 5/24	437712.91	3367790.00	359.23	0.00	0.00	0.00	0.00	0.00
TH240074	3/ 5/24	437779.81	3368754.00	232.71	0.00	0.00	0.00	0.00	0.00
TH240075	3/ 6/24	438145.91	3367540.00	243.35	0.00	0.00	0.00	0.00	0.00
TH240076	3/ 7/24	438655.59	3366061.00	337.48	0.00	0.00	0.00	0.00	0.00
TH240077	3/12/24	436686.00	3366408.00	243.77	0.00	0.00	0.01	0.01	0.07
TH240078	3/12/24	437851.19	3366908.00	356.73	0.01	0.00	0.00	0.02	0.11
TH240079	3/13/24	437851.19	3366908.00	282.43	0.00	0.00	0.00	0.00	0.00
TH240080	3/14/24	437178.41	3366322.00	241.15	0.00	0.01	0.02	0.03	0.06
TH240081	3/15/24	437381.41	3367079.00	335.74	2.63	0.02	0.02	2.68	2.30
TH240082	3/18/24	437381.41	3367079.00	281.93	0.39	0.03	0.03	0.45	1.45
TH240083	3/20/24	437851.19	3366908.00	1137.75	0.00	0.00	0.00	0.00	0.00
TH240084	3/24/24	437851.19	3366908.00	420.31	0.21	0.03	0.03	0.27	1.35
TH240085	3/26/24	437851.19	3366908.00	434.19	0.01	0.00	0.00	0.01	0.00
TH240086	3/27/24	437851.19	3366908.00	609.58	0.17	0.02	0.02	0.20	0.91
TH240087	3/29/24	438321.09	3366737.00	412.20	0.00	0.00	0.00	0.00	0.00
TH240088	4/ 2/24	437381.41	3367079.00	478.02	2.17	0.05	0.05	2.27	2.19
TH240089	4/ 2/24	436911.50	3367250.00	269.46	2.12	0.04	0.04	2.20	2.03
TH240090	4/ 3/24	437851.19	3366908.00	632.72	0.08	0.00	0.00	0.08	0.13
TH240091	4/ 5/24	438321.09	3366737.00	442.00	0.00	0.00	0.00	0.00	0.00
TH240092	4/ 6/24	438321.09	3366737.00	370.03	0.00	0.00	0.00	0.00	0.00
TH240093	4/ 6/24	439444.91	3366790.00	232.09	0.00	0.00	0.00	0.00	0.00
TH240094	4/ 6/24	440269.41	3366665.00	253.24	0.00	0.00	0.00	0.00	0.00
TH240095	4/ 9/24	437851.19	3366908.00	589.49	0.13	0.04	0.04	0.20	1.37
TH240096	4/ 9/24	437381.41	3367079.00	250.75	0.17	0.03	0.03	0.24	1.37
TH240097	4/10/24	437610.00	3365540.00	304.03	0.00	0.00	0.00	0.00	0.00
TH240098	4/13/24	437851.19	3366908.00	1001.02	0.00	0.00	0.00	0.00	0.00
TH240099	4/17/24	438928.81	3367790.00	256.25	0.00	0.00	0.00	0.00	0.00
TH240100	4/17/24	439860.00	3368571.00	266.29	0.00	0.00	0.00	0.00	0.00
TH240101	4/19/24	438578.91	3367290.00	321.33	0.00	0.00	0.00	0.00	0.00
TH240102	4/20/24	437851.19	3366908.00	504.34	1.05	0.00	0.00	1.05	0.33
TH240103	4/21/24	437851.19	3366908.00	718.61	0.00	0.00	0.00	0.00	0.00
TH240104	4/22/24	437851.19	3366908.00	363.43	0.00	0.00	0.00	0.00	0.00
TH240105	4/25/24	437851.19	3366908.00	1227.17	0.83	0.00	0.00	0.83	0.28
TH240106	4/26/24	438321.09	3366737.00	241.37	2.00	0.01	0.01	2.02	1.16
TH240107	4/26/24	437851.19	3366908.00	719.01	1.86	0.01	0.01	1.87	0.96
TH240108	4/27/24	437851.19	3366908.00	298.12	0.20	0.04	0.04	0.28	0.10
TH240109	4/28/24	437851.19	3366908.00	472.39	0.02	0.07	0.07	0.17	0.44
TH240110	4/30/24	437851.19	3366908.00	583.91	0.00	0.00	0.00	0.00	0.00
TH240111	5/ 3/24	437851.19	3366908.00	786.23	0.00	0.00	0.00	0.00	0.00
TH240112	5/ 4/24	442978.09	3361781.00	234.46	0.00	0.00	0.00	0.00	0.00
TH240113	5/ 4/24	442391.41	3361108.00	296.69	0.00	0.00	0.00	0.00	0.00
TH240114	5/ 4/24	441610.00	3360540.00	333.45	0.00	0.00	0.00	0.00	0.00
TH240115	5/ 4/24	438578.91	3367290.00	519.01	0.00	0.00	0.00	0.00	0.00
TH240116	5/ 7/24	437851.19	3366908.00	258.90	1.52	0.01	0.01	1.54	0.67
TH240117	5/12/24	437381.41	3367079.00	261.22	2.90	0.05	0.05	3.00	2.75
TH240118	5/13/24	437851.19	3366908.00	309.77	0.32	0.00	0.00	0.32	0.08
TH240119	5/14/24	438321.09	3366737.00	341.82	0.00	0.00	0.00	0.00	0.00
TH240120	5/18/24	437851.19	3366908.00	323.50	0.28	0.01	0.01	0.30	0.26
TH240121	5/19/24	437851.19	3366908.00	969.86	0.00	0.00	0.00	0.00	0.00

TABLE D-7 (Cont'd)

ISCEV2 Modeling Summary
24-Hour SO_2 AAQS Compliance Analysis
1984 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH240122	5/20/24	438145.91	3367540.00	347.82	0.04	0.00	0.00	0.04	0.05
TH240123	5/21/24	437851.19	3366908.00	1218.91	0.00	0.00	0.00	0.00	0.00
TH240124	5/22/24	437851.19	3366908.00	731.32	0.06	0.01	0.01	0.09	0.57
TH240125	5/26/24	437381.41	3367079.00	288.45	0.91	0.03	0.03	0.96	1.46
TH240126	5/26/24	436911.50	3367250.00	293.51	0.95	0.02	0.02	0.99	1.28
TH240127	5/27/24	437851.19	3366908.00	837.90	0.03	0.01	0.01	0.05	0.40
TH240128	5/27/24	438145.91	3367540.00	280.00	0.00	0.00	0.00	0.00	0.00
TH240129	5/27/24	437712.91	3367790.00	419.83	0.00	0.00	0.00	0.00	0.00
TH240130	5/28/24	437851.19	3366908.00	968.91	0.02	0.00	0.00	0.03	0.04
TH240131	5/28/24	437712.91	3367790.00	340.76	0.02	0.00	0.00	0.02	0.00
TH240132	5/28/24	437779.81	3368754.00	267.39	0.72	0.11	0.11	0.95	0.40
TH240133	5/29/24	437851.19	3366908.00	1051.85	0.00	0.00	0.00	0.00	0.00
TH240134	5/29/24	437279.91	3368040.00	234.18	0.00	0.00	0.00	0.00	0.00
TH240135	5/30/24	438163.19	3366148.00	336.70	0.00	0.00	0.00	0.00	0.00
TH240136	6/ 1/24	437851.19	3366908.00	242.55	0.00	0.00	0.00	0.00	0.00
TH240137	6/ 2/24	438321.09	3366737.00	261.97	0.00	0.00	0.00	0.00	0.00
TH240138	6/ 3/24	439011.91	3367040.00	261.24	0.00	0.00	0.00	0.00	0.00
TH240139	6/ 5/24	437381.41	3367079.00	257.02	1.42	0.01	0.01	1.45	1.00
TH240140	6/ 8/24	437381.41	3367079.00	374.74	3.52	0.03	0.04	3.59	2.08
TH240141	6/ 8/24	436911.50	3367250.00	252.49	3.17	0.03	0.03	3.23	1.77
TH240142	6/14/24	437851.19	3366908.00	577.09	0.09	0.01	0.01	0.10	0.34
TH240143	6/15/24	437381.41	3367079.00	330.25	2.18	0.03	0.03	2.24	1.25
TH240144	6/16/24	437381.41	3367079.00	273.70	0.15	0.00	0.00	0.15	0.14
TH240145	6/17/24	437712.91	3367790.00	294.87	0.48	0.02	0.02	0.52	0.93
TH240146	6/18/24	437851.19	3366908.00	610.49	0.91	0.01	0.01	0.93	0.64
TH240147	6/19/24	437851.19	3366908.00	304.78	0.37	0.00	0.00	0.38	0.16
TH240148	6/20/24	438321.09	3366737.00	392.89	0.00	0.00	0.00	0.00	0.00
TH240149	6/27/24	437851.19	3366908.00	324.07	0.02	0.00	0.00	0.02	0.01
TH240150	6/29/24	438578.91	3367290.00	276.76	0.00	0.00	0.00	0.00	0.00
TH240151	6/30/24	438578.91	3367290.00	293.24	0.00	0.00	0.00	0.00	0.00
TH240152	7/ 4/24	437851.19	3366908.00	356.97	1.06	0.00	0.00	1.07	0.44
TH240153	7/ 5/24	437851.19	3366908.00	651.82	0.32	0.00	0.00	0.33	0.09
TH240154	7/ 6/24	437851.19	3366908.00	472.56	1.14	0.01	0.01	1.15	0.70
TH240155	7/ 7/24	438321.09	3366737.00	299.90	0.00	0.00	0.00	0.00	0.00
TH240156	7/ 8/24	438321.09	3366737.00	241.76	0.58	0.00	0.00	0.59	0.38
TH240157	7/11/24	437851.19	3366908.00	726.85	1.41	0.01	0.01	1.42	0.62
TH240158	7/14/24	437851.19	3366908.00	770.60	0.05	0.00	0.00	0.05	0.01
TH240159	7/16/24	437851.19	3366908.00	648.94	0.00	0.00	0.00	0.00	0.00
TH240160	7/16/24	437712.91	3367790.00	270.81	0.01	0.00	0.00	0.01	0.00
TH240161	7/17/24	437851.19	3366908.00	260.34	0.00	0.00	0.00	0.00	0.00
TH240162	7/21/24	437381.41	3367079.00	333.19	0.05	0.05	0.05	0.15	0.46
TH240163	7/22/24	437851.19	3366908.00	238.35	0.10	0.04	0.05	0.19	0.22
TH240164	7/27/24	437851.19	3366908.00	448.21	0.00	0.00	0.00	0.00	0.00
TH240165	7/28/24	437851.19	3366908.00	304.65	0.00	0.02	0.02	0.05	1.21
TH240166	7/29/24	437851.19	3366908.00	404.18	0.00	0.00	0.00	0.00	0.00
TH240167	8/ 1/24	437851.19	3366908.00	670.50	0.00	0.00	0.00	0.00	0.00
TH240168	8/ 1/24	437712.91	3367790.00	257.83	0.00	0.00	0.00	0.01	0.00
TH240169	8/ 2/24	437851.19	3366908.00	2182.08	0.00	0.00	0.00	0.00	0.00
TH240170	8/ 2/24	437279.91	3368040.00	245.13	0.00	0.00	0.00	0.00	0.00
TH240171	8/ 3/24	437851.19	3366908.00	372.05	1.47	0.00	0.00	1.48	0.51
TH240172	8/ 4/24	437851.19	3366908.00	391.45	0.65	0.03	0.03	0.71	1.04
TH240173	8/ 5/24	437381.41	3367079.00	274.07	2.53	0.01	0.01	2.55	1.26
TH240174	8/ 7/24	438163.19	3366148.00	291.64	0.00	0.00	0.00	0.00	0.00
TH240175	8/10/24	438321.09	3366737.00	261.46	0.00	0.00	0.00	0.00	0.00
TH240176	8/11/24	438321.09	3366737.00	376.14	0.00	0.00	0.00	0.00	0.00
TH240177	8/12/24	438578.91	3367290.00	317.71	0.00	0.00	0.00	0.00	0.00
TH240178	8/13/24	437851.19	3366908.00	306.81	0.08	0.02	0.02	0.13	0.93
TH240179	8/13/24	438145.91	3367540.00	318.05	0.00	0.00	0.00	0.00	0.01
TH240180	8/23/24	438578.91	3367290.00	259.93	0.00	0.00	0.00	0.00	0.00
TH240181	8/24/24	438145.91	3367540.00	326.23	0.88	0.01	0.01	0.89	0.52
TH240182	8/24/24	437712.91	3367790.00	363.73	0.89	0.00	0.00	0.89	0.46
TH240183	8/27/24	438321.09	3366737.00	254.82	0.38	0.01	0.01	0.39	0.49
TH240184	8/29/24	438321.09	3366737.00	245.73	0.83	0.05	0.05	0.93	1.30
TH240185	8/31/24	438321.09	3366737.00	414.68	0.00	0.00	0.00	0.00	0.00
TH240186	9/ 2/24	437851.19	3366908.00	349.47	0.52	0.04	0.04	0.59	0.91
TH240187	9/ 3/24	437851.19	3366908.00	375.85	0.00	0.00	0.00	0.00	0.00

TABLE D-7 (Cont'd)

ISCEV2 Modeling Summary
24-Hour SO_2 AAQS Compliance Analysis
1984 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH240188	9/ 8/24	438163.19	3366148.00	260.79	0.00	0.00	0.00	0.00	0.00
TH240189	9/ 9/24	438163.19	3366148.00	309.39	0.00	0.00	0.00	0.00	0.00
TH240190	9/10/24	438655.59	3366061.00	384.71	0.00	0.00	0.00	0.00	0.00
TH240191	9/11/24	438321.09	3366737.00	304.13	0.00	0.00	0.00	0.00	0.00
TH240192	9/13/24	438321.09	3366737.00	294.61	0.00	0.00	0.00	0.00	0.00
TH240193	9/16/24	437670.81	3366235.00	249.88	0.00	0.00	0.00	0.00	0.00
TH240194	9/17/24	437670.81	3366235.00	235.16	0.00	0.00	0.00	0.00	0.00
TH240195	9/30/24	437851.19	3366908.00	414.23	0.23	0.07	0.07	0.38	1.46
TH240196	9/30/24	437381.41	3367079.00	237.72	0.29	0.07	0.07	0.42	1.47
TH240197	10/ 1/24	438655.59	3366061.00	309.02	0.00	0.00	0.00	0.00	0.00
TH240198	10/17/24	437851.19	3366908.00	637.40	0.00	0.00	0.00	0.00	0.00
TH240199	10/20/24	437851.19	3366908.00	502.17	1.65	0.04	0.04	1.72	1.24
TH240200	10/20/24	437381.41	3367079.00	287.69	1.60	0.03	0.03	1.67	1.08
TH240201	10/21/24	437851.19	3366908.00	499.30	0.11	0.00	0.00	0.11	0.04
TH240202	10/22/24	437851.19	3366908.00	1275.22	0.00	0.00	0.00	0.00	0.00
TH240203	10/22/24	437279.91	3368040.00	327.34	0.00	0.00	0.00	0.00	0.00
TH240204	10/26/24	437670.81	3366235.00	266.86	0.00	0.00	0.00	0.00	0.00
TH240205	10/26/24	437178.41	3366322.00	277.64	0.00	0.00	0.00	0.00	0.00
TH240206	10/27/24	437381.41	3367079.00	322.90	0.29	0.05	0.05	0.39	2.34
TH240207	10/28/24	437851.19	3366908.00	1130.80	0.00	0.00	0.00	0.00	0.01
TH240208	10/28/24	437381.41	3367079.00	273.82	0.00	0.00	0.00	0.00	0.01
TH240209	10/28/24	437279.91	3368040.00	300.93	0.02	0.15	0.16	0.33	0.19
TH240210	10/31/24	437178.41	3366322.00	232.47	0.00	0.00	0.00	0.00	0.00
TH240211	11/ 6/24	438163.19	3366148.00	244.34	0.00	0.00	0.00	0.00	0.00
TH240212	11/12/24	438321.09	3366737.00	245.28	0.00	0.00	0.00	0.00	0.00
TH240213	11/18/24	437851.19	3366908.00	552.26	0.01	0.00	0.00	0.01	0.00
TH240214	11/21/24	437610.00	3365540.00	352.95	0.00	0.00	0.00	0.00	0.00
TH240215	11/21/24	437670.81	3366235.00	315.30	0.00	0.00	0.00	0.00	0.00
TH240216	11/22/24	437610.00	3365540.00	255.73	0.00	0.00	0.00	0.00	0.00
TH240217	11/23/24	437670.81	3366235.00	312.63	0.00	0.00	0.00	0.00	0.00
TH240218	11/24/24	437670.81	3366235.00	247.05	0.00	0.00	0.00	0.00	0.00
TH240219	11/26/24	437178.41	3366322.00	261.41	0.01	0.00	0.00	0.01	0.00
TH240220	11/27/24	437851.19	3366908.00	281.81	0.13	0.04	0.04	0.22	0.62
TH240221	11/27/24	437381.41	3367079.00	411.69	0.14	0.04	0.04	0.22	0.68
TH240222	11/28/24	437851.19	3366908.00	291.78	0.00	0.00	0.00	0.00	0.00
TH240223	12/ 8/24	438321.09	3366737.00	485.89	0.00	0.00	0.00	0.00	0.00
TH240224	12/ 9/24	437851.19	3366908.00	276.65	0.00	0.00	0.00	0.00	0.01
TH240225	12/14/24	437178.41	3366322.00	267.87	0.00	0.00	0.00	0.00	0.00
TH240226	12/23/24	437178.41	3366322.00	352.89	0.02	0.00	0.00	0.03	0.01
TH240227	12/26/24	437110.00	3365540.00	265.54	0.00	0.00	0.00	0.00	0.00
TH240228	12/27/24	437178.41	3366322.00	260.39	0.05	0.01	0.01	0.08	0.44
TH240229	12/29/24	437851.19	3366908.00	253.66	0.00	0.00	0.00	0.00	0.00
TH240230	12/29/24	437381.41	3367079.00	248.66	0.00	0.00	0.00	0.00	0.00
TH240231	12/31/24	437851.19	3366908.00	606.64	0.71	0.06	0.06	0.83	2.19
TH240232	12/31/24	437381.41	3367079.00	350.50	0.76	0.06	0.05	0.87	2.25
TH240233	12/31/24	436911.50	3367250.00	317.53	0.80	0.05	0.05	0.91	2.27

TABLE D-8

ISCEV2 Modeling Summary
24-Hour SO_2 AAQS Compliance Analysis
1985 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Cedar Bay Cogen. Project Total	CFB	LSD1	LSD2	Total	SK Package Boilers
TH240001	1/ 1/24	437851.19	3366908.00	652.38	0.00	0.00	0.00	0.00	0.00
TH240002	1/ 2/24	437851.19	3366908.00	791.62	0.06	0.02	0.02	0.10	0.75
TH240003	1/ 2/24	437712.91	3367790.00	263.09	0.04	0.03	0.03	0.09	0.77
TH240004	1/ 2/24	437279.91	3368040.00	270.31	0.06	0.02	0.02	0.10	0.76
TH240005	1/ 3/24	437851.19	3366908.00	827.83	0.00	0.04	0.04	0.08	0.06
TH240006	1/ 3/24	438145.91	3367540.00	256.85	0.00	0.00	0.00	0.00	0.00
TH240007	1/ 4/24	438321.09	3366737.00	403.80	0.00	0.00	0.00	0.00	0.00
TH240008	1/ 4/24	437851.19	3366908.00	347.01	0.00	0.00	0.00	0.00	0.00
TH240009	1/ 5/24	438790.91	3366566.00	232.21	0.00	0.00	0.00	0.00	0.00
TH240010	1/ 8/24	438790.91	3366566.00	232.45	0.00	0.00	0.00	0.00	0.00
TH240011	1/ 8/24	438321.09	3366737.00	393.03	0.00	0.00	0.00	0.00	0.00
TH240012	1/11/24	438655.59	3366061.00	320.18	0.00	0.00	0.00	0.00	0.00
TH240013	1/12/24	438163.19	3366148.00	254.73	0.00	0.00	0.00	0.00	0.00
TH240014	1/14/24	438321.09	3366737.00	272.23	0.00	0.00	0.00	0.00	0.00
TH240015	1/15/24	438321.09	3366737.00	592.65	0.00	0.00	0.00	0.00	0.00
TH240016	1/17/24	437851.19	3366908.00	290.79	0.00	0.00	0.00	0.00	0.00
TH240017	1/18/24	438790.91	3366566.00	232.12	0.00	0.00	0.00	0.00	0.00
TH240018	1/18/24	438321.09	3366737.00	391.90	0.00	0.00	0.00	0.00	0.00
TH240019	1/22/24	438790.91	3366566.00	246.61	0.00	0.00	0.00	0.00	0.00
TH240020	1/22/24	438321.09	3366737.00	643.42	0.00	0.00	0.00	0.00	0.00
TH240021	1/25/24	438790.91	3366566.00	238.52	0.00	0.00	0.00	0.00	0.00
TH240022	1/25/24	438321.09	3366737.00	486.96	0.00	0.00	0.00	0.00	0.00
TH240023	2/ 1/24	438578.91	3367290.00	279.04	0.00	0.00	0.00	0.00	0.00
TH240024	2/ 1/24	438145.91	3367540.00	253.33	0.00	0.00	0.00	0.00	0.00
TH240025	2/ 4/24	437670.81	3366235.00	383.07	0.00	0.00	0.00	0.00	0.00
TH240026	2/ 6/24	438145.91	3367540.00	342.47	0.00	0.00	0.00	0.00	0.00
TH240027	2/ 9/24	438790.91	3366566.00	268.50	0.00	0.00	0.00	0.00	0.00
TH240028	2/11/24	437851.19	3366908.00	743.25	0.00	0.00	0.00	0.00	0.00
TH240029	2/12/24	438790.91	3366566.00	383.27	0.00	0.00	0.00	0.00	0.00
TH240030	2/12/24	438321.09	3366737.00	693.49	0.00	0.00	0.00	0.00	0.00
TH240031	2/13/24	438321.09	3366737.00	273.91	0.00	0.00	0.00	0.00	0.00
TH240032	2/14/24	438321.09	3366737.00	509.91	0.00	0.00	0.00	0.00	0.00
TH240033	2/19/24	437851.19	3366908.00	276.73	0.01	0.00	0.00	0.01	0.03
TH240034	2/20/24	437178.41	3366322.00	231.99	0.00	0.00	0.00	0.00	0.00
TH240035	2/23/24	437851.19	3366908.00	358.54	0.21	0.01	0.01	0.23	0.45
TH240036	2/23/24	437381.41	3367079.00	563.82	0.21	0.01	0.01	0.23	0.46
TH240037	2/23/24	436911.50	3367250.00	367.82	0.21	0.01	0.01	0.23	0.47
TH240038	2/24/24	437851.19	3366908.00	889.93	0.00	0.00	0.00	0.00	0.00
TH240039	2/24/24	437712.91	3367790.00	253.23	0.08	0.02	0.02	0.11	0.53
TH240040	2/25/24	437851.19	3366908.00	323.87	0.09	0.00	0.00	0.09	0.02
TH240041	2/25/24	437712.91	3367790.00	256.02	0.55	0.00	0.00	0.55	0.16
TH240042	3/11/24	437851.19	3366908.00	781.65	0.37	0.04	0.04	0.44	0.61
TH240043	3/12/24	438321.09	3366737.00	329.01	0.00	0.00	0.00	0.00	0.00
TH240044	3/15/24	437178.41	3366322.00	264.81	0.00	0.00	0.00	0.00	0.00
TH240045	3/20/24	437851.19	3366908.00	495.41	0.20	0.04	0.04	0.28	1.74
TH240046	3/21/24	437851.19	3366908.00	240.61	0.05	0.02	0.02	0.09	0.73
TH240047	3/23/24	438655.59	3366061.00	232.05	0.00	0.00	0.00	0.00	0.00
TH240048	3/24/24	438321.09	3366737.00	429.49	0.00	0.00	0.00	0.00	0.00
TH240049	3/26/24	436686.00	3366408.00	253.37	1.33	0.01	0.01	1.35	0.67
TH240050	3/27/24	437851.19	3366908.00	987.46	0.03	0.00	0.00	0.03	0.01
TH240051	3/28/24	438145.91	3367540.00	238.01	0.00	0.00	0.00	0.00	0.00
TH240052	3/29/24	437851.19	3366908.00	263.96	0.00	0.00	0.00	0.00	0.00
TH240053	3/30/24	437851.19	3366908.00	407.26	0.11	0.01	0.01	0.13	0.37
TH240054	4/ 1/24	438578.91	3367290.00	233.32	0.00	0.00	0.00	0.00	0.00
TH240055	4/ 4/24	437851.19	3366908.00	397.19	0.03	0.00	0.00	0.03	0.09

TABLE D-8 (Cont'd)

ISCEV2 Modeling Summary
24-Hour SO_2 AAQS Compliance Analysis
1985 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH240056	4/ 5/24	437851.19	3366908.00	250.36	0.00	0.00	0.00	0.00	0.00
TH240057	4/ 5/24	438145.91	3367540.00	251.38	0.00	0.00	0.00	0.00	0.00
TH240058	4/ 5/24	438162.81	3368433.00	286.73	0.00	0.00	0.00	0.00	0.00
TH240059	4/12/24	437381.41	3367079.00	277.20	0.14	0.05	0.06	0.26	1.76
TH240060	4/15/24	438578.91	3367290.00	350.28	0.00	0.00	0.00	0.00	0.00
TH240061	4/16/24	438321.09	3366737.00	275.72	0.00	0.00	0.00	0.00	0.00
TH240062	4/17/24	437670.81	3366235.00	287.99	0.00	0.00	0.00	0.00	0.00
TH240063	4/20/24	438321.09	3366737.00	256.98	2.64	0.05	0.05	2.74	3.06
TH240064	4/22/24	437381.41	3367079.00	272.89	2.09	0.12	0.13	2.34	1.20
TH240065	4/23/24	437851.19	3366908.00	623.89	2.01	0.05	0.05	2.11	2.27
TH240066	4/23/24	437381.41	3367079.00	239.13	1.98	0.04	0.04	2.06	2.07
TH240067	4/24/24	437851.19	3366908.00	307.21	0.08	0.00	0.00	0.08	0.03
TH240068	4/25/24	438321.09	3366737.00	232.80	0.00	0.00	0.00	0.00	0.00
TH240069	4/28/24	438790.91	3366566.00	235.78	0.00	0.00	0.00	0.00	0.00
TH240070	4/30/24	437178.41	3366322.00	275.62	0.00	0.00	0.00	0.00	0.00
TH240071	5/ 1/24	437381.41	3367079.00	394.85	1.77	0.06	0.06	1.88	0.99
TH240072	5/ 2/24	437851.19	3366908.00	876.58	0.00	0.00	0.00	0.00	0.00
TH240073	5/ 6/24	437851.19	3366908.00	539.97	1.33	0.04	0.06	1.43	0.57
TH240074	5/ 8/24	438321.09	3366737.00	279.97	0.00	0.00	0.00	0.00	0.00
TH240075	5/ 9/24	437851.19	3366908.00	317.22	0.10	0.08	0.08	0.25	2.83
TH240076	5/10/24	437851.19	3366908.00	393.07	0.15	0.01	0.02	0.18	0.23
TH240077	5/11/24	437851.19	3366908.00	361.86	0.89	0.01	0.01	0.91	0.64
TH240078	5/16/24	438321.09	3366737.00	256.60	0.00	0.00	0.00	0.00	0.00
TH240079	5/17/24	438321.09	3366737.00	430.19	0.00	0.00	0.00	0.00	0.00
TH240080	5/18/24	438790.91	3366566.00	393.85	0.00	0.00	0.00	0.00	0.00
TH240081	5/18/24	438321.09	3366737.00	388.79	0.00	0.00	0.00	0.00	0.00
TH240082	5/22/24	439311.91	3367468.00	243.73	0.00	0.00	0.00	0.00	0.00
TH240083	5/24/24	438321.09	3366737.00	307.63	0.00	0.00	0.00	0.00	0.00
TH240084	5/25/24	437670.81	3366235.00	283.93	0.00	0.00	0.00	0.00	0.00
TH240085	5/28/24	437851.19	3366908.00	305.29	0.37	0.00	0.00	0.37	0.15
TH240086	5/30/24	437851.19	3366908.00	313.97	0.39	0.00	0.00	0.40	0.31
TH240087	6/ 1/24	438321.09	3366737.00	562.35	0.00	0.00	0.00	0.00	0.00
TH240088	6/ 2/24	438321.09	3366737.00	519.66	0.00	0.00	0.00	0.00	0.00
TH240089	6/ 3/24	438321.09	3366737.00	242.78	0.00	0.00	0.00	0.00	0.00
TH240090	6/ 4/24	437851.19	3366908.00	1153.16	1.32	0.03	0.03	1.39	1.64
TH240091	6/ 5/24	437851.19	3366908.00	813.62	2.18	0.01	0.01	2.20	1.25
TH240092	6/ 6/24	437851.19	3366908.00	360.65	0.92	0.00	0.00	0.93	0.49
TH240093	6/10/24	438321.09	3366737.00	248.81	0.00	0.00	0.00	0.00	0.00
TH240094	6/12/24	438578.91	3367290.00	232.48	0.00	0.00	0.00	0.00	0.00
TH240095	6/15/24	437851.19	3366908.00	659.14	0.00	0.00	0.00	0.00	0.00
TH240096	6/16/24	437851.19	3366908.00	300.17	0.00	0.00	0.00	0.00	0.00
TH240097	6/17/24	438578.91	3367290.00	245.95	0.00	0.00	0.00	0.00	0.00
TH240098	6/18/24	438578.91	3367290.00	354.04	0.00	0.00	0.00	0.00	0.00
TH240099	6/19/24	438578.91	3367290.00	277.69	0.00	0.00	0.00	0.00	0.00
TH240100	6/27/24	438321.09	3366737.00	246.89	1.01	0.02	0.02	1.05	1.29
TH240101	6/28/24	437851.19	3366908.00	251.93	0.06	0.00	0.00	0.07	0.07
TH240102	6/29/24	438578.91	3367290.00	282.33	0.00	0.00	0.00	0.00	0.00
TH240103	6/30/24	438578.91	3367290.00	256.19	0.00	0.00	0.00	0.00	0.00
TH240104	7/ 4/24	438321.09	3366737.00	328.22	0.00	0.00	0.00	0.00	0.00
TH240105	7/ 7/24	438321.09	3366737.00	258.39	0.04	0.01	0.01	0.06	0.34
TH240106	7/ 9/24	438321.09	3366737.00	322.23	0.00	0.00	0.00	0.00	0.00
TH240107	7/10/24	437851.19	3366908.00	937.61	0.00	0.00	0.00	0.00	0.00
TH240108	7/11/24	438578.91	3367290.00	237.80	0.01	0.00	0.00	0.01	0.01
TH240109	7/14/24	437381.41	3367079.00	272.01	1.60	0.01	0.01	1.61	0.64
TH240110	7/19/24	437178.41	3366322.00	285.46	0.00	0.00	0.00	0.00	0.00
TH240111	7/22/24	437851.19	3366908.00	841.50	0.33	0.00	0.00	0.33	0.09
TH240112	7/23/24	437381.41	3367079.00	405.42	0.58	0.04	0.03	0.65	1.38
TH240113	7/25/24	438162.81	3368433.00	303.83	0.00	0.00	0.00	0.00	0.00
TH240114	7/26/24	437851.19	3366908.00	373.07	0.00	0.00	0.00	0.00	0.00
TH240115	7/26/24	437712.91	3367790.00	257.56	0.03	0.06	0.07	0.16	0.53
TH240116	7/27/24	437851.19	3366908.00	558.32	0.94	0.00	0.00	0.95	0.34
TH240117	7/28/24	437851.19	3366908.00	275.92	0.04	0.00	0.00	0.04	0.01
TH240118	7/30/24	437851.19	3366908.00	481.03	0.02	0.00	0.00	0.02	0.00
TH240119	8/ 3/24	437178.41	3366322.00	364.09	0.00	0.00	0.00	0.00	0.01
TH240120	8/ 4/24	437178.41	3366322.00	330.94	0.00	0.00	0.00	0.00	0.00
TH240121	8/ 4/24	437851.19	3366908.00	256.34	0.00	0.00	0.00	0.00	0.00

TABLE D-8 (Cont'd)

ISCEV2 Modeling Summary
24-Hour SO_2 AAQS Compliance Analysis
1985 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH240122	8/ 6/24	437381.41	3367079.00	269.06	2.65	0.07	0.07	2.80	1.97
TH240123	8/ 7/24	437381.41	3367079.00	258.27	0.64	0.02	0.02	0.67	0.45
TH240124	8/ 8/24	437851.19	3366908.00	417.61	0.00	0.00	0.00	0.00	0.00
TH240125	8/ 8/24	438145.91	3367540.00	466.91	0.00	0.00	0.00	0.00	0.00
TH240126	8/ 8/24	437712.91	3367790.00	360.18	0.00	0.00	0.00	0.00	0.00
TH240127	8/ 9/24	438321.09	3366737.00	337.42	0.00	0.00	0.00	0.00	0.00
TH240128	8/14/24	437851.19	3366908.00	277.18	0.12	0.03	0.03	0.17	1.00
TH240129	8/15/24	437381.41	3367079.00	398.82	1.45	0.00	0.00	1.46	0.51
TH240130	8/16/24	437851.19	3366908.00	525.79	0.16	0.00	0.00	0.16	0.08
TH240131	8/17/24	438145.91	3367540.00	303.20	0.00	0.00	0.00	0.00	0.00
TH240132	8/17/24	438162.81	3368433.00	236.41	0.16	0.00	0.00	0.16	0.04
TH240133	8/21/24	438578.91	3367290.00	286.85	0.00	0.00	0.00	0.00	0.00
TH240134	8/22/24	437851.19	3366908.00	291.93	0.00	0.00	0.00	0.00	0.00
TH240135	8/23/24	436686.00	3366408.00	256.12	0.56	0.00	0.00	0.56	0.28
TH240136	8/24/24	437851.19	3366908.00	799.30	0.03	0.00	0.00	0.03	0.01
TH240137	8/25/24	437851.19	3366908.00	459.65	0.00	0.00	0.00	0.00	0.00
TH240138	8/26/24	437851.19	3366908.00	711.38	0.36	0.00	0.00	0.37	0.26
TH240139	8/26/24	437381.41	3367079.00	237.55	0.35	0.00	0.00	0.36	0.23
TH240140	8/29/24	437381.41	3367079.00	383.09	1.27	0.03	0.03	1.32	1.68
TH240141	8/29/24	436911.50	3367250.00	234.05	1.18	0.03	0.02	1.23	1.60
TH240142	8/30/24	437851.19	3366908.00	574.94	0.01	0.01	0.01	0.03	0.18
TH240143	9/ 1/24	437381.41	3367079.00	338.74	0.60	0.06	0.06	0.72	2.98
TH240144	9/ 1/24	436911.50	3367250.00	255.85	0.74	0.05	0.05	0.84	2.83
TH240145	9/ 2/24	437381.41	3367079.00	554.47	0.39	0.04	0.04	0.47	1.13
TH240146	9/ 2/24	436911.50	3367250.00	307.13	0.41	0.04	0.04	0.49	1.13
TH240147	9/ 3/24	437381.41	3367079.00	312.72	1.74	0.01	0.01	1.77	1.22
TH240148	9/ 4/24	437851.19	3366908.00	366.34	0.01	0.00	0.00	0.01	0.01
TH240149	9/ 9/24	437851.19	3366908.00	291.48	0.80	0.04	0.04	0.87	0.73
TH240150	9/10/24	438145.91	3367540.00	349.45	0.69	0.00	0.00	0.70	0.28
TH240151	9/21/24	437670.81	3366235.00	236.90	0.00	0.00	0.00	0.00	0.00
TH240152	9/23/24	437381.41	3367079.00	253.09	2.56	0.02	0.02	2.60	1.46
TH240153	9/26/24	438163.19	3366148.00	286.67	0.00	0.00	0.00	0.00	0.00
TH240154	9/30/24	437178.41	3366322.00	234.66	0.03	0.03	0.04	0.10	0.45
TH240155	10/ 1/24	437851.19	3366908.00	653.43	1.20	0.02	0.02	1.24	1.18
TH240156	10/ 1/24	437381.41	3367079.00	618.68	1.16	0.02	0.02	1.20	1.08
TH240157	10/ 1/24	436911.50	3367250.00	396.84	1.11	0.02	0.02	1.14	1.00
TH240158	10/ 2/24	437381.41	3367079.00	250.12	2.82	0.02	0.02	2.87	1.96
TH240159	10/ 3/24	437851.19	3366908.00	541.79	0.06	0.00	0.00	0.06	0.06
TH240160	10/ 4/24	438578.91	3367290.00	236.53	0.02	0.02	0.02	0.05	0.30
TH240161	10/ 4/24	438545.81	3368111.00	261.11	0.01	0.01	0.01	0.02	0.21
TH240162	10/ 6/24	438110.00	3365540.00	292.33	0.48	0.01	0.01	0.49	0.32
TH240163	10/ 8/24	437670.81	3366235.00	284.32	0.00	0.00	0.00	0.00	0.00
TH240164	10/11/24	438578.91	3367290.00	273.80	0.00	0.00	0.00	0.00	0.00
TH240165	10/17/24	437178.41	3366322.00	445.61	0.00	0.00	0.00	0.00	0.00
TH240166	10/19/24	437610.00	3365540.00	248.04	0.11	0.09	0.16	0.36	1.41
TH240167	10/24/24	437851.19	3366908.00	693.61	0.00	0.00	0.00	0.00	0.00
TH240168	10/25/24	437670.81	3366235.00	254.02	0.00	0.00	0.00	0.00	0.00
TH240169	10/26/24	437178.41	3366322.00	251.64	0.02	0.00	0.00	0.03	0.11
TH240170	10/27/24	437381.41	3367079.00	432.72	0.25	0.05	0.05	0.35	1.79
TH240171	10/27/24	436911.50	3367250.00	277.78	0.32	0.05	0.05	0.41	1.79
TH240172	10/30/24	437851.19	3366908.00	488.05	0.00	0.00	0.00	0.00	0.00
TH240173	10/31/24	438717.50	3362093.00	252.55	0.00	0.00	0.00	0.00	0.00
TH240174	10/31/24	437851.19	3366908.00	1685.88	0.00	0.00	0.00	0.00	0.00
TH240175	10/31/24	437712.91	3367790.00	310.03	0.00	0.00	0.00	0.00	0.00
TH240176	10/31/24	437279.91	3368040.00	258.33	0.00	0.00	0.00	0.00	0.00
TH240177	11/ 1/24	438145.91	3367540.00	255.42	0.00	0.00	0.00	0.00	0.00
TH240178	11/ 3/24	437851.19	3366908.00	345.06	0.01	0.04	0.04	0.09	0.13
TH240179	11/ 4/24	438790.91	3366566.00	270.17	0.00	0.00	0.00	0.00	0.00
TH240180	11/ 4/24	438321.09	3366737.00	471.09	0.00	0.00	0.00	0.00	0.00
TH240181	11/ 5/24	438321.09	3366737.00	414.23	0.00	0.00	0.00	0.00	0.00
TH240182	11/ 6/24	438321.09	3366737.00	304.40	0.00	0.00	0.00	0.00	0.00
TH240183	11/ 8/24	437110.00	3365540.00	241.42	0.00	0.00	0.00	0.00	0.00
TH240184	11/11/24	437670.81	3366235.00	237.93	0.00	0.00	0.00	0.00	0.00
TH240185	11/11/24	437178.41	3366322.00	236.83	0.00	0.00	0.00	0.00	0.00
TH240186	11/17/24	437178.41	3366322.00	241.77	0.55	0.01	0.01	0.56	0.25
TH240187	11/19/24	436686.00	3366408.00	238.70	0.02	0.00	0.00	0.03	0.11

TABLE D-8 (Cont'd)

ISCEV2 Modeling Summary
24-Hour SO_2 AAQS Compliance Analysis
1985 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH240188	11/20/24	437381.41	3367079.00	364.49	0.35	0.06	0.06	0.47	2.53
TH240189	11/20/24	436911.50	3367250.00	265.41	0.45	0.05	0.05	0.55	2.46
TH240190	11/21/24	438396.09	3361710.00	241.83	0.00	0.00	0.00	0.00	0.00
TH240191	11/25/24	437851.19	3366908.00	246.61	0.00	0.00	0.00	0.00	0.00
TH240192	11/27/24	438162.81	3368433.00	243.37	0.27	0.00	0.00	0.27	0.08
TH240193	11/28/24	437712.91	3367790.00	351.68	0.00	0.00	0.00	0.00	0.00
TH240194	11/28/24	438162.81	3368433.00	255.24	0.00	0.00	0.00	0.00	0.00
TH240195	11/28/24	437779.81	3368754.00	393.66	0.00	0.00	0.00	0.00	0.00
TH240196	11/29/24	437851.19	3366908.00	376.80	0.00	0.00	0.00	0.00	0.00
TH240197	11/30/24	438545.81	3368111.00	235.60	0.00	0.04	0.04	0.08	0.03
TH240198	12/ 6/24	438163.19	3366148.00	234.96	0.00	0.00	0.00	0.00	0.00
TH240199	12/10/24	437178.41	3366322.00	235.29	0.09	0.04	0.04	0.18	1.22
TH240200	12/11/24	437851.19	3366908.00	1105.81	0.00	0.00	0.00	0.00	0.00
TH240201	12/12/24	438145.91	3367540.00	302.36	0.00	0.00	0.00	0.00	0.00
TH240202	12/15/24	438163.19	3366148.00	327.66	0.00	0.00	0.00	0.00	0.00
TH240203	12/20/24	438321.09	3366737.00	322.13	0.00	0.00	0.00	0.00	0.00
TH240204	12/24/24	438545.81	3368111.00	243.78	0.00	0.00	0.00	0.00	0.00
TH240205	12/27/24	438578.91	3367290.00	282.09	0.00	0.00	0.00	0.00	0.00
TH240206	12/28/24	437851.19	3366908.00	292.79	0.01	0.01	0.01	0.02	0.06
TH240207	12/29/24	438321.09	3366737.00	348.26	0.00	0.00	0.00	0.00	0.00
TH240208	12/31/24	437851.19	3366908.00	442.39	0.00	0.00	0.00	0.00	0.00

TABLE D-9

ISCEV2 Modeling Summary
24-Hour SO_2 AAQS Compliance Analysis
1986 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH240001	1/ 3/24	438578.91	3367290.00	262.08	0.00	0.00	0.00	0.00	0.00
TH240002	1/ 6/24	437851.19	3366908.00	296.54	0.00	0.00	0.00	0.00	0.00
TH240003	1/14/24	438321.09	3366737.00	518.06	0.00	0.00	0.00	0.00	0.00
TH240004	1/14/24	438578.91	3367290.00	331.62	0.00	0.00	0.00	0.00	0.00
TH240005	1/17/24	438321.09	3366737.00	287.43	0.01	0.00	0.00	0.01	0.02
TH240006	1/17/24	437381.41	3367079.00	260.31	0.01	0.00	0.00	0.01	0.02
TH240007	1/19/24	438321.09	3366737.00	295.44	0.00	0.00	0.00	0.00	0.00
TH240008	1/20/24	438321.09	3366737.00	232.40	0.00	0.00	0.00	0.00	0.00
TH240009	1/20/24	439011.91	3367040.00	253.68	0.00	0.00	0.00	0.00	0.00
TH240010	1/31/24	438790.91	3366566.00	247.51	0.78	0.02	0.02	0.82	1.25
TH240011	2/ 3/24	437851.19	3366908.00	1235.62	0.00	0.00	0.00	0.00	0.00
TH240012	2/ 4/24	437851.19	3366908.00	377.27	0.00	0.00	0.00	0.00	0.00
TH240013	2/ 6/24	437851.19	3366908.00	605.08	0.00	0.00	0.00	0.00	0.00
TH240014	2/ 6/24	438145.91	3367540.00	238.91	0.00	0.00	0.00	0.00	0.00
TH240015	2/ 9/24	437851.19	3366908.00	340.75	0.00	0.04	0.04	0.09	0.50
TH240016	2/10/24	437851.19	3366908.00	355.86	0.00	0.08	0.08	0.16	0.99
TH240017	2/12/24	438655.59	3366061.00	243.65	0.00	0.00	0.00	0.00	0.00
TH240018	2/16/24	437851.19	3366908.00	235.01	1.83	0.01	0.01	1.85	1.24
TH240019	2/17/24	437851.19	3366908.00	879.86	0.00	0.00	0.00	0.00	0.00
TH240020	2/20/24	438321.09	3366737.00	274.36	0.07	0.00	0.00	0.07	0.02
TH240021	2/22/24	438578.91	3367290.00	298.53	0.00	0.00	0.00	0.00	0.00
TH240022	2/24/24	439011.91	3367040.00	239.96	0.00	0.00	0.00	0.00	0.00
TH240023	2/25/24	438163.19	3366148.00	399.81	0.00	0.00	0.00	0.00	0.00
TH240024	2/26/24	442478.31	3360616.00	233.44	0.00	0.00	0.00	0.00	0.00
TH240025	2/26/24	438578.91	3367290.00	255.45	0.00	0.00	0.00	0.00	0.00
TH240026	3/ 1/24	438655.59	3366061.00	246.55	0.00	0.00	0.00	0.00	0.00
TH240027	3/ 2/24	438321.09	3366737.00	539.04	0.00	0.00	0.00	0.00	0.00
TH240028	3/ 3/24	438578.91	3367290.00	259.92	0.00	0.00	0.00	0.00	0.00
TH240029	3/ 6/24	438321.09	3366737.00	234.72	0.00	0.00	0.00	0.00	0.00
TH240030	3/ 7/24	438321.09	3366737.00	376.85	0.00	0.00	0.00	0.00	0.00
TH240031	3/10/24	437851.19	3366908.00	567.87	0.01	0.00	0.00	0.01	0.03
TH240032	3/10/24	437381.41	3367079.00	270.85	0.02	0.00	0.00	0.02	0.03
TH240033	3/12/24	437851.19	3366908.00	494.45	1.03	0.01	0.01	1.06	1.01
TH240034	3/12/24	437381.41	3367079.00	245.50	1.03	0.01	0.01	1.05	0.94
TH240035	3/13/24	437851.19	3366908.00	823.30	0.00	0.00	0.00	0.00	0.00
TH240036	3/13/24	437712.91	3367790.00	331.16	0.03	0.00	0.00	0.03	0.03
TH240037	3/14/24	438578.91	3367290.00	237.59	0.00	0.00	0.00	0.00	0.01
TH240038	3/15/24	437851.19	3366908.00	274.99	0.00	0.00	0.00	0.00	0.00
TH240039	3/18/24	438396.09	3361710.00	271.65	0.00	0.00	0.00	0.00	0.00
TH240040	3/18/24	437851.19	3366908.00	996.19	0.00	0.01	0.02	0.03	0.09
TH240041	3/19/24	437851.19	3366908.00	616.64	0.00	0.00	0.00	0.00	0.00
TH240042	3/29/24	437178.41	3366322.00	263.25	0.00	0.00	0.00	0.00	0.00
TH240043	3/30/24	437851.19	3366908.00	464.51	0.80	0.02	0.02	0.85	0.95
TH240044	4/ 1/24	438321.09	3366737.00	247.33	2.03	0.01	0.01	2.05	0.99
TH240045	4/ 4/24	437851.19	3366908.00	381.25	2.25	0.05	0.07	2.37	1.92
TH240046	4/ 4/24	437381.41	3367079.00	331.31	2.12	0.04	0.05	2.21	1.70
TH240047	4/ 5/24	437381.41	3367079.00	577.08	4.95	0.05	0.05	5.06	3.62
TH240048	4/ 5/24	436911.50	3367250.00	242.07	4.72	0.05	0.05	4.82	3.27
TH240049	4/ 6/24	437851.19	3366908.00	374.48	1.09	0.00	0.00	1.10	0.43
TH240050	4/10/24	438655.59	3366061.00	238.62	0.00	0.00	0.00	0.00	0.00
TH240051	4/11/24	438321.09	3366737.00	305.69	0.00	0.00	0.00	0.00	0.00
TH240052	4/14/24	437851.19	3366908.00	1065.53	0.77	0.03	0.03	0.82	1.29
TH240053	4/16/24	438321.09	3366737.00	262.40	0.00	0.00	0.00	0.00	0.00
TH240054	4/18/24	437851.19	3366908.00	230.55	0.73	0.02	0.03	0.78	0.79
TH240055	4/18/24	437381.41	3367079.00	270.93	0.62	0.02	0.02	0.65	0.71

TABLE D-9 (Cont'd)

ISCEV2 Modeling Summary
24-Hour SO_2 AAQS Compliance Analysis
1986 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH240056	4/20/24	438321.09	3366737.00	272.80	0.00	0.00	0.00	0.00	0.00
TH240057	4/20/24	437851.19	3366908.00	636.21	0.00	0.00	0.00	0.00	0.00
TH240058	4/26/24	438321.09	3366737.00	376.55	0.00	0.00	0.00	0.00	0.00
TH240059	4/27/24	438321.09	3366737.00	275.79	0.00	0.00	0.00	0.00	0.00
TH240060	4/27/24	439011.91	3367040.00	321.47	0.00	0.00	0.00	0.00	0.00
TH240061	4/27/24	439694.91	3367147.00	280.88	0.00	0.00	0.00	0.00	0.00
TH240062	4/28/24	438321.09	3366737.00	355.21	0.00	0.00	0.00	0.00	0.00
TH240063	4/28/24	437851.19	3366908.00	372.26	0.00	0.00	0.00	0.00	0.00
TH240064	4/29/24	438321.09	3366737.00	469.39	0.00	0.00	0.00	0.00	0.00
TH240065	4/30/24	437851.19	3366908.00	333.52	1.56	0.00	0.00	1.57	0.51
TH240066	4/30/24	437381.41	3367079.00	362.45	1.30	0.00	0.00	1.31	0.41
TH240067	5/ 2/24	438321.09	3366737.00	250.39	0.00	0.00	0.00	0.00	0.00
TH240068	5/ 4/24	437178.41	3366322.00	384.06	0.01	0.00	0.00	0.01	0.01
TH240069	5/ 5/24	437851.19	3366908.00	701.84	0.18	0.00	0.00	0.18	0.20
TH240070	5/ 5/24	437381.41	3367079.00	263.37	0.18	0.00	0.00	0.18	0.20
TH240071	5/ 6/24	437851.19	3366908.00	907.00	0.29	0.03	0.03	0.34	1.21
TH240072	5/ 9/24	437178.41	3366322.00	276.02	0.00	0.00	0.00	0.00	0.00
TH240073	5/10/24	437178.41	3366322.00	283.66	0.00	0.00	0.00	0.00	0.00
TH240074	5/11/24	437851.19	3366908.00	1093.55	1.50	0.00	0.00	1.51	0.59
TH240075	5/14/24	437381.41	3367079.00	235.97	0.76	0.04	0.04	0.83	1.84
TH240076	5/15/24	437381.41	3367079.00	473.71	3.04	0.07	0.07	3.18	2.67
TH240077	5/15/24	436911.50	3367250.00	266.67	2.82	0.06	0.06	2.94	2.43
TH240078	5/16/24	437381.41	3367079.00	378.34	2.41	0.09	0.09	2.59	2.79
TH240079	5/17/24	437381.41	3367079.00	356.90	0.78	0.04	0.04	0.86	2.32
TH240080	5/18/24	437851.19	3366908.00	846.54	0.36	0.00	0.00	0.37	0.16
TH240081	5/19/24	437851.19	3366908.00	510.16	0.00	0.00	0.00	0.00	0.01
TH240082	5/21/24	438321.09	3366737.00	242.65	0.00	0.00	0.00	0.00	0.00
TH240083	5/23/24	437851.19	3366908.00	538.25	1.01	0.00	0.00	1.02	0.48
TH240084	5/23/24	437381.41	3367079.00	290.03	0.96	0.00	0.00	0.97	0.41
TH240085	5/25/24	437851.19	3366908.00	437.81	0.25	0.00	0.00	0.25	0.10
TH240086	5/27/24	437851.19	3366908.00	1075.03	0.13	0.04	0.04	0.21	1.52
TH240087	5/28/24	437851.19	3366908.00	575.71	0.33	0.00	0.00	0.33	0.13
TH240088	5/30/24	437712.91	3367790.00	254.69	0.00	0.00	0.00	0.00	0.00
TH240089	6/ 1/24	437851.19	3366908.00	956.30	2.27	0.02	0.02	2.31	1.58
TH240090	6/ 1/24	437712.91	3367790.00	271.07	0.33	0.00	0.00	0.34	0.35
TH240091	6/ 2/24	437851.19	3366908.00	234.47	1.17	0.01	0.01	1.18	0.65
TH240092	6/ 3/24	437178.41	3366322.00	290.87	1.76	0.01	0.01	1.78	1.02
TH240093	6/ 3/24	437851.19	3366908.00	296.06	0.10	0.01	0.01	0.11	0.68
TH240094	6/ 6/24	437851.19	3366908.00	305.77	0.86	0.01	0.01	0.88	0.76
TH240095	6/ 7/24	438321.09	3366737.00	274.00	0.00	0.04	0.05	0.09	0.22
TH240096	6/ 7/24	437851.19	3366908.00	346.96	0.00	0.04	0.04	0.08	0.25
TH240097	6/ 8/24	438321.09	3366737.00	232.51	0.00	0.00	0.00	0.00	0.00
TH240098	6/ 8/24	439011.91	3367040.00	283.20	0.00	0.00	0.00	0.00	0.00
TH240099	6/13/24	437851.19	3366908.00	237.89	0.00	0.00	0.00	0.00	0.00
TH240100	6/14/24	438321.09	3366737.00	265.24	0.47	0.00	0.00	0.48	0.27
TH240101	6/15/24	437851.19	3366908.00	618.04	0.96	0.01	0.01	0.99	0.93
TH240102	6/16/24	437712.91	3367790.00	273.95	1.07	0.01	0.01	1.09	1.16
TH240103	6/24/24	437851.19	3366908.00	268.33	0.20	0.00	0.00	0.21	0.18
TH240104	6/25/24	438321.09	3366737.00	302.38	0.01	0.00	0.00	0.01	0.00
TH240105	6/27/24	437851.19	3366908.00	961.52	1.59	0.01	0.01	1.61	0.98
TH240106	6/27/24	437279.91	3368040.00	289.97	1.31	0.01	0.01	1.33	0.99
TH240107	6/28/24	437851.19	3366908.00	499.58	0.00	0.00	0.00	0.00	0.00
TH240108	6/29/24	438145.91	3367540.00	241.31	0.00	0.00	0.00	0.00	0.00
TH240109	6/30/24	437851.19	3366908.00	246.79	0.03	0.00	0.00	0.03	0.03
TH240110	7/ 1/24	438578.91	3367290.00	284.42	0.00	0.00	0.00	0.00	0.00
TH240111	7/ 2/24	438321.09	3366737.00	349.07	0.00	0.00	0.00	0.00	0.00
TH240112	7/ 3/24	438321.09	3366737.00	267.53	0.59	0.06	0.06	0.70	1.41
TH240113	7/ 7/24	437851.19	3366908.00	976.60	2.82	0.01	0.01	2.84	1.07
TH240114	7/ 7/24	437381.41	3367079.00	337.91	2.48	0.01	0.01	2.50	0.89
TH240115	7/ 8/24	437851.19	3366908.00	485.63	0.00	0.00	0.00	0.00	0.00
TH240116	7/10/24	438321.09	3366737.00	252.80	0.00	0.00	0.00	0.00	0.00
TH240117	7/11/24	438321.09	3366737.00	339.05	0.00	0.00	0.00	0.00	0.00
TH240118	7/18/24	438321.09	3366737.00	309.26	0.00	0.00	0.00	0.00	0.00
TH240119	7/19/24	438321.09	3366737.00	319.80	0.00	0.00	0.00	0.00	0.00
TH240120	7/20/24	438578.91	3367290.00	254.08	0.00	0.00	0.00	0.00	0.00
TH240121	7/21/24	438578.91	3367290.00	282.18	0.00	0.00	0.00	0.00	0.00

TABLE D-9 (Cont'd)

ISCEV2 Modeling Summary
24-Hour SO_2 AAQS Compliance Analysis
1986 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH240122	7/25/24	437851.19	3366908.00	239.61	0.00	0.00	0.00	0.00	0.00
TH240123	7/26/24	437851.19	3366908.00	284.59	0.00	0.00	0.00	0.00	0.00
TH240124	7/26/24	438578.91	3367290.00	237.01	0.01	0.02	0.02	0.04	0.11
TH240125	7/27/24	438578.91	3367290.00	319.74	0.00	0.00	0.00	0.00	0.00
TH240126	7/31/24	438321.09	3366737.00	290.49	0.00	0.00	0.00	0.00	0.00
TH240127	8/ 3/24	437851.19	3366908.00	509.54	0.00	0.00	0.00	0.00	0.00
TH240128	8/ 4/24	437851.19	3366908.00	282.03	0.00	0.00	0.00	0.00	0.00
TH240129	8/10/24	437851.19	3366908.00	526.71	0.73	0.00	0.00	0.73	0.25
TH240130	8/11/24	437851.19	3366908.00	845.69	0.00	0.00	0.00	0.00	0.00
TH240131	8/12/24	438396.09	3361710.00	256.06	0.00	0.00	0.00	0.00	0.00
TH240132	8/13/24	437851.19	3366908.00	1086.23	0.00	0.00	0.00	0.00	0.00
TH240133	8/13/24	437712.91	3367790.00	263.82	0.00	0.00	0.00	0.00	0.00
TH240134	8/14/24	438578.91	3367290.00	330.30	0.00	0.00	0.00	0.00	0.00
TH240135	8/16/24	438321.09	3366737.00	418.20	0.00	0.00	0.00	0.00	0.00
TH240136	8/17/24	438321.09	3366737.00	307.57	0.00	0.00	0.00	0.00	0.00
TH240137	8/20/24	437851.19	3366908.00	1171.35	0.00	0.00	0.00	0.00	0.01
TH240138	8/21/24	437712.91	3367790.00	296.70	0.02	0.15	0.16	0.33	0.95
TH240139	8/26/24	437381.41	3367079.00	327.23	2.39	0.03	0.03	2.46	1.67
TH240140	8/27/24	437851.19	3366908.00	405.25	0.62	0.00	0.00	0.62	0.33
TH240141	8/28/24	438578.91	3367290.00	289.96	0.00	0.00	0.00	0.00	0.00
TH240142	9/ 1/24	437178.41	3366322.00	270.57	0.11	0.02	0.02	0.15	0.85
TH240143	9/ 2/24	438163.19	3366148.00	240.18	0.00	0.00	0.00	0.00	0.00
TH240144	9/ 4/24	437381.41	3367079.00	286.18	0.23	0.01	0.01	0.26	0.47
TH240145	9/ 7/24	437178.41	3366322.00	344.12	0.05	0.01	0.01	0.08	0.43
TH240146	9/ 8/24	437178.41	3366322.00	238.04	1.00	0.01	0.01	1.02	0.57
TH240147	9/11/24	437851.19	3366908.00	547.61	0.40	0.02	0.02	0.43	0.79
TH240148	9/12/24	438321.09	3366737.00	272.63	0.00	0.00	0.00	0.00	0.00
TH240149	9/15/24	437381.41	3367079.00	254.75	0.96	0.00	0.00	0.97	0.41
TH240150	9/21/24	437851.19	3366908.00	566.63	0.74	0.00	0.00	0.75	0.35
TH240151	9/23/24	437381.41	3367079.00	241.29	0.03	0.00	0.00	0.03	0.03
TH240152	9/25/24	437381.41	3367079.00	266.09	0.12	0.00	0.00	0.12	0.07
TH240153	9/26/24	437381.41	3367079.00	257.72	2.04	0.01	0.01	2.07	1.29
TH240154	9/27/24	437851.19	3366908.00	407.69	0.00	0.00	0.00	0.01	0.01
TH240155	9/30/24	437381.41	3367079.00	234.52	0.11	0.00	0.00	0.11	0.07
TH240156	10/ 1/24	437851.19	3366908.00	508.45	0.10	0.00	0.00	0.11	0.07
TH240157	10/ 2/24	437851.19	3366908.00	384.67	2.07	0.01	0.01	2.10	1.23
TH240158	10/ 4/24	438578.91	3367290.00	271.85	0.00	0.00	0.00	0.00	0.00
TH240159	10/ 5/24	438321.09	3366737.00	501.70	0.00	0.00	0.00	0.00	0.00
TH240160	10/ 6/24	438321.09	3366737.00	249.46	0.01	0.03	0.04	0.07	0.40
TH240161	10/ 7/24	437381.41	3367079.00	259.47	0.16	0.05	0.05	0.25	1.66
TH240162	10/ 8/24	437381.41	3367079.00	309.76	0.86	0.02	0.02	0.90	0.73
TH240163	10/11/24	437670.81	3366235.00	358.40	0.00	0.00	0.00	0.00	0.00
TH240164	10/12/24	437610.00	3365540.00	253.84	0.00	0.00	0.00	0.00	0.00
TH240165	10/12/24	437670.81	3366235.00	250.98	0.00	0.00	0.00	0.00	0.00
TH240166	10/13/24	437851.19	3366908.00	357.14	0.40	0.00	0.00	0.41	0.43
TH240167	10/25/24	438717.50	3362093.00	233.16	0.00	0.00	0.00	0.00	0.00
TH240168	10/25/24	437851.19	3366908.00	1360.74	0.00	0.00	0.00	0.00	0.00
TH240169	10/25/24	437712.91	3367790.00	406.69	0.00	0.00	0.00	0.00	0.00
TH240170	10/25/24	437279.91	3368040.00	250.61	0.00	0.00	0.00	0.00	0.00
TH240171	10/26/24	437851.19	3366908.00	242.58	0.00	0.00	0.00	0.00	0.00
TH240172	10/29/24	437110.00	3365540.00	247.70	0.00	0.00	0.00	0.00	0.00
TH240173	10/30/24	438163.19	3366148.00	236.13	0.00	0.00	0.00	0.00	0.00
TH240174	10/30/24	437670.81	3366235.00	403.23	0.00	0.00	0.00	0.00	0.00
TH240175	10/31/24	437670.81	3366235.00	262.09	0.00	0.00	0.00	0.00	0.00
TH240176	11/ 1/24	437670.81	3366235.00	257.02	0.00	0.00	0.00	0.00	0.00
TH240177	11/ 2/24	438655.59	3366061.00	303.43	0.00	0.00	0.00	0.00	0.00
TH240178	11/ 2/24	438163.19	3366148.00	373.38	0.00	0.00	0.00	0.00	0.00
TH240179	11/ 4/24	437178.41	3366322.00	303.22	0.00	0.00	0.00	0.00	0.00
TH240180	11/ 7/24	437851.19	3366908.00	411.69	0.02	0.01	0.01	0.03	0.27
TH240181	11/ 8/24	437851.19	3366908.00	316.24	0.01	0.00	0.00	0.01	0.04
TH240182	11/ 8/24	437381.41	3367079.00	279.91	0.01	0.00	0.00	0.02	0.04
TH240183	11/10/24	437178.41	3366322.00	239.30	0.35	0.00	0.00	0.35	0.29
TH240184	11/11/24	437381.41	3367079.00	316.71	0.60	0.00	0.00	0.60	0.29
TH240185	11/12/24	437851.19	3366908.00	483.27	0.04	0.02	0.02	0.09	0.69
TH240186	11/18/24	438928.81	3367790.00	237.41	0.00	0.00	0.00	0.00	0.00
TH240187	11/24/24	437851.19	3366908.00	303.95	0.33	0.00	0.00	0.33	0.19

TABLE D-9 (Cont'd)

ISCEV2 Modeling Summary
24-Hour SO_2 AAQS Compliance Analysis
1986 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH24018B	11/25/24	437851.19	3366908.00	503.67	0.00	0.00	0.00	0.01	0.02
TH240189	11/26/24	437851.19	3366908.00	390.22	0.00	0.00	0.00	0.00	0.00
TH240190	11/26/24	437712.91	3367790.00	257.90	0.00	0.00	0.00	0.00	0.00
TH240191	11/29/24	437178.41	3366322.00	254.45	0.00	0.00	0.00	0.00	0.00
TH240192	12/ 1/24	437670.81	3366235.00	445.44	0.00	0.00	0.00	0.00	0.00
TH240193	12/ 3/24	438321.09	3366737.00	248.40	0.00	0.00	0.00	0.00	0.00
TH240194	12/ 8/24	437381.41	3367079.00	269.03	0.73	0.00	0.00	0.74	0.38
TH240195	12/ 9/24	438717.50	3362093.00	260.84	0.00	0.00	0.00	0.00	0.00
TH240196	12/ 9/24	437851.19	3366908.00	2047.77	0.00	0.00	0.00	0.00	0.00
TH240197	12/ 9/24	437712.91	3367790.00	394.71	0.00	0.00	0.00	0.00	0.00
TH240198	12/ 9/24	437279.91	3368040.00	432.60	0.00	0.00	0.00	0.00	0.00
TH240199	12/11/24	437851.19	3366908.00	356.38	0.00	0.00	0.00	0.00	0.00
TH240200	12/11/24	437712.91	3367790.00	328.49	0.00	0.00	0.00	0.00	0.00
TH240201	12/12/24	438578.91	3367290.00	245.17	0.00	0.00	0.00	0.00	0.00
TH240202	12/24/24	438578.91	3367290.00	379.45	0.00	0.00	0.00	0.00	0.00
TH240203	12/28/24	437178.41	3366322.00	271.61	0.00	0.00	0.00	0.00	0.00
TH240204	12/29/24	438163.19	3366148.00	258.51	0.00	0.00	0.00	0.00	0.00

TABLE D-10

ISCEV2 Modeling Summary
24-Hour SO_2 AAQS Compliance Analysis
1987 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Cedar Bay Cogen. Project Total	CFB	LSD1	LSD2	Total	SK Package Boilers
TH240001	1/ 1/24	439148.00	3365974.00	244.04	0.00	0.00	0.00	0.00	0.00
TH240002	1/ 2/24	438790.91	3366566.00	307.74	0.00	0.00	0.00	0.00	0.00
TH240003	1/ 2/24	438321.09	3366737.00	668.46	0.00	0.00	0.00	0.00	0.00
TH240004	1/11/24	438655.59	3366061.00	262.28	0.00	0.00	0.00	0.00	0.00
TH240005	1/12/24	439011.91	3367040.00	374.22	0.00	0.00	0.00	0.00	0.00
TH240006	1/14/24	437381.41	3367079.00	289.93	0.26	0.01	0.01	0.27	0.99
TH240007	1/16/24	437851.19	3366908.00	601.87	0.06	0.05	0.06	0.16	1.14
TH240008	1/18/24	437851.19	3366908.00	606.07	0.00	0.00	0.00	0.00	0.00
TH240009	1/19/24	437851.19	3366908.00	247.04	0.00	0.00	0.00	0.00	0.00
TH240010	1/21/24	437670.81	3366235.00	341.41	0.00	0.00	0.00	0.00	0.00
TH240011	1/23/24	438790.91	3366566.00	255.87	0.00	0.00	0.00	0.00	0.00
TH240012	1/23/24	438321.09	3366737.00	494.63	0.00	0.00	0.00	0.00	0.00
TH240013	1/25/24	437851.19	3366908.00	381.92	0.00	0.00	0.00	0.00	0.00
TH240014	1/27/24	438655.59	3366061.00	295.97	0.00	0.00	0.00	0.00	0.00
TH240015	1/29/24	437851.19	3366908.00	861.07	0.00	0.00	0.00	0.00	0.00
TH240016	1/29/24	437712.91	3367790.00	239.33	0.00	0.00	0.00	0.00	0.00
TH240017	2/ 2/24	437851.19	3366908.00	335.65	0.00	0.00	0.00	0.00	0.00
TH240018	2/ 2/24	438145.91	3367540.00	241.59	0.00	0.00	0.00	0.00	0.00
TH240019	2/ 4/24	437670.81	3366235.00	336.42	0.00	0.00	0.00	0.00	0.00
TH240020	2/ 5/24	437178.41	3366322.00	275.33	0.01	0.02	0.02	0.05	0.17
TH240021	2/ 6/24	437178.41	3366322.00	235.21	0.00	0.00	0.00	0.00	0.00
TH240022	2/12/24	439311.91	3367468.00	233.60	0.00	0.00	0.00	0.00	0.00
TH240023	2/20/24	437178.41	3366322.00	251.90	0.00	0.00	0.00	0.00	0.00
TH240024	2/22/24	437851.19	3366908.00	237.48	0.00	0.00	0.00	0.00	0.00
TH240025	2/24/24	437110.00	3365540.00	260.56	0.00	0.00	0.00	0.00	0.00
TH240026	2/26/24	437670.81	3366235.00	664.10	0.00	0.00	0.00	0.00	0.00
TH240027	2/28/24	437851.19	3366908.00	639.33	0.00	0.00	0.00	0.00	0.00
TH240028	3/ 1/24	437851.19	3366908.00	324.38	0.00	0.00	0.00	0.00	0.00
TH240029	3/ 1/24	438578.91	3367290.00	252.75	0.00	0.00	0.00	0.00	0.00
TH240030	3/ 6/24	437670.81	3366235.00	254.88	0.00	0.00	0.00	0.00	0.00
TH240031	3/10/24	438321.09	3366737.00	407.07	0.00	0.00	0.00	0.00	0.00
TH240032	3/11/24	437670.81	3366235.00	428.49	0.00	0.00	0.00	0.00	0.00
TH240033	3/12/24	438163.19	3366148.00	275.56	0.00	0.00	0.00	0.00	0.00
TH240034	3/17/24	437610.00	3365540.00	248.61	0.00	0.00	0.00	0.00	0.00
TH240035	3/18/24	438396.09	3361710.00	238.04	0.00	0.01	0.01	0.02	0.00
TH240036	3/18/24	437851.19	3366908.00	709.27	0.00	0.01	0.02	0.04	0.09
TH240037	3/20/24	437178.41	3366322.00	255.24	0.00	0.00	0.00	0.00	0.00
TH240038	3/21/24	438321.09	3366737.00	313.73	0.00	0.00	0.00	0.00	0.00
TH240039	3/22/24	438321.09	3366737.00	271.57	0.00	0.00	0.00	0.00	0.00
TH240040	3/24/24	437381.41	3367079.00	541.52	0.26	0.03	0.03	0.32	1.54
TH240041	3/24/24	436911.50	3367250.00	287.90	0.32	0.03	0.03	0.38	1.52
TH240042	3/25/24	437851.19	3366908.00	678.19	0.00	0.00	0.00	0.00	0.00
TH240043	3/25/24	437712.91	3367790.00	234.31	0.00	0.00	0.00	0.01	0.03
TH240044	3/27/24	437851.19	3366908.00	363.90	0.00	0.00	0.00	0.00	0.00
TH240045	3/29/24	437851.19	3366908.00	519.89	0.03	0.02	0.02	0.08	0.67
TH240046	3/30/24	437851.19	3366908.00	318.97	0.00	0.00	0.00	0.00	0.00
TH240047	3/30/24	438578.91	3367290.00	251.22	0.00	0.00	0.00	0.00	0.00
TH240048	4/ 2/24	437851.19	3366908.00	232.46	0.00	0.00	0.00	0.00	0.00
TH240049	4/ 4/24	438321.09	3366737.00	258.80	0.00	0.00	0.00	0.00	0.00
TH240050	4/ 5/24	438790.91	3366566.00	250.30	0.00	0.00	0.00	0.00	0.00
TH240051	4/ 5/24	438321.09	3366737.00	390.73	0.00	0.00	0.00	0.00	0.00
TH240052	4/ 6/24	438321.09	3366737.00	667.62	0.00	0.00	0.00	0.00	0.00
TH240053	4/ 7/24	438321.09	3366737.00	437.62	0.00	0.00	0.00	0.00	0.00
TH240054	4/ 8/24	439640.41	3365887.00	232.50	0.00	0.00	0.00	0.00	0.00
TH240055	4/ 9/24	438790.91	3366566.00	370.31	0.00	0.00	0.00	0.00	0.00

TABLE D-10 (Cont'd)

ISCEV2 Modeling Summary
24-Hour SO_2 AAQS Compliance Analysis
1987 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH240056	4/10/24	438321.09	3366737.00	238.91	0.00	0.00	0.00	0.00	0.00
TH240057	4/10/24	439011.91	3367040.00	240.74	0.00	0.00	0.00	0.00	0.00
TH240058	4/13/24	437851.19	3366908.00	247.98	0.05	0.00	0.00	0.05	0.01
TH240059	4/14/24	437851.19	3366908.00	645.89	0.00	0.00	0.00	0.00	0.00
TH240060	4/17/24	438321.09	3366737.00	606.42	0.00	0.00	0.00	0.00	0.00
TH240061	4/23/24	437851.19	3366908.00	328.60	0.00	0.00	0.00	0.00	0.01
TH240062	4/23/24	437381.41	3367079.00	232.39	0.00	0.00	0.00	0.00	0.01
TH240063	4/23/24	437712.91	3367790.00	369.50	0.27	0.04	0.04	0.35	1.68
TH240064	4/26/24	438163.19	3366148.00	342.26	0.00	0.00	0.00	0.00	0.00
TH240065	5/ 1/24	438321.09	3366737.00	403.61	0.00	0.00	0.00	0.00	0.00
TH240066	5/ 5/24	437670.81	3366235.00	344.23	0.00	0.00	0.00	0.00	0.00
TH240067	5/ 6/24	437670.81	3366235.00	284.68	0.30	0.01	0.01	0.33	0.23
TH240068	5/ 9/24	437178.41	3366322.00	432.36	0.02	0.01	0.01	0.04	0.22
TH240069	5/11/24	437381.41	3367079.00	472.14	0.10	0.01	0.01	0.12	0.43
TH240070	5/12/24	437851.19	3366908.00	717.20	0.06	0.03	0.03	0.13	0.97
TH240071	5/12/24	437279.91	3368040.00	253.31	0.16	0.00	0.00	0.16	0.04
TH240072	5/14/24	437381.41	3367079.00	397.76	0.47	0.05	0.05	0.57	2.16
TH240073	5/14/24	436911.50	3367250.00	254.60	0.52	0.05	0.05	0.61	2.13
TH240074	5/15/24	437381.41	3367079.00	346.16	0.15	0.05	0.06	0.26	0.98
TH240075	5/16/24	437381.41	3367079.00	403.57	0.50	0.03	0.03	0.57	0.92
TH240076	5/17/24	437381.41	3367079.00	234.25	0.43	0.06	0.06	0.55	2.11
TH240077	5/18/24	437851.19	3366908.00	322.45	0.94	0.00	0.00	0.95	0.41
TH240078	5/18/24	437381.41	3367079.00	267.51	0.80	0.00	0.00	0.81	0.35
TH240079	5/19/24	437851.19	3366908.00	619.73	0.00	0.00	0.00	0.00	0.00
TH240080	5/22/24	437178.41	3366322.00	280.39	0.00	0.00	0.00	0.00	0.00
TH240081	5/24/24	437381.41	3367079.00	417.39	0.91	0.01	0.01	0.93	0.67
TH240082	5/25/24	437381.41	3367079.00	236.70	0.18	0.03	0.04	0.25	1.03
TH240083	5/28/24	437110.00	3365540.00	234.12	0.01	0.00	0.00	0.02	0.06
TH240084	5/31/24	437381.41	3367079.00	237.91	0.22	0.05	0.05	0.31	1.40
TH240085	6/ 1/24	437851.19	3366908.00	632.94	1.19	0.01	0.01	1.21	0.62
TH240086	6/ 2/24	437851.19	3366908.00	607.30	0.65	0.03	0.03	0.71	1.15
TH240087	6/ 3/24	437851.19	3366908.00	331.11	0.69	0.00	0.00	0.69	0.25
TH240088	6/ 3/24	437712.91	3367790.00	308.43	0.75	0.01	0.01	0.78	0.84
TH240089	6/ 7/24	437381.41	3367079.00	247.95	1.28	0.05	0.05	1.38	2.88
TH240090	6/ 8/24	437381.41	3367079.00	330.20	0.35	0.03	0.03	0.41	1.37
TH240091	6/ 9/24	437851.19	3366908.00	360.13	0.15	0.02	0.02	0.18	0.83
TH240092	6/10/24	437851.19	3366908.00	233.73	2.79	0.02	0.02	2.82	1.75
TH240093	6/11/24	437381.41	3367079.00	321.52	0.52	0.01	0.01	0.55	0.77
TH240094	6/12/24	437851.19	3366908.00	618.60	0.21	0.00	0.00	0.21	0.05
TH240095	6/14/24	437779.81	3368754.00	246.30	0.00	0.00	0.00	0.00	0.00
TH240096	6/17/24	438578.91	3367290.00	252.29	0.00	0.00	0.00	0.00	0.00
TH240097	6/19/24	437851.19	3366908.00	1105.30	0.93	0.01	0.01	0.94	0.70
TH240098	6/22/24	437851.19	3366908.00	420.63	0.00	0.00	0.00	0.00	0.00
TH240099	6/24/24	438162.81	3368433.00	253.94	0.04	0.00	0.00	0.05	0.05
TH240100	6/26/24	438162.81	3368433.00	288.29	0.00	0.00	0.00	0.00	0.00
TH240101	6/27/24	438578.91	3367290.00	253.26	0.00	0.00	0.00	0.00	0.00
TH240102	6/30/24	437851.19	3366908.00	309.05	0.00	0.00	0.00	0.00	0.00
TH240103	7/ 2/24	437851.19	3366908.00	1126.00	0.08	0.00	0.00	0.08	0.02
TH240104	7/ 4/24	437851.19	3366908.00	388.55	0.00	0.00	0.00	0.00	0.00
TH240105	7/21/24	437381.41	3367079.00	466.34	3.06	0.04	0.04	3.14	2.72
TH240106	7/29/24	438578.91	3367290.00	282.34	0.00	0.00	0.00	0.00	0.00
TH240107	7/31/24	438321.09	3366737.00	345.62	0.18	0.00	0.00	0.18	0.08
TH240108	8/ 3/24	438145.91	3367540.00	414.74	0.00	0.00	0.00	0.00	0.00
TH240109	8/ 4/24	438145.91	3367540.00	322.00	0.00	0.00	0.00	0.00	0.00
TH240110	8/ 6/24	437851.19	3366908.00	502.23	0.00	0.00	0.00	0.00	0.00
TH240111	8/12/24	438321.09	3366737.00	289.58	0.95	0.00	0.00	0.96	0.47
TH240112	8/19/24	437851.19	3366908.00	272.85	0.00	0.00	0.00	0.00	0.00
TH240113	8/20/24	438321.09	3366737.00	239.19	0.08	0.00	0.00	0.08	0.02
TH240114	8/20/24	437851.19	3366908.00	251.25	0.06	0.00	0.00	0.06	0.01
TH240115	8/24/24	438578.91	3367290.00	307.12	0.02	0.01	0.01	0.03	0.15
TH240116	8/27/24	437851.19	3366908.00	291.04	2.10	0.01	0.01	2.12	0.92
TH240117	8/27/24	437381.41	3367079.00	256.71	1.82	0.01	0.01	1.84	0.75
TH240118	8/28/24	437381.41	3367079.00	281.67	1.05	0.00	0.00	1.05	0.37
TH240119	8/29/24	437851.19	3366908.00	1110.03	1.13	0.01	0.01	1.16	0.87
TH240120	8/29/24	437381.41	3367079.00	265.86	1.00	0.01	0.01	1.02	0.80
TH240121	8/29/24	437279.91	3368040.00	243.17	0.97	0.03	0.03	1.03	1.53

TABLE D-10 (Cont'd)

ISCEV2 Modeling Summary
24-Hour SO_2 AAQS Compliance Analysis
1987 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH240122	9/ 7/24	438655.59	3366061.00	279.49	0.00	0.00	0.00	0.00	0.00
TH240123	9/ 8/24	438321.09	3366737.00	327.99	0.00	0.00	0.00	0.00	0.00
TH240124	9/ 9/24	437851.19	3366908.00	423.02	0.00	0.00	0.00	0.00	0.00
TH240125	9/10/24	437851.19	3366908.00	503.07	0.01	0.00	0.00	0.01	0.00
TH240126	9/12/24	437712.91	3367790.00	317.26	0.00	0.00	0.00	0.01	0.00
TH240127	9/13/24	438545.81	3368111.00	365.64	0.00	0.00	0.00	0.00	0.00
TH240128	9/14/24	438321.09	3366737.00	304.38	0.00	0.00	0.00	0.01	0.01
TH240129	9/17/24	437851.19	3366908.00	405.34	0.00	0.00	0.00	0.00	0.00
TH240130	9/19/24	438321.09	3366737.00	232.30	0.00	0.00	0.00	0.00	0.00
TH240131	9/29/24	437381.41	3367079.00	372.47	0.96	0.01	0.01	0.98	0.52
TH240132	10/ 3/24	438163.19	3366148.00	256.18	0.00	0.00	0.00	0.00	0.00
TH240133	10/ 4/24	438110.00	3365540.00	239.96	0.50	0.01	0.01	0.52	0.52
TH240134	10/ 7/24	438321.09	3366737.00	395.04	0.00	0.00	0.00	0.00	0.00
TH240135	10/11/24	437610.00	3365540.00	277.25	0.00	0.00	0.00	0.00	0.00
TH240136	10/11/24	437670.81	3366235.00	267.23	0.00	0.00	0.00	0.00	0.00
TH240137	10/16/24	437670.81	3366235.00	315.10	0.00	0.00	0.00	0.00	0.00
TH240138	10/17/24	438163.19	3366148.00	291.74	0.00	0.00	0.00	0.00	0.00
TH240139	10/19/24	437178.41	3366322.00	251.72	0.11	0.01	0.01	0.12	0.41
TH240140	10/23/24	437670.81	3366235.00	360.59	0.00	0.00	0.00	0.00	0.00
TH240141	10/25/24	437670.81	3366235.00	377.89	0.00	0.00	0.00	0.00	0.00
TH240142	10/27/24	438655.59	3366061.00	235.74	0.00	0.00	0.00	0.00	0.00
TH240143	10/28/24	438610.00	3365540.00	233.89	0.00	0.00	0.00	0.00	0.00
TH240144	10/28/24	438163.19	3366148.00	254.76	0.00	0.00	0.00	0.00	0.00
TH240145	10/31/24	437610.00	3365540.00	282.69	0.00	0.00	0.00	0.00	0.00
TH240146	11/ 1/24	437670.81	3366235.00	235.63	0.00	0.00	0.00	0.00	0.00
TH240147	11/ 3/24	436686.00	3366408.00	272.25	0.00	0.00	0.00	0.00	0.00
TH240148	11/ 9/24	437851.19	3366908.00	237.61	0.54	0.07	0.07	0.68	2.00
TH240149	11/ 9/24	437381.41	3367079.00	474.87	0.60	0.06	0.06	0.71	1.96
TH240150	11/ 9/24	436911.50	3367250.00	319.50	0.64	0.05	0.05	0.74	1.90
TH240151	11/10/24	438578.91	3367290.00	272.90	0.00	0.00	0.00	0.00	0.00
TH240152	11/15/24	437178.41	3366322.00	245.74	0.00	0.00	0.00	0.00	0.00
TH240153	11/17/24	437851.19	3366908.00	1145.34	0.00	0.00	0.00	0.01	0.02
TH240154	11/20/24	439148.00	3365974.00	282.48	0.00	0.00	0.00	0.00	0.00
TH240155	11/30/24	438321.09	3366737.00	498.26	0.00	0.00	0.00	0.00	0.00
TH240156	12/ 1/24	438321.09	3366737.00	260.81	0.00	0.00	0.00	0.00	0.00
TH240157	12/ 1/24	439444.91	3366790.00	270.04	0.00	0.00	0.00	0.00	0.00
TH240158	12/ 5/24	438655.59	3366061.00	243.00	0.00	0.00	0.00	0.00	0.00
TH240159	12/ 5/24	438163.19	3366148.00	292.68	0.00	0.00	0.00	0.00	0.00
TH240160	12/ 8/24	437381.41	3367079.00	267.85	0.06	0.00	0.00	0.07	0.19
TH240161	12/10/24	438145.91	3367540.00	365.77	0.00	0.00	0.00	0.00	0.00
TH240162	12/11/24	438321.09	3366737.00	329.64	0.00	0.00	0.00	0.00	0.00
TH240163	12/14/24	437851.19	3366908.00	990.63	0.00	0.00	0.00	0.00	0.00
TH240164	12/15/24	437851.19	3366908.00	581.64	0.00	0.00	0.00	0.00	0.00
TH240165	12/20/24	437851.19	3366908.00	547.86	0.00	0.00	0.00	0.00	0.00
TH240166	12/20/24	438162.81	3368433.00	267.45	0.00	0.00	0.00	0.00	0.00
TH240167	12/23/24	437178.41	3366322.00	256.86	0.01	0.00	0.00	0.01	0.01
TH240168	12/24/24	437851.19	3366908.00	757.19	0.01	0.00	0.00	0.02	0.05
TH240169	12/25/24	437851.19	3366908.00	601.42	0.00	0.00	0.00	0.00	0.00
TH240170	12/25/24	437712.91	3367790.00	261.84	0.00	0.00	0.00	0.00	0.00
TH240171	12/27/24	437851.19	3366908.00	271.33	0.00	0.00	0.00	0.00	0.00
TH240172	12/27/24	437712.91	3367790.00	305.24	0.00	0.00	0.00	0.00	0.00
TH240173	12/29/24	438655.59	3366061.00	244.28	0.00	0.00	0.00	0.00	0.00
TH240174	12/30/24	438163.19	3366148.00	271.54	0.00	0.01	0.01	0.02	0.08

TABLE D-11

Modeling Summary
Annual SO_2 AAQS Compliance Analysis
1983 Meteorology

Modeled Concentrations (ug/m^3)				
Receptor Location (m)			Cedar Bay Cogen. Project	SK Package Boilers
UTM X	UTM Y	Total	Total	
280	3000	56.74	0.19	0.21
290	3000	56.43	0.19	0.21
290	3500	87.95	0.19	0.19
300	3500	56.51	0.18	0.19
280	4000	60.53	0.19	0.17
280	4500	58.74	0.19	0.16
290	4000	117.80	0.19	0.17
290	4500	46.64	0.18	0.16

TABLE D-12

Modeling Summary
Annual SO_2 AAQS Compliance Analysis
1984 Meteorology

Modeled Concentrations (ug/m^3)				
Receptor Location (m)			Cedar Bay Cogen. Project	SK Package Boilers
UTM X	UTM Y	Total	Total	
280	3500	56.14	0.19	0.16
290	3500	83.10	0.18	0.18
300	3500	62.06	0.23	0.23
220	5000	57.87	0.17	0.24
280	4500	56.82	0.17	0.13
290	4000	148.55	0.18	0.17
290	4500	66.91	0.17	0.15

TABLE D-13

Modeling Summary
Annual SO_2 AAQS Compliance Analysis
1985 Meteorology

Modeled Concentrations (ug/m^3)				
Receptor Location (m)			Cedar Bay Cogen. Project	SK Package Boilers
UTM X	UTM Y	Total	Total	
290	3000	61.42	0.20	0.22
290	3500	97.86	0.21	0.21
300	3000	55.03	0.24	0.25
300	3500	64.72	0.24	0.23
200	5000	55.05	0.11	0.11
210	4500	55.25	0.12	0.19
280	4500	66.71	0.17	0.16
290	4000	121.42	0.20	0.19
290	4500	66.48	0.20	0.18

TABLE D-14

Modeling Summary
Annual SO_2 AAQS Compliance Analysis
1986 Meteorology

Modeled Concentrations (ug/m^3)				
Receptor Location (m)			Cedar Bay Cogen. Project	SK Package Boilers
UTM X	UTM Y	Total	Total	
290	3000	56.48	0.21	0.19
290	3500	87.62	0.21	0.17
300	3000	60.13	0.27	0.30
300	3500	72.15	0.27	0.30
210	4500	55.48	0.10	0.20
210	5000	56.02	0.10	0.19
220	5000	55.03	0.13	0.20
280	4500	56.98	0.13	0.10
290	4000	143.22	0.21	0.15
290	4500	70.58	0.20	0.14

TABLE D-15

Modeling Summary
Annual SO_2 AAQS Compliance Analysis
1987 Meteorology

Modeled Concentrations (ug/m^3)				
Receptor Location (m)			Cedar Bay Cogen. Project	SK Package Boilers
UTM X	UTM Y	Total	Total	
280	3000	56.18	0.14	0.16
290	3500	83.38	0.16	0.18
280	4000	60.54	0.14	0.14
280	4500	59.40	0.13	0.13
290	4000	104.47	0.16	0.16
290	4500	62.15	0.15	0.15

TABLE D-16

ISCEV2 Modeling Summary
24-Hour PM_{10} AAQS Compliance Analysis
1983 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH240001	2/14/24	439110.00	3361210.00	171.65	0.00	0.00	0.00	0.00	0.00
TH240002	2/23/24	439110.00	3361210.00	122.32	0.00	0.00	0.00	0.00	0.00
TH240003	3/18/24	439110.00	3361210.00	186.75	0.00	0.00	0.00	0.00	0.00
TH240004	3/19/24	439110.00	3361210.00	260.72	0.00	0.00	0.00	0.00	0.00
TH240005	4/ 3/24	439110.00	3361210.00	178.33	0.00	0.00	0.00	0.00	0.00
TH240006	4/10/24	439110.00	3361210.00	170.42	0.00	0.00	0.00	0.00	0.00
TH240007	7/17/24	439110.00	3361210.00	143.38	0.00	0.00	0.00	0.00	0.00
TH240008	9/11/24	439110.00	3361210.00	137.95	0.00	0.00	0.00	0.00	0.00
TH240009	11/29/24	439110.00	3361210.00	133.49	0.00	0.00	0.00	0.00	0.00
TH240010	12/13/24	439110.00	3361210.00	127.50	0.00	0.00	0.00	0.00	0.00

TABLE D-17

ISCEV2 Modeling Summary
24-Hour PM_{10} AAQS Compliance Analysis
1984 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH240001	1/28/24	439110.00	3361210.00	120.77	0.00	0.00	0.00	0.00	0.00
TH240002	2/23/24	439110.00	3361210.00	155.19	0.00	0.00	0.00	0.00	0.00
TH240003	3/21/24	439110.00	3361210.00	128.47	0.00	0.00	0.00	0.00	0.00
TH240004	3/22/24	439110.00	3361210.00	142.77	0.00	0.00	0.00	0.00	0.00
TH240005	4/16/24	439110.00	3361210.00	146.97	0.00	0.00	0.00	0.00	0.00
TH240006	5/14/24	439110.00	3361210.00	121.04	0.00	0.00	0.00	0.00	0.00
TH240007	6/ 3/24	439110.00	3361210.00	129.12	0.00	0.00	0.00	0.00	0.00
TH240008	7/13/24	439110.00	3361210.00	122.04	0.00	0.00	0.00	0.00	0.00
TH240009	8/10/24	439110.00	3361210.00	218.15	0.00	0.00	0.00	0.00	0.00
TH240010	8/11/24	439110.00	3361210.00	167.56	0.00	0.00	0.00	0.00	0.00

TABLE D-18

ISCEV2 Modeling Summary
24-Hour PM_{10} AAQS Compliance Analysis
1985 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH240001	1/ 4/24	439110.00	3361210.00	158.99	0.00	0.00	0.00	0.00	0.00
TH240002	1/25/24	439110.00	3361210.00	179.52	0.00	0.00	0.00	0.00	0.00
TH240003	2/13/24	439110.00	3361210.00	135.35	0.00	0.00	0.00	0.00	0.00
TH240004	2/27/24	439110.00	3361210.00	118.26	0.00	0.00	0.00	0.00	0.00
TH240005	3/12/24	439110.00	3361210.00	127.31	0.00	0.00	0.00	0.00	0.00
TH240006	5/22/24	439110.00	3361210.00	132.99	0.00	0.00	0.00	0.00	0.00
TH240007	5/29/24	439110.00	3361210.00	125.92	0.00	0.00	0.00	0.00	0.00
TH240008	6/ 1/24	439110.00	3361210.00	227.63	0.00	0.00	0.00	0.00	0.00
TH240009	8/ 1/24	439110.00	3361210.00	124.30	0.00	0.00	0.00	0.00	0.00
TH240010	11/ 4/24	439110.00	3361210.00	233.92	0.00	0.00	0.00	0.00	0.00

TABLE D-19

ISCEV2 Modeling Summary
24-Hour PM_{10} AAQS Compliance Analysis
1986 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH240001	4/28/24	439110.00	3361210.00	167.71	0.00	0.00	0.00	0.00	0.00
TH240002	7/ 2/24	439110.00	3361210.00	145.53	0.00	0.00	0.00	0.00	0.00
TH240003	7/10/24	439110.00	3361210.00	118.99	0.00	0.00	0.00	0.00	0.00
TH240004	7/18/24	439110.00	3361210.00	133.39	0.00	0.00	0.00	0.00	0.00
TH240005	7/19/24	439110.00	3361210.00	128.52	0.00	0.00	0.00	0.00	0.00
TH240006	7/23/24	439110.00	3361210.00	129.17	0.00	0.00	0.00	0.00	0.00

TABLE D-20

ISCEV2 Modeling Summary
24-Hour PM_{10} AAQS Compliance Analysis
1987 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH240001	1/ 7/24	439110.00	3361210.00	122.35	0.00	0.00	0.00	0.00	0.00
TH240002	3/27/24	439110.00	3361210.00	131.97	0.00	0.00	0.00	0.00	0.00
TH240003	4/ 6/24	439110.00	3361210.00	151.48	0.00	0.00	0.00	0.00	0.00
TH240004	4/10/24	439110.00	3361210.00	126.23	0.00	0.00	0.00	0.00	0.00
TH240005	4/15/24	439110.00	3361210.00	118.87	0.00	0.00	0.00	0.00	0.00
TH240006	4/24/24	439110.00	3361210.00	173.55	0.00	0.00	0.00	0.00	0.00
TH240007	4/30/24	439110.00	3361210.00	144.23	0.00	0.00	0.00	0.00	0.00
TH240008	7/30/24	439110.00	3361210.00	128.83	0.00	0.00	0.00	0.00	0.00
TH240009	8/ 1/24	439110.00	3361210.00	214.11	0.00	0.00	0.00	0.00	0.00
TH240010	8/20/24	439110.00	3361210.00	147.10	0.00	0.00	0.00	0.00	0.00
TH240011	8/24/24	439110.00	3361210.00	137.02	0.00	0.00	0.00	0.00	0.00
TH240012	11/30/24	439110.00	3361210.00	132.58	0.00	0.00	0.00	0.00	0.00

TABLE D-21

Modeling Summary
Annual PM_{10} AAQS Compliance Analysis
1983 Meteorology

Modeled Concentrations (ug/m^3)				
Receptor Location (m)			Cedar Bay Cogen. Project	SK Package Boiler
UTM X	UTM Y	Total	Total	
210	5000	26.69	0.04	0.02

TABLE D-22

Modeling Summary
Annual PM_{10} AAQS Compliance Analysis
1984 Meteorology

Modeled Concentrations (ug/m^3)				
Receptor Location (m)			Cedar Bay Cogen. Project	SK Package Boilers
UTM X	UTM Y	Total	Total	
210	5000	24.75	0.04	0.01

TABLE D-23

Modeling Summary
Annual PM_{10} AAQS Compliance Analysis
1985 Meteorology

Modeled Concentrations (ug/m^3)				
Receptor Location (m)			Cedar Bay Cogen. Project	SK Package Boilers
UTM X	UTM Y	Total	Total	
210	5000	27.53	0.04	0.01

TABLE D-24

Modeling Summary
Annual PM_{10} AAQS Compliance Analysis
1986 Meteorology

Modeled Concentrations (ug/m^3)				
Receptor Location (m)			Cedar Bay Cogen. Project	SK Package Boilers
UTM X	UTM Y	Total	Total	
210	5000	26.17	0.03	0.02

TABLE D-25

Modeling Summary
Annual PM_{10} AAQS Compliance Analysis
1987 Meteorology

Modeled Concentrations (ug/m^3)				
Receptor Location (m)			Cedar Bay Cogen. Project	SK Package Boilers
UTM X	UTM Y	Total	Total	
210	5000	24.91	0.04	0.02

TABLE D-26

ISCEV2 Modeling Summary
24-Hour SO_2 PSD Compliance Analysis
1983 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH240001	6/12/24	437178.41	3366322.00	128.48	0.00	0.00	0.00	0.00	0.00
TH240002	10/14/24	437610.00	3365540.00	92.69	0.00	0.00	0.00	0.00	0.00
TH240003	10/16/24	437670.81	3366235.00	111.71	0.00	0.00	0.00	0.00	0.00

TABLE D-27

ISCEV2 Modeling Summary
24-Hour SO_2 PSD Compliance Analysis
1984 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH240001	1/10/24	438145.91	3367540.00	124.37	0.00	0.00	0.00	0.00	0.00
TH240002	5/ 4/24	438578.91	3367290.00	120.25	0.00	0.00	0.00	0.00	0.00
TH240003	5/14/24	438321.09	3366737.00	94.20	0.00	0.00	0.00	0.00	0.00
TH240004	6/20/24	438321.09	3366737.00	91.08	0.00	0.00	0.00	0.00	0.00
TH240005	8/10/24	438321.09	3366737.00	92.25	0.00	0.00	0.00	0.00	0.00
TH240006	8/11/24	438321.09	3366737.00	106.90	0.00	0.00	0.00	0.00	0.00
TH240007	8/31/24	438321.09	3366737.00	102.12	0.00	0.00	0.00	0.00	0.00

TABLE D-28

ISCEV2 Modeling Summary
24-Hour SO_2 PSD Compliance Analysis
1985 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH240001	8/15/24	437381.41	3367079.00	103.73	1.45	0.00	0.00	1.46	0.51
TH240002	10/ 1/24	437381.41	3367079.00	100.58	1.16	0.02	0.02	1.20	1.08
TH240003	10/17/24	437178.41	3366322.00	109.61	0.00	0.00	0.00	0.00	0.00

TABLE D-29

ISCEV2 Modeling Summary
24-Hour SO_2 PSD Compliance Analysis
1986 Meteorology

		Modeled Concentrations (ug/m**3)							
		Receptor Location (m)			Cedar Bay Cogen. Project				SK
Event Code	Period End Mon/Day/Hr	UTM X	UTM Y	Total	CFB	LSD1	LSD2	Total	Package Boilers
TH240001	7/18/24	438321.09	3366737.00	91.70	0.00	0.00	0.00	0.00	0.00

TABLE D-30

ISCEV2 Modeling Summary
24-Hour SO_2 PSD Compliance Analysis
1987 Meteorology

Event Code	Period End Mon/Day/Hr	Receptor Location (m) UTM X	UTM Y	Modeled Concentrations (ug/m**3) Total	Cedar Bay Cogen. Project CFB	LSD1	LSD2	Total	SK Package Boilers
TH240001	2/26/24	437670.81	3366235.00	99.04	0.00	0.00	0.00	0.00	0.00
TH240002	5/ 9/24	437178.41	3366322.00	92.24	0.02	0.01	0.01	0.04	0.22
TH240003	8/ 1/24	438321.09	3366737.00	91.77	0.00	0.00	0.00	0.00	0.00

APPENDIX F

ONGOING RESEARCH INTO POSSIBLE MERCURY CONTROLS

APPENDIX F

ONGOING RESEARCH INTO POSSIBLE MERCURY CONTROLS

Programs to assess the relative advantages and disadvantages of alternative pollution control devices on mercury collection from coal combustion have only recently begun. However, test data is available from programs to determine the best system of trace metals control from municipal waste combustors (MWCs), in conjunction with the recently promulgated new source performance standard for these sources; these data are currently more complete than any other data available in the published literature and as such are considered the best representation of mercury control from combustion sources in general. Even for this more complete data set, there are major uncertainties. As detailed further below, understanding mercury emissions from CFB's firing coal are further clouded by the differences in the concentration of mercury in the respective flue gases.

Potential control alternatives for mercury include:

- sodium sulfide injection upstream of SO_2/particulate matter control devices;
- activated carbon injection upstream of fabric filter;
- wet scrubbing techniques;
- spray dryer followed by a fabric filter; and
- flue gas cooling.

At this time, EPA is not clear on which control alternative best reduces mercury emissions from any combustion process (Porter, 1990) or which operating variables in the combustor influence alternative controls' performance. Recognizing this, the EPA stated in the preamble to the proposed NSPS for MWCs that a joint EPA/industry task force is being established to investigate mercury emissions and controls, and that the findings would be considered in development of the final standards (EPA 1989). Under § 112 of the Clean Air Act as amended in 1990, there are a number of studies underway to further assess the control options for steam electric boilers.

As part of the effort of the joint task force, two meetings were held in Research Triangle Park by EPA in February 1990 to discuss both "precombustion" controls of mercury emissions and add-on control of mercury emissions. It is evident from the meetings' transcripts that there are not only

numerous unknowns regarding mercury formation and control, but there are some valid side issues that must also be resolved before the subject can be understood and the MWC NSPS for Hg fairly promulgated.

Some of the key issues raised in the meetings were:

- the potential of NO_x controls by ammonia injection to reduce mercury control efficiencies of downstream (fabric filter) systems;
- the relationship between the amount of carbon in the flue gas and the amount of mercury control, and whether this is more influential on mercury emissions than NO_x controls;
- the conversion of mercuric chloride on the filter cake to mercury vapor over time;
- reliability of current test methods;
- the inconsistencies in test data between the U.S. and European facilities (which use different test methods)
- lack of data on mercury content of ash, effects of add-on mercury control to ash toxicity and possible outgassing;
- contradictory data and general variability of data;
- the overemphasis on mercury control from MWCs; and
- establishing which mercury control systems are "demonstrated".

The following provides more information on the controls discussed by the EPA/industry task force.

Sodium Sulfide Injection

For combustion units utilizing spray drying/absorption (SDA) for control of SO_2 emissions, sodium sulfide (Na_2S) can be sprayed into the gas stream as a 10 percent water solution, either upstream of or in the spray dryer. The mercury vapor is converted to solid mercuric sulfide according to the following reaction:

$$Na_2S + Hg + H_2O + 1/2O_2 \rightarrow HgS + 2NaOH$$

The resulting solids are collected in the baghouse or ESP as particulate. (Buschmann, 1990).

Activated Carbon Injection

Injecting activated carbon or a modified activated carbon material into the flue gas upstream of the fabric filter may achieve mercury emissions reductions. There are, however, currently no CFB units operating which employ activated carbon injection. Activated carbon injection systems are listed as being offered commercially by A/S Niro Atomizer of Denmark and Research Cottrell for use on MSW incinerators. There are no vendors offering such systems for use on CFB boilers.

On MSW plants, carbon injection may achieve sizeable mercury reductions, as shown by two sets of test data in the Niro patent. In three pilot-test runs, injection of 80 mg/Nm^3 in flue gas at a location between the SDA and fabric filter resulted in overall mercury reductions of 89 percent (230°F run), 95 percent (230°F run), and 91 percent (284°F run). Mercury reductions with no carbon injection (fabric filter only) were still sizeable, however, at about 69 percent.

On full-size MWCs tests, 78 to 93 percent mercury reductions were achieved with carbon injection. However, data from these tests indicate mercury removals of 66 to 27 percent with the carbon injection system off, and utilizing only the fabric filter for mercury control. This implies that mercury control attributable to the carbon injection system was on the order of 75% of inlet mercury.

Comparisons between the potential effectiveness of this alternative on MSW plants vs CFB plants are necessarily inconclusive due to the difference in flue gas mercury concentrations. The CBCP expects to limit mercury emissions to 2.89 x 10^{-5} lb/MMBtu which converts to approximately 9 µg/dscm, while MSW plants typically operate with mercury levels of 510 µg/dscm. Since programs to assess the effect of this difference have only recently begun, and considering the fact that this alternative has not been installed on a CFB boiler, carbon injection systems are consequently not considered to be demonstrated effective emission controls on CFB boilers.

Wet Scrubbing Techniques

There is a general opinion in the scientific community that because of the saturated operating conditions and cooler flue gas temperatures in wet scrubbing, better mercury condensation and collection should occur than in dry systems. The NJDEP tested the efficiency of mercury removal at the small scale resource recovery facility in Ft. Dix, New Jersey, which uses a baghouse upstream of a wet scrubber. Using EPA Test Method 101A, the removal efficiency

ranged over three test runs between 16.6 percent and 74.9 percent (average 42.8 percent). Not only was the variability in test results similar to that observed in SDA/FF-equipped MWC facilities, less mercury was removed with wet scrubbing compared to SDA/FF. These test data do not support use of wet scrubbers for control of mercury from coal-fired facilities.

Flue Gas Cooling

Flue gas cooling has been considered essential for Hg removal because Hg typically enters the control equipment as a vapor. Test data available for MWCs both support and refute this theory. Env. Canada and Flakt reported mercury reduction of 40 percent when flue gas was cooled to 289°F (Env. Canada, 1987). Environment Canada also reported (1986) data that are more inconclusive. Over two test runs for each temperature, mercury reductions were 90.9% (230°F), 97.3% (257°F) and, 93.7% (284°F). The lowest flue gas temperature achieved the lowest percent mercury control. Tests conducted in June 1989 at Ogden Martin's Indianapolis Resource Recovery Facility, which uses a spray dryer/fabric filter control system, indicate that measured emissions of mercury were well below the expected levels. Mercury removal efficiency was measured at spray dryer outlet temperatures of 265 and 295°F. The study concluded that lowering the spray dryer outlet temperature by 25°F has no significant impact on the mercury stack emission. Ogden Martin has also conducted tests at one of its facilities and has observed no "discernible" reductions at a temperature of 285°F versus 325°F. Therefore, operating at temperatures below 325°F does not appear to be warranted.

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Alaska	Anchorage	(907) 276-4302
California	Los Angeles	
	Camarillo	(805) 388-3775
	Newport Beach	(714) 476-0321
	San Francisco	(415) 865-1888
Colorado	Fort Collins	(303) 493-8878
Connecticut	Hartford	(203) 657-8910
Illinois	Chicago	(708) 887-1700
Massachusetts	Boston	(508) 635-9500
Minnesota	Minneapolis	(612) 924-0117
New Jersey	Mahwah	(201) 818-0900
	New Brunswick	(908) 560-7323
Pennsylvania	Pittsburgh	(412) 261-2910
South Carolina	Rock Hill	(803) 329-9690
Texas	Dallas	(214) 960-6855
	Houston	(713) 520-9900
Washington	Seattle	(206) 881-7700
Puerto Rico	San Juan	(809) 769-9509