C Fancy
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MEMORANDUM

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From: Colin High
Subject: Cedar Bay Cogeneration Project Air Quality Analysis Review.
Date: April 1st 1993

Enclosed please find a copy of the draft "Cedar Bay Cogeneration Project Air Quality Analysis Review" prepared by Resource Systems Group Inc.
ate:

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 41

To Angela Morrison	From Joe Curreri
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DRAFT

Cedar Bay Cogeneration Project Air Quality Analysis Review

RESOURCE SYSTEMS GROUP INC.

Norwich, Vermont

Prepared for:

City of Jacksonville, The Sierra Club, Duval Audubon Society, the Florida Audubon Society, and Stafford Campbell

April 1993

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A) INTRODUCTION

The purpose of this report is to review and evaluate the air quality analysis undertaken for the modification proceedings regarding the Cedar Bay Cogeneration Project (CBCP). This report primarily reviews the analysis presented in the "Cedar Bay Cogeneration Project Air Quality Analysis" prepared by ENSR Consulting and Engineering in February, 1993 (ENSR Report) and reports on analyses undertaken by Resources Systems Group (RSG) to supplement that work. The ENSR report addresses the air quality impacts of the CBCP as proposed to be modified in the context of the Siting Boards Order Instituting Modification Proceeding of June 16, 1992 (Siting Board Order).

This report is based on our review of the ENSR report as well as earlier reports, correspondence between the parties, depositions of witnesses for parties, the application of Seminole Kraft Corporation (SKC) for a permit for the construction of three package boilers to supplement the steam purchased from CBCP, data, computer files and modeling runs provided by ENSR, data provided by SKC, U.S. Generating, the Florida Department of Environmental Regulation, the U.S. EPA, private companies, and our own air quality modeling runs.

The main focus of this review and analysis is to address the issues which the Siting Board's Order required the CBCP and SKC to address, namely:

> "that for the proposed modification to be approved AES and SKC will have the burden of proving that:
>
> > On balance the environmental impacts of the AES power plant, as modified, and the addition of any boilers on the SKC site necessary to provide the 640,000 lbs of steam per hour for SKC's use, as called for by the original certification, will be less than the impacts of the SKC recycling operation without the power plant, etc. "[1]

Re "test"

Also, the analyses reported here were conducted to determine if the "proposed modifications are both technically feasible and consistent with the non-procedural standards of the agencies", to the extent that they meet the requirements of Florida and federal air quality regulations[2].

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[1] Siting Board Order June 16th 1992 page 2
[2] Siting Board Order June 16th 1992 page 5

The report is therefore organized in two parts which address the following issues: first, a comparison of emissions from each source; and second, the compliance of the CBCP with all applicable State and federal standards.

B) COMPARISON OF CBCP PLUS SKC PACKAGE BOILERS WITH SKC RECYCLING

The Siting Board Order required the CBCP to compare the environmental impacts of the CBCP as proposed to be modified with the SKC boilers that will be closed if the CBCP operates. The terms of that comparison are given in the order, and the ENSR report has put forward the specific emissions and operating parameters on which they believe the comparison should be made. This section of our report reviews and, where necessary, modifies ENSR's emissions and operating parameters, to respond more accurately to the Siting Board's Order for a comparison.

The parameters which specify the operation of the CBCP and the three package boilers to be constructed by SKC are based on the ENSR report, in the application of SKC for a PSD permit[1], in the revised conditions of certification proposed by DER[2], and depositions testimony of a DER official, Mr. Clair Fancy. We understand that the DER has proposed to limit the SKC package boilers to burn natural gas as the primary fuel. Fuel oil may not be combusted for more than 400 hours per year, and the sulfur content of the oil burned at SKC must be limited to 0.05%. Also, the CBCP limestone dryers would also be restricted to 0.05% sulfur in their fuel oil.

The CBCP, with the conditions described above, will be compared to the expected emissions and impacts of two bark boilers and three oil-fired power boilers at the existing SKC recycling operation, used as required to provide the steam for SKC without the CBCP.

B.1) EMISSIONS AND OPERATING PARAMETERS OF CBCP

For criteria pollutants, review of operating parameters is, for the most part, unnecessary since the applicant will be legally bound by their permit which will be based on the proposal. For the review of unregulated hazardous emissions, where the applicant will not be legally bound, it is appropriate to

1 "PSD Permit Application for New Package Boilers; Seminole Kraft Corporation; Jacksonville, Florida," KBN Corp, November 1992.

2 "State of Florida Department of Environmental Regulation Review of Proposed Modification of Certified Electric Power Plant Site for Cedar Bay Cogeneration Project; Case No. PA 88-24A," Florida Department of Environmental Regulation, March 25, 1993.

review these rates. Both criteria pollutants and toxic air pollutants are discussed below.

B.1.1) CRITERIA POLLUTANTS

The emissions of criteria pollutants for the CBCP seem reasonable given the emission factors published in the ENSR report. In our analysis the only major difference in emission estimates is for SO_2 from the limestone dryers and package boilers. Based on the recently published DER recommended conditions of certification and Mr. Fancy's deposition testimony, the limestone dryers and package boilers will run on 0.05% sulfur oil rather than the previously proposed 0.3% sulfur oil (annual average). Furthermore, the limestone dryers will be limited to operating no more than 14 hours per day, and the package boilers will only be allowed to use oil for 400 hours per year. These changes will result in maximum emissions of SO_2 being significantly reduced for the two sources. The resulting SO_2 emissions on an annual basis will be:

Table 1: SO_2 Emissions Based on New Permit Conditions

Source	SO_2 Emissions from March ENSR Report	Proposed Permit Limitation	Difference
Limestone Dryers	43.0	2.3	-41.7
Package Boilers	449.1	4	-445.1

B.1.2) TOXIC EMISSION RATES

ENSR relied primarily on the EPA manual on air toxics from coal and oil combustion sources[1] for data on toxics content in coal. However, rather than rely on actual emission rates of other plants, they estimated emission rates based the estimated concentration of each toxic pollutant in the coal, and assuming a percentage that would actually go up the stack for each pollutant.

The toxic emission factors used by the applicant were changed markedly from the previous application, in their efforts to assure that the risks are not overstated. The most significant change was that rather than using the mean concentration of the metals in the coal plus three standard deviations, their revised emission rates use the mean plus only one standard deviation. This

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[1] Estimating Air Toxics From Coal and Oil Combustion Sources, U.S. EPA OAQPS EPA-450/2 89-001

reduces their confidence in the resultant emission rate calculation from 99.7% to 68.2%.

There were also a number of assumptions made about the removal efficiency of trace metals that contradict other statements in the ENSR report and test results from other similar facilities. In the case of mercury, Arshad Nawaz from Bechtel, in his October 23, 1992 letter, indicated that mercury removal efficiencies ranged from 40 to 70% in similar facilities, and that they would use 50% to be conservative. However, using a number closer to the middle of the range (55%) than to the lower end of the range (40%) is not particularly conservative. Moreover, in the final emission rate calculations, a removal efficiency of 60% was used. This is actually an optimistic assumption, rather than a conservative assumption, given the range of typical removal efficiencies of 40% to 70%.

In the case of hexavalent chromium, a removal efficiency of 98% was assumed in ENSR's emission rates. However, in test results from the AES Thames CFB facility, noted by the applicant as being similar to CBCP, only a 68% removal efficiency of chromium was measured. This results in a sixteen-fold underestimation of hexavalent chromium emissions, which is a very potent carcinogen. A similar discrepancy exists for nickel, for which a removal efficiency of 98% was assumed, but only 62% removal was attained in the AES Thames CFB.

Using the lower removal efficiencies for chromium and nickel, and the operating parameters of the SKC package boilers, the modified hazardous air emission rates for the CBCP Case 3 are presented in Table A-II in Appendix II.

B.2) EMISSIONS AND OPERATING PARAMETERS OF SKC

In the ENSR report, the CBCP emissions are to be compared with those from SKC recycling operation. In this type of comparative analysis, it is important that the emissions from SKC are not over-estimated, as this would tend to under-estimate the changes in emissions due to the construction of the CBCP. Rather, realistic assumptions about the projected SKC operation should be used.

B.2.1) OPERATING PARAMETERS OF SKC RECYCLING

To determine what emissions from the SKC recycling facility may be expected when SKC's five existing boilers are operating to provide power to SKC recycling without CBCP, we made an analysis of the historical operating parameters of the facility. Based on depositions taken of SKC witnesses, it has become apparent that the operations of the bark and power boilers have not and will not significantly change as a result of the change-over to a 100%

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recycling facility. Significant operating parameters include the hours of operation, the amount of steam generated by each boiler, and the fuel used in the boilers. We performed an analysis of the fuel use at SKC based on operating reports submitted to the City of Jacksonville for the years 1978, and 1980 through 1991. We have also obtained 1992 and January 1993 data, but we understand that of these data, SKC only considers December 1992 and January 1993 to be typical of SKC's operation, given the change-over to recycling in the remaining parts of 1992.

Our first analysis considered the use of fuel at the five boilers in SKC's operating history. Figure 1 illustrates the steam use at SKC from 1980 to 1991. As is shown, average steam generation by the bark and power boilers peaked in 1981 at 640,000 lb/hr (average). Between 1988 and 1991, annual average steam use was 526,000 lb/hr and never exceeded 555,735 lb/hr. Approximately 37% of this steam load was provided by the bark boilers. Depositions of SKC witnesses, Messrs. Stanley and Riddle, indicate that this more recent steam load is typical of the recycling operation, and that on the peak day, the steam load should not exceed 640,000 lb/hr. This peak steam loading is the loading used by ENSR in both long term and short term forecasts of SKC emissions.

SKC runs two types of boilers: bark boilers, which burn oil, bark, and recycling rejects; and power boilers, which burn oil. The emissions from each of these fuels are generally quite different, making the accurate estimation of total emissions highly dependent on the actual use of each boiler type.

In their estimation of SKC recycling emissions, ENSR used different operational capacity parameters for each pollutant, with the result that in any one situation, tended to overpredict the amount of pollution generated from SKC. For example, ENSR's SO_2 emission calculation assumed that the power boilers were used at 100% capacity over the entire year, since the power boilers have higher SO_2 emissions per BTU than the bark boilers. For TSP, ENSR assumed a capacity factor of 100% for the bark boilers, since TSP emissions are worse from the bark boilers. These two assumptions are inconsistent, and apparently were made to purposefully over-estimate SKC emissions. Our investigations of an historical SKC operations have shown that neither of ENSR's assumptions are representative of actual operations. Over the last four years (1988 to 1991), the bark boiler were operated at an average of 79% of capacity, and the power boilers operated at an average of 76% of capacity.

To estimate the breakdown of the fuel types used over this time period, we analyzed the fuel reports for each specific boiler. Figure 2 shows the percentage of BTU provided by each fuel from 1980. As is shown, approximately 5% of the bark boiler output is generated by oil, while the remainder is generated by bark. According to SKC officials Messrs. Stanley and Riddle, and consistent with January 1993 data provided by SKC, this fuel ratio is not expected to change with the recycling operation. The only change is that some of the bark fuel will be replaced by recycled fiber rejects. However, this change will not result is significant changes in emissions.

Also shown in Figure 2 is the future operation of the boilers as assumed in the ENSR report. For SO_2 emissions, the modeled emission rates in the report assumed that the power boilers would operate at 100% capacity while the bark boilers would operate the remainder of the time. Based on the historical data, the ENSR estimates of the use of the power and bark boilers are not consistent with the typical operations at SKC. Furthermore, it appears that ENSR significantly overestimated the amount of oil used in the bark boilers for certain scenarios.

B.2.2) CRITERIA POLLUTANTS

Emissions of criteria pollutants can be estimated using a number of sources. Among the methods used by ENSR are:

- Mass Balance - Mass balance assumes that the concentration of a substance in the fuel will be equal to its concentration in the exhaust gas. For example, SO_2 emissions could theoretically be estimated by assuming all of the sulfur in the fuel is converted to SO_2 in the exhaust.
- AP-42[1] - EPA's AP-42 shows national average emission rates for many different types of sources, including coal fired boilers, utility boilers, and other fuel burning facilities.
- Stack Tests - Stack tests are generally the best source of information on emission rates since they give results that are specific to a piece of machinery. While stack test results cannot be used in this case to estimate emissions from the CFB plant since it is not yet built, they can be used to estimate emissions from SKC, whose boilers have been running for a number of years.
- Other - Sources of emission rates could also include other published reports.

B.2.2.1) SO_2

SO_2 is an important component of the emissions generated by the project. Given that the ENSR report and modeling by the City of Jacksonville show multiple violations of the SO_2 Florida Ambient Air Quality Standards (FAAQS) in the vicinity of the project, and that SO_2 is emitted in the highest

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1 "Compilation of Air Pollutant Emission Factors. Volume I: Stationary Point and the Area Sources," U.S. EPA AP-42.

volume of any criteria pollutant from the CFB's, the accurate estimation of the SO_2 emission rates for the CBCP and for SKC is critical to the project.

The estimate of SO_2 emissions that ENSR performed was based on two sources. For the power and bark boilers burning fuel oil, the emission factors were based on mass balance equations. For the bark boilers burning bark and recycled fiber rejects, emission rates were based on data obtained from the Seminole Kraft Corporation.

The use of mass balance assumes that all of the sulfur in the fuel oil is converted to SO_2. In general, this is rarely the case. Sulfur can be emitted in the exhaust gas as sulfur, sulfur trioxide, hydrogen sulfide, and other sulfuric compounds. The use of the mass balance equation shows an emission factor of 165S where S represents the percentage of sulfur in the fuel. As a comparison, the average rates for residual oil combustion in industrial and utility boilers is 157S[1].

Sulfur emissions from the bark portion of the bark boilers were estimated by ENSR based on the *"Seminole Kraft Corporation (Referenced Factor)"* of 0.057 lb/MMBTU. We do have other sources of emission rates to compare it to. First, EPA's AP-42 reports that the average emission rate at four plants burning bark was approximately 0.0078 lb/MMBTU. Second, emission test results for the bark boilers taken in 1991 by IEA, Inc. at the SKC bark boilers show an average emission rate of 0.014 lb/MMBTU. This last number is roughly 25% of that estimated by ENSR. Therefore, the sulfur emission rate from the bark boilers appears to be significantly overestimated.

Also involved in the calculation of emissions from the SKC recycling operation is the amount of each fuel type burned by each source. For SO_2, ENSR makes the assumption that the power boilers would burn at 100% of capacity during the year, and that the bark boilers would provide for the remaining steam capacity by burning 50% oil and 50% bark. As shown in the previous section on operating parameters, this is not how the facility operates. In operation, approximately 94% of SKC's SO2 emissions are from the power boilers even though they generate only 63% of the total steam needs of the facility. In ENSR's analysis, the power boilers were assumed to emit 91% of the total SO_2 while providing 77% of the total steam needs of the facility.

When actual operating parameters are taken into account, we estimate that SO_2 emissions at SKC recycling are substantially lower than that which ENSR estimated. Figure 3 shows the actual SO_2 emissions from SKC's bark and power boilers since 1980, based on SKC's Annual Operating Reports. As is shown, SO_2 emissions significantly decreased in the mid 1980's with the switch from fuel oil with 2.27% to 1% sulfur. Since that time, emissions have been fairly constant, averaging 2,120 tons per year between 1988 and 1991. The

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1 AP-42 page 1.3-2, Table 1.3-1.

maximum emissions in those years was 2,239 TPY. This compares with ENSR's estimate of emissions of 3,560 TPY.

It should be noted that this difference of 1,320 TPY between ENSR's estimates and SKC's maximum emissions are based on two different steam demand scenarios. ENSR's estimates are based on an average of 640,000 lb steam/hour while the 2,240 TPY calculated above is based on the highest annual steam generation during the past four years at SKC, of 555,755 lb steam/hr. Using the actual operating parameters at a level of 640,000 lb steam/hr, we calculate that SKC would emit 2,578 TPY, which is still 982 TPY below ENSR's estimate.

While these estimates reflect historical emissions from SKC, the future SKC recycling operation almost certainly have lower SO_2 emissions. According to correspondence between SKC and the City of Jacksonville[1], SKC currently contributes to violations of the Florida Ambient Air Quality Standard (FAAQS) for SO_2. This is also confirmed by our own modeling. We understand that SKC will be required by the City to address this non-compliance. To do so, it has several possible options to accomplish this, including :

1) Increasing the stack heights of the SO_2 emitting sources,
2) Changing fuels,
3) Reducing the sulfur content of the fuel oils,
4) Limiting the operation of the SO_2 emitting sources, and/or,
5) Equipment retrofits.

Based on our modeling of SKC's existing boilers, even with a 125 foot stack as modeled by ENSR, SKC still contributes to violations of the 24 hour SO_2 FAAQS standard (see Appendix I). Indeed, over the five years modeled, if SKC burned the permitted amounts of fuel, i.e., 100% capacity of all boilers burning 2.27% fuel oil, it would contribute to 24-hour SO_2 violations on 2,896 occasions. If the CBCP is not built, we understand that the City of Jacksonville will require SKC to reduce SO_2 emissions to the point that they no longer contribute to a SO_2 violation.[2]

We therefore conducted modeling to determine what possible configurations at SKC will result in reductions in SO_2 ambient levels so that SKC does not contribute to a violation. Based on that modeling we determined that a probable operating scenario for SKC in the absence of the CBCP is as follows:

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1 Letter sfrom Robert Pace, City of Jacksonville Department of Regulatory and Environmental Services to Mike Riddle, Seminole Kraft Corp., dated December 15, 1992 and February 9, 1993.

2 Letter from Robert S. Pace Chief Air Quality Division DRES City of Jacksonville to Dr. Colin J. High Resource Systems Group ,Norwich, Vermont ,March 31st 1993.

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1) Raise all SKC stacks to GEP formula height (65.5 m).
2) Limit oil use in bark boilers to 50% of total BTU content for use only during startup and emergency conditions.
3) Limit annual oil use to 10% of total BTU in bark boilers.
4) Limit sulfur in oil to 0.4 % for all boilers.
5) Assure 50% removal efficiency of SO_2 in bark boiler scrubbers.
6) Set the maximum steam production load at 700,000 lb/hr.

Given these operating parameters, the SKC sources will neither cause nor contribute to a violation of the SO_2 Florida AAQS standards. Furthermore, as a result of these changes, SO_2 emissions will likely average approximately 907 TPY. This is significantly less than the existing emissions of 2,192 TPY and ENSR's estimates of 3,560 TPY.

B.2.2.2) NOx

Emissions of NOx were estimated by ENSR to be 1,736 tons per year from SKC's bark and power boilers. Using the maximum fuel use over the last four years at SKC, 555,755 lb steam/hr, we calculated a total NOx emission rate of 1,354 TPY. This is 382 TPY less than the ENSR estimate. At 640,000 lb/hr of steam, we estimate emissions of 1,560 TPY, or 176 TPY less than the ENSR estimate.

The major difference between the RSG and ENSR estimate is based on the split between the bark and power boilers. The ENSR estimate is based on the worst case split between the bark and power boilers for NO_x, while the RSG estimate is based on the actual split over the last four years.

An additional difference between the two methodologies is the way each interpreted the results of emissions monitoring of the bark boilers. While ENSR used the highest emission factors from the series of eight tests, RSG used the average emission factor from the eight tests.

B.2.2.3) PM10

Emissions of PM10 were estimated by ENSR to be 460 tons per year from SKC's bark and power boilers. Using the maximum fuel use over the last four years at SKC, 555,755 lb steam/hr, we calculated a total PM10 emission rate of 343 TPY. This is 117 TPY less than the ENSR estimate. At 640,000 lb/hr of steam, we estimate emissions of 395 TPY, or 65 TPY less than the ENSR estimate. Using the probable future scenario of 0.4% sulfur in the fuel, we calculate emissions of 312 TPY for the 640,000 lb/hr scenario and 271 TPY for the 555,755 lb/hr scenario.

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The major difference between the RSG and ENSR estimate is based on the split between the bark and power boilers. The ENSR estimate is based on the worst case split between the bark and power boilers, while the RSG estimate is based on the actual split over the last four years.

An additional difference between the two methodologies is the way each interpreted the results of emissions monitoring of the bark boilers. While ENSR used the highest emission factors from the permit conditions, RSG used the average emission factor from eight emission tests of the boiler exhaust gas.

B.2.2.4) CO

Emissions of CO were estimated by ENSR to be 2,191 tons per year from SKC's bark and power boilers. Using the maximum fuel use (555,755 lb steam/hr) over the last four years at SKC, we calculated a total CO emission rate of 1,299 TPY. This is 892 TPY less than the ENSR estimate. At 640,000 lb/hr of steam, we estimate emissions of 1,496 TPY, or 695 TPY less than the ENSR estimate.

The major difference between the RSG and ENSR estimate is based on the split between the bark and power boiler. The ENSR estimate is based on the worst case split between the bark and power boiler, while the RSG estimate is based on the actual split over the last four years.

An additional difference between the two methodologies is the way each interpreted the results of emissions monitoring of the bark boilers. While ENSR used the highest emission factors from the series of eight tests, RSG used the average emission factor from the eight tests.

B.2.3) SKC SUMMARY

The emissions estimates that ENSR provided to forecast the annual emissions from the recycling operation for SO_2, NOx, PM10 and CO overestimate actual emissions by between 2,824 tons per year and 2,030 tons per year, depending on the fuel use scenario. Table 3 summarizes these data.

Table 3: Comparison of SKC Recycling Emissions between SKC Actual Operation and ENSR Estimates (in Tons per Year)

Pollutant	ENSR estimate based on 640,000 lb/hr steam	Maximum SKC emissions over last 4 years (555,755 lb/hr steam)	Difference between ENSR estimate and Maximum SKC emission (1)	SKC emissions based on typical operating parameters at 640,000 lb/hr steam	Difference between ENSR estimate and SKC typical for 640,000 lb/hr steam (1)
SO_2 - Now	3,560	2,239	-1,321	2,578	-982
- Future		907	-2,653	1,044	-2516
NOx	1,736	1,354	-382	1,560	-176
PM10-Now	572	343	-229	395	-177
- Future		217	-301	312	-260
CO	2,191	1,299	-892	1,496	-695

(1) negative number indicates that the ENSR estimate for SKC is higher

3.2.4) TOXIC EMISSION RATES

The emission rates of toxic air pollutants was also revised, incorporating the same assumptions that are described in the previous section. For purposes of this analysis, it is assumed that the toxic emissions from SKC do not vary with sulfur content of the fuel oil. Therefore, the most significant change in operating parameters that effects these emissions is the use of 555,755 lb/hr of steam, which represents the highest annual use of the past four years.

ENSR used results of actual emission tests of toxic pollutants to estimate the emissions from the bark boilers. For each pollutant, the maximum emission rate tested was used, rather than the average emission rate. Therefore, in Table 4 below, the toxic emission rates for SKC were calculated using the average emission rates.

Table 4: Comparison of SKC Recycling Toxic Air Emissions between SKC Actual Operation and ENSR Estimates (Tons per Year)

Pollutant	ENSR estimate based on 640,000 lb/hr steam	Maximum SKC emissions over last 4 years (555,755 lb/hr steam)	Difference between ENSR estimate and Maximum SKC emission (1)	SKC emissions based on typical operating parameters at 640,000 lb/hr steam	Difference between ENSR estimate and SKC typical for 640,000 (1) lb/hr steam
Lead	0.19	0.131	0.059	0.151	0.039
Mercury	0.012	0.007	0.005	0.008	0.005
Beryllium	0.013	0.012	0.001	0.013	0.000
Fluorides	203.2	176.344	26.856	203.075	0.125
Antimony	0.05	0.037	0.013	0.043	0.007
Arsenic	0.057	0.049	0.008	0.056	0.001
Barium	0.76	0.125	0.635	0.144	0.616
Bromine	15.82	13.734	2.086	15.82	0.000
Cadmium	0.057	0.039	0.018	0.045	0.012
Cobalt	5.3	4.603	0.697	5.30	0.000
HCl	21.8	18.949	2.851	21.8	0.000
Indium	1.39	1.211	0.179	1.39	0.000
Chromium VI	0.0009	0.0009	0.000	0.0009	0.000
Copper	0.72	0.608	0.112	0.700	0.020
Formaldehyde	2.38	2.071	0.309	2.38	0.000
Manganese	0.18	0.121	0.059	0.139	0.041
Molybdenum	2.82	2.444	0.376	2.82	0.000
Nickel	3.09	2.636	0.454	3.035	0.055
Phosphorus	0.74	0.552	0.188	0.636	0.104
POM	0.44	0.383	0.057	0.44	0.000
Selenium	0.008	0.006	0.002	0.007	0.001
Tin	2.49	2.162	0.328	2.490	0.000
Vanadium	10.95	9.510	1.440	10.95	0.000
Zinc	1.65	1.142	0.508	1.315	0.335

Table 4 above indicates that the ENSR report also overestimated many of the toxic pollutant emissions from the SKC recycling operation.

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B.3) COMPARISON OF EMISSIONS

B.3.1) NET EMISSION RATE CHANGES

Based on the discussion above concerning the actual emissions from SKC recycling and the revisions to the FDER's Proposed Conditions of Certification, we have calculated the likely actual changes in total emissions due to the construction of the CBCP and SKC package boilers. Table 5 shows the short term emission rate comparison, i.e. the SKC recycling operation running at 640,000 lbs steam/hour compared with the annual limitations placed on the CBCP. As is shown, SO_2, NOx and CO emissions each increase with the construction of the CBCP and package boilers. PM10 is the only one of these pollutants that decrease in emissions due to the construction of the facilities.

Table 5: Net Emission Changes: SKC Recycling with Short Term Fuel Use Compared with Proposed Annual CBCP and SKC Package Boiler Emissions (Tons/year)

Pollutant		SKC Recycling with Power & Bark Boilers Maximum Short Term Fuel Use (640,000 lb/hr)	CBCP and SKC New Package Boilers as proposed to be permitted	Net Emission Change
SO_2	- Now	2,578	2,604	26
	- Future	1,044		949
NOx		1,560	2,525	965
PM10	- Now	395	266	-129
	- Future	312		-46
CO		1,496	2,828	1,332

Table 6 shows the annual emission rates based on SKC burning the equivalent of the highest annual fuel consumption between 1988 and 1991 (555,755 lb/hr steam). As is shown, for SO_2, NO_x, and CO, the annual emissions will increase with the construction of the CBCP and SKC package boilers.

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Table 6: Net Emission Changes: SKC Recycling with Long Term Fuel Use Compared with Proposed Annual CBCP and SKC Package Boiler Emissions (Tons/year)

Pollutant		SKC Recycling with Power & Bark Boilers Annual Fuel Use (555,755 lb/hr)	CBCP and SKC New Package Boilers as proposed to be permitted	Net Emission Change
SO_2	-Now	2,239	2,604	366
	-Future	574		2,030
NOx		1,354	2,525	1,170
PM10	-Now	343	266	-77
	-Future	253		13
CO		1,299	2,828	1,529

B.3.2) ALTERNATIVE COMPARISON BASED ON HEALTH EFFECTS

In Table ES-1 of the ENSR report, ENSR compares the total tons of pollutants which increase or decrease. They note that according to their estimates, total regulated (primarily criteria) pollutants decrease by 594 tons per year, while non-regulated toxic air pollutants increase by 29 tons per year. Then they add these together, resulting in a net decrease of total pollutants of 565 tons per year.

Leaving aside our arguments presented elsewhere in this report that these estimates may not be correct, the addition of emissions of different pollutants together implies an equivalence that is extremely misleading. ENSR's Table ES-1 implies, for example, that a ton of arsenic or a ton of mercury is equivalent to a ton of carbon monoxide or sulfur dioxide. In fact, arsenic and mercury are extremely toxic at very low concentrations, where the carbon monoxide, or sulfur dioxide are toxic only at extremely high concentrations.

In order to demonstrate the degree to which ENSR's comparison is misleading, we have undertaken an alternative type of emissions comparison. In our comparison, we expressed the emissions for each pollutant in terms of tons of "SO_2 equivalents", based on the health risk associated with each pollutant.

Although the standards for different pollutants are based on slightly different criteria in each case, the established regulated annual ambient standard or guideline provides a reasonable measure of the relative toxicity or health risk associated with each pollutant. Expressing annual emissions in equivalent units (in this case SO_2 equivalents) has been undertaken by multiplying the annual emissions of each pollutant by the ratio of its annual average ambient standard to the annual average ambient standard for SO_2.

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Some pollutants are not shown on the table, are those that currently do not have an appropriate annual average standard, guideline, or unit risk factor. Table 7 shows results of this normalized comparison.

Table 7: Emissions of Toxic Pollutants, and their Toxicity Relative to SO_2

Pollutant	SKC Projected emissions (TPY) for compliance	CBCP emissions (TPY) (nat gas in package boilers)	CBCP- SKC (TPY)	SO2 Equivalent (TPY)
SO2	907	2,604	1,697	1,697
NOx	1,354	2,363	1,009	1,009
PM-10	271	266	-5.000	-5
Lead	0.131	0.721	0.590	394
Mercury	0.007	0.100	0.094	13,415
Beryllium	0.012	0.351	0.339	169
Fluorides	176.3	8.905	-167.4	-169
Arsenic	0.049	1.701	1.652	430,977
Barium	0.125	7.300	7.176	9
Cadmium	0.039	0.382	0.343	36,728
HCl	18.95	21.71	2.762	24
Chromium VI	0.001	0.241	0.241	174,009
Formaldehyde	2.071	2.114	0.043	34
Manganese	0.121	6.002	5.881	882
Nickel	2.636	15.39	12.8	231,925
POM	0.383	0.222	-0.16	-32,138
Selenium	0.006	0.192	0.19	2
Vanadium	9.510	3.905	-5.61	-17
Total			-2,559	+858,943

The second and third columns of Table 7 show the emission rates, taken from the ENSR report, showing tons per year in emissions of each pollutant, for each case. The fourth column shows the change in emissions of each pollutant. The fifth column in Table 7 above shows the "SO_2 equivalent tons per year". This is calculated, as explained above, by multiplying the actual emissions of each pollutant by the ratio of the annual standard (or No Threat Levels, for toxic pollutants) to the annual standard for SO_2. For example, the average annual standard for SO_2 is 60 µg/m3, and that of arsenic is 0.00023 µg/m3, or 260,870 times lower than SO_2. The CBCP emissions of arsenic are 1.652 tons per year higher than those of SKC @ 555,755 lb steam/hr. To account for the fact that arsenic is so highly toxic compared to SO_2, the difference in emissions is multiplied by 260,870, resulting in a net change of 430,977 equivalent SO_2 tons. This analysis (like ENSR Report Table ES-1) is an emissions comparison and

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does not estimate the health threat at a specific location. It does however, provide a more realistic presentation of the relative loading of the environment with potentially health threatening pollutants. This comparison is more appropriate for determining the relative environmental and health effects of the two facilities than simply adding tons of pollutants as if they all had the same health impact.

A summary of our analysis compared with the ENSR Report is presented in Table 8.

Table 8: The ENSR Report Emissions Shown Raw and Weighted by Toxicity - Based on ENSR Table ES-1 Comparing Case 1 and Case 3.[1]

Pollutant Category	ENSR Report Net Change (tons/year)	Alternative Health based Net Change (Tons/year SO2 equivalent)
Total Regulated	-594 tons	-596 tons
Total Non-Regulated	+29 tons	+446,567 tons
Total Pollutants	-565 tons	+445,971 tons

Table 8 shows that, in RSG's analysis in the third column, the fact that criteria pollutants are decreasing, based on ENSR's analysis, is vastly overwhelmed by the increase in toxic air pollutants. This clearly illustrates the fact that, while CBCP emissions may be by ENSR's estimate, lower in overall tons per year, the emissions are much more highly toxic, carcinogenic, and hazardous to health. Many of the most highly toxic emissions, such as arsenic and beryllium, increase substantially with the operation of the CBCP.

Table 9 below is a revised version of Table 8 using the same methodology described for Table 8, but using our revised estimates for both the criteria and non-regulated pollutants. Table 9 shows that with the revised estimates of the emissions of the SKC recycling and the CBCP and package boilers, the net increase in emissions is quite large. When those emissions for which there is an annual standard are expressed in terms of SO_2 equivalents to make them more comparable, then the total emissions equivalents of the CBCP project with package boilers is enormously higher. Again, if these SO_2 equivalents are considered an index of the relative health effects of pollutant loading to the environment, then it is clear that the Cedar Bay Project is substantially worse than the continued operation of the SKC recycling facility boilers as specified.

1 The emission estimates used in this table are from the ENSR Report Table ES-1 In other places in this report alternative estimates for some of these pollutants are provided.

Table 9: Revised Emission Comparison Table Comparing Case 1 and Case 3 using RSG estimates of Actual Emission Rates.

Pollutant Category	Net Change Tons /year	Net Change Equivalent SO2 Tons/year
Total Regulated	+4,181 tons	+16,481 tons
Total Non-Regulated	+4,223 tons	+805,737 tons
Total Pollutants	+ 8,403 tons	+822,218 tons

B.3.2) COMPARISON OF GREENHOUSE GAS EMISSIONS

The combustion of fossil fuels emits carbon dioxide, which is one of the greenhouse gases that has been demonstrated to cause global warming.[1] Although there is not an agreement among scientists on the magnitude of global climate change, or when and where the effects will first become acute, there is broad agreement on the process, on the role that is played by carbon dioxide in the atmosphere and on the need to adopt strategies to mitigate the effects. The U.S. Congress Office of Technology Assessment has concluded "that the decision to limit emissions (of greenhouse gases) cannot await the time when the full impacts are evident."[2] Therefore, although carbon dioxide is not yet a regulated pollutant, it would be prudent to consider the magnitude of carbon dioxide emissions in any comparative assessment of the environmental effects of the Cedar Bay Project.

The original Cedar Bay Project as certified included a program for mitigating the effects of carbon dioxide emissions. The CBCP as proposed to be modified does not include any effective carbon dioxide mitigation measures. Table 10 shows the comparison of carbon dioxide emissions for the CBCP and the three package boilers with the existing SKC recycling operation.

Table 10: Carbon Dioxide Emissions From CBCP and SKC Package BoilersCompared with the SKC Bark and Power Boilers

Source	Tons per Year
SKC Recycling Boilers	337,162
CBCP and SKC Package Boilers	3,170,986

[1]Inter Governmental Panel on Climate Change, Scientific Assessment of Climate Change , Summary and Report , World Meteorological Organization, Cambridge University Press 1990 Cambridge MA.

[2] U.S. Congress , Office of Technology Assessment Changing By Degrees: Steps to Reduce Greenhouse Gases. U.S. Government printing House Washington D.C. 1991.

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It can be seen that the emissions of carbon dioxide from the CBCP project including the SKC package boilers are over 9 times greater than those of the SKC recycling boilers. Thus, in terms of relative contribution to global warming, the proposed CBCP is clearly worse than the existing SKC recycling operation.

B.4) COMPARISON OF AMBIENT AIR IMPACTS

B.4.1) SOURCE INVENTORY

Analysis of the ambient air quality impacts requires the use of an interactive multisource model (ISCST2). The impacts of the CBCP, as proposed to be modified, are modeled with existing sources to estimate the ambient air quality impacts of the proposed source combined with all other sources. A critical part of this process requires the use of an up to date inventory of emissions and source parameters for other sources in the area. This source inventory must be produced by the applicant in cooperation with the regulatory agencies and must conform to procedures established by the U.S. EPA. Our review of the ENSR inventory involved comparing it with the complete source listing of the FDER emissions inventory, including all counties within 75 km of CFCP. Data from all sources from the FDER database over 5 tpy within about 80 km of Cedar Bay were obtained from the FDER, and entered into a database. This database was used in the following comparisons to ENSR's inventory:

1) *Minor Sources* —ENSR did not include any sources under 100 tons per year, even those inside the significant impact area (SIA), which extends up to 15 km from the site, in their modeling. This is clearly contrary to EPA recommended procedures[1]. The total emissions omitted from the modeling are 46 tpy of SO2, and 452 tpy NOx.
2) *Emission Rates of sources ENSR modeled*— Of the sources ENSR modeled, their total SO_2 emissions *exceed* that in the FDER database by 1,652 tpy. For NO_x, their total emissions are 2,451 tpy *less* than the FDER database. However, there are some major sources that are missing emission rates in the FDER database.
3) *Screening sources outside the SIA*—The North Carolina screening method was used to determine which sources outside the SIA are to be included in modeling. ENSR used an SIA diameter of 15 km for their screening. However the sources from which they screened do not include any outside Duval County.. When screening on the additional

[1]US EPA, *New Source Review Workshop Manual*, October 1990.

sources outside the county is conducted, two additional sources should be modeled, with total emissions of 1,358 tpy SO_2, and 3529 tpy NO_x.

The overall results of the inventory indicate that ENSR included all sources likely to significantly effect concentrations of SO_2, but do not apparently include all significant sources of NOx. Their development of the emissions inventory did not follow EPA guidelines in the following ways:

- Minor sources (less than 100 tpy) were not included in the PSD inventory, and
- All sources within 50 km of the SIA were not screened.

A phone survey of sources showing the greatest discrepencies with ENSR's emission rates was conducted to verify data in the source listing of the FDER emissions inventory. For each of 47 sources the allowable emission rates of SO_2 and NO_x listed in the FDER database were compared with the allowable emission rates of SO_2 and NO_x listed in the ENSR database. The 20 sources for which the discrepancy in total allowable SO_2 and NO_x emissions was greatest were selected to be contacted for verification of the FDER data. Of the 20 sources for which telephone contact was attempted, confirmation and/or correction of the FDER data was received from 10 (as of 3:00 PM April 1, 1993). At one other source the contact declined to respond. The contacts at six sources are currently reviewing the data and have not yet responded. The contacts at several other sources have not been reached for discussion.

The telephone interviews which were completed resulted in minor updates and corrections to the FDER source data. No significant errors in the FDER database were identified. The sources which were interviewed and the confirmation and/or ammendments to the FDER data are shown in Appendix II.

B.4.2) AIR QUALITY MODELING

To determine what effects the above changes in emission rates, particulary the Future Recycling Scenario, would have on air emissions, we performed a simple set of case comparisons, similar to those performed by ENSR in chapter 2 of their report. However due to constraints, we were only able to perform these comparisons for SO_2.

For the equivalent of ENSR's Case 1, we assumed that SKC would be running 640,000 lb/hour steam for the 24 hour comparisons, and 555,755 lb/hour steam for the annual comparisons. The identical polar grid network that ENSR used was also used in the modeling. Emission rates were based on 0.25% sulfur in the fuel, and a mix between bark and oil firing based on the actual usage of the boilers between 1988 and 1991. Lastly, both bark boiler stacks and the combined power boiler stack were raised to GEP stack height.

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This scenario was compared with ENSR's Case 3, except that SO_2 emissions at the limestone dryers and package boilers were reduced to reflect the use of 0.05% sulfur and a limit on the package boilers of 400 hours/year burning oil, with natural gas for the remainder of the year.

Table 11 shows the results of these runs for each year of meteorological data. As is shown for each year the following data is tabulated:

- The number of modeled receptors
- The sum of the change for each receptor weighted by the geographic area that the receptor represents
- The total area whose air quality worsened with CBCP
- The total area whose air quality improved with CBCP
- The highest concentration for any one receptor for CBCP and the SKC recycling operation.

As is shown, the average change in air quality due to the CBCP is just under 1 $\mu g/m^3$, while a significant majority of land area with the modeling region showed a higher concentrations of SO_2.

Table 11: Case Compa rison of Changes in Ambient Impacts between SKC Future Recycling and CBCP for SO_2 (24-hour averaging period)

	1983	1984	1985	1986	1987
No. Receptors	1008	1008	1008	1008	1008
No. Receptors Improved	392	334	214	273	247
Weighted Sum of Difs ($\mu g/m^3$)	0.23	0.32	0.41	0.32	0.42
Worse Area (km^2)	1,831	2,048	2,219	2,005	2,109
Better Area (km^2)	544	328	157	370	267
Max Conc CBCP ($\mu g/m^3$)	16.7	25.3	24.6	20.9	19.8
Max Conc SKC ($\mu g/m^3$)	6.5	6.3	1.8	7.3	5.5

Table 12 is similar to Table 11, but it shows the results for the annual averaging period. In this scenario, one year out of the five shows overall improvements with CBCP.

Table 12: Case Comparison of Changes in Ambient Impacts between SKC Future Recycling and CBCP for SO_2 (annual average)

	1983	1984	1985	1986	1987
No. Receptors	1008	1008	1008	1008	1008
No. Receptors Improved	660	635	658	635	657
Weighted Sum of Difs ($\mu g/m^3$)	0.0006	0.0027	0.0010	-0.0027	0.0017
Worse Area (km^2)	1,511	1,784	1,545	1,286	1,602
Better Area (km^2)	864	591	830	1089	773
Max Conc CBCP ($\mu g/m^3$)	0.543	0.705	0.632	0.660	0.617
Max Conc SKC ($\mu g/m^3$)	0.331	0.352	0.333	0.350	0.436

B.4.3) CANCER RISK ASSESSMENT

Concentrations of criteria pollutants from SKC's recycling operation have been compared to those that would be present with CBCP. However, nowhere in their report did ENSR compare the ambient concentrations and cancer risks from toxic air emissions from CBCP to that of SKC's projected recycling operation.

The ambient concentrations of the seven known carcinogens found in emissions from SKC and CBCP, listed below, were modeled:

- Arsenic
- Beryllium
- Cadmium
- Chromium (hexavalent)
- Formaldehyde
- Nickel
- Polycyclic Aromatic Hydrocarbons

The following assumptions were made in this analysis, which differ from those made by ENSR in their analyses:

1) The emissions from SKC were calculated using the mean values collected in emissions test results. For formaldehyde and polycyclic aromatic hydrocarbons, ENSR emission rates were used as no tests were performed for these pollutants.

2) SKC's operation was assumed to operate at the highest steam production level of the past four years, with necessary modifications to ensure NAAQS compliance, including GEP stack height.

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3) The SKC package boilers were assumed to use natural gas for all but 400 hours of the year; emission rates of formaldehyde and polycyclic aromatic hydrocarbons were calculated using rates for the EPA's *Toxic Air Pollutant Emission Factors.*

4) Emission rates of the carcinogens from the CFB's were identical to those reported by ENSR, with two exceptions: hexavalent chromium and nickel. ENSR calculated these emission rates with the very optimistic assumption that 98% of each would be removed by the pollution control equipment. However, tests done at a similar plant, the AES Thames facility in Connecticut, showed much lower removal efficiencies, of 62% and 68% for nickel and chromium, respectively. Therefore, these more realistic, removal rates were used in the calculation of nickel and chromium emissions from the CFB.

In order to evaluate the overall change in cancer risk in the area, the average annual concentrations were compared at each receptor, and averaged over the entire receptor grid. Table 13 presents the modeling results.

Table 13: Results of Cancer Risk Modeling

Pollutant	Average Change in Concentration ($\mu g/m^3$)	Change in Cancer Risk (. . . in one million)
Arsenic	0.0000731	0.318
Beryllium	0.00000303	0.00233
Cadmium	-0.0000374	-0.0657
Chromium (hexavalent)	0.0000137	16.1
Formaldehyde	-0.00153	-0.0191
Nickel	-0.000530	-0.161
Polycyclic Aromatic Hydrocarbons	-0.000342	-1.14
Total Additive Cancer Risk		14.3 in one million

The second column in Table 13 shows the changes in modeled concentration. A negative concentration changes indicate a decrease if CBCP is operating. Out of the seven pollutants, four are shown to decrease with CBCP. However, a better indication of the health effects associated with CBCP is to calculate the actual cancer risk posed by each pollutant. This is done by multiplying the change in concentration, in the second column of Table 13, by the "unit risk factor" of that carcinogen, which is a measure of the pollutant's potency as a carcinogen developed by the EPA. The third column in Table 13 shows the change in cancer risk that would result if Cedar Bay operates. These numbers can be added together to show an overall increase in cancer risk of 14.3 in one million with CBCP. Generally, the EPA considers any change in cancer risk greater than one in one million to be of concern, meriting at least a more detailed study. In any case, the CBCP will clearly result in an increased cancer risk to the public, which should be an important consideration in determining its environmental impacts.

It is interesting to note that, if all the concentrations in the second column were added, there would be a decrease in total pollutant concentrations. The increase in cancer risk is primarily due to fact that the hexavalent chromium, which is an extremely potent carcinogen, concentration increases. This analysis indicates that CBCP will pose an increase in cancer risk to the public, despite the fact that the sum of the pollutant concentrations decreases.

C) COMPLIANCE WITH AIR QUALITY STANDARDS AND REGULATIONS

C.1) FLORIDA AND NATIONAL AMBIENT AIR QUALITY STANDARDS

Modeling perfomed by ENSR showed a number of periods for which violations of the Florida and National Ambient Air Quality Standards (FAAQS & NAAQS) occured. For the most part, the modeling conformed with State and Federal guidelines. However, there are three areas in which we feel the modeling may be inadequate:

1) Terrain Elevations - Terrain elevations were not modeled by ENSR. While the terrain around the facility may seem to be flat, there are actually small hills nearby which could experience higher concentrations due to their elevation. For example, just to the west of the facility, sand dunes rise to as much as 95 feet ASL. This elevation is higher than the limestone dryer stack height. There are many other areas in the significant impact area that tend to range from 10 to 40 feet ASL.

2) Sulfur in Fuel - Due to the recent proposed Conditions of Certification produced by the DER, stricter emission limitations were placed on the limestone dryers and package boilers. These were not modeled in the AAQS analyses. would be less impact

3) Emissions Inventory - There are still outstanding issues concerning the emissions inventory. There appear to be several sources which were left off the inventory, as well as sources whose emissions that are not properly represented.

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In order to address these issues, RSG performed FAAQS modeling for the 24-hour SO_2 condition. This scenario was chosen because of the many violations of the standard were revealed by ENSR's modeling. The modeling was performed with terrain elevations along cartesian grids. Four different grids were used: The first was a 12 km by 12 km grid with 1 km spacing; the second was a 500 m spacing centered closer to the CBCP; third was a 250 m grid centered around the areas of high elevation to the west of the site; and the last were three discrete receptors placed near the intersection of Dunn Avenue and I-95. Consistent with common practice, the highest elevations for each grid square plus 10 ft were obtained from U.S. Geologic Survey Topographic Maps. The discrete receptors used actual elevations. The emission rates for the limestone dryers and package boilers were changed to reflect the currently proposed conditions of certification. No change was made to the inventory, as the outstanding issues have yet to be resolved. All other parameters remained the same as ENSR's modeling.

The results of the modeling showed that the CBCP contributed significantly to one violation (high-second-high) of the 24-hour FAAQS over the five year meteorological period. This violation occurred at one of the Dunn Avenue discrete recepetors (see Appendix III).

No other averaging time or pollutants were modeled by RSG for AAQS purposes.

C.2) PREVENTION OF SIGNIFICANT DETERIORATION REQUIREMENTS

The Prevention of Significant Deterioration (PSD) increments are designed to insure that the air in any one area does not significantly worsen. ENSR performed a PSD analysis using a PSD inventory and much the same modeling techniques as the AAQS analyses. Therefore we have many of the same concerns relating to the PSD analysis as we do with the NAAQS analysis, concerning terrain elevations, sulfur content in the fuel, and the emissions inventory, as described in the previous sectio.

We did not perform any modeling for PSD analysis. However, aside from the above points, ENSR's modeling appears reasonable.

D) SUMMARY

The main findings of the review undertaken by Resource Systems Group are as follows:

1) The ENSR report over-estimates the actual or expected emissions of the five boilers at SKC operating without the CBCP. This

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significantly alters the comparisons of the CBCP with SKC as required by the Siting Board Order.

2) The SKC recycling facility, as it exists at present, contributes to modeled violations of the Florida 24-hour SO2 standard. This will require that, in the event that the CBCP is not in operation, the SKC facility will be required to reduce its emissions and change its operating parameters so that it no longer significantly contributes to a violation. The specifications of the SKC facility operations needed to meet those requirements should be used in making comparisons required by the Siting Boards Order. by rule?

3) A comparison of the emissions of the CBCP and package boilers (Case 3) with the SKC recycling facility (Case 1), when corrected to reflect the deficiencies described in 1) and 2) above, shows that:
   - the CBCP (Case 1) has higher emissions of SO_2, NO_x, and CO and has only slightly lower emissions of PM10.
   - the emissions of hazardous air pollutants are variable but the emissions of the most hazardous pollutants are higher from the CBCP (Case 3).

4) The aggregate cancer risk associated with the carcinogenic pollutants is greater for the CBCP (Case 3)than for the SKC recycling operation (Case 1), as revised.

5) Revised modeling conducted by Resource Systems Group shows that the ambient impacts of the CBCP for SO_2 are greater than for SKC recycling operations without the CBCP.

6) Revised modeling conducted by Resource Systems Group shows that the CBCP significantly contributes to a violation of the Florida 24-hour SO2 ambient air quality standard.

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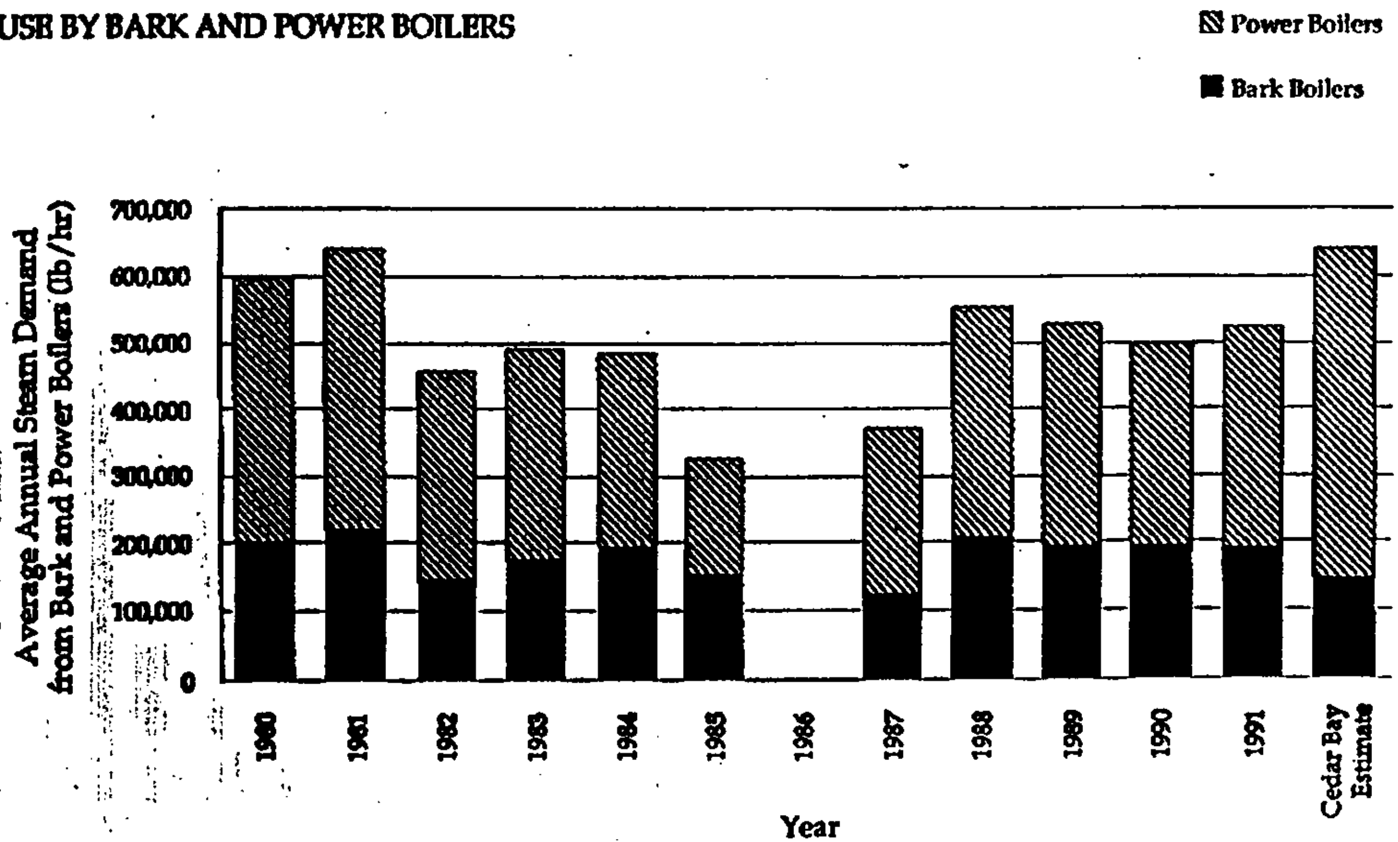
STEAM USE BY BARK AND POWER BOILERS



Cedar Bay Report
Figure 1

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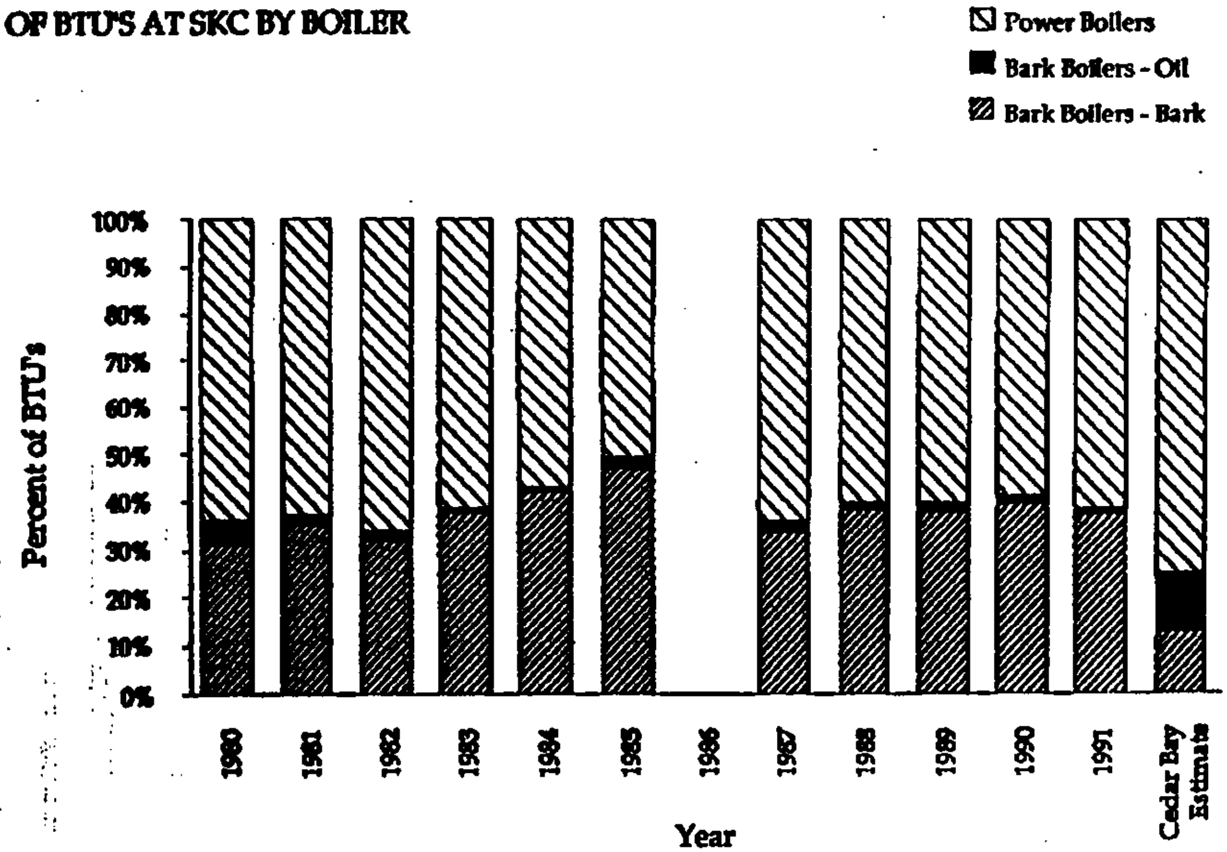
PERCENT OF BTU'S AT SKC BY BOILER



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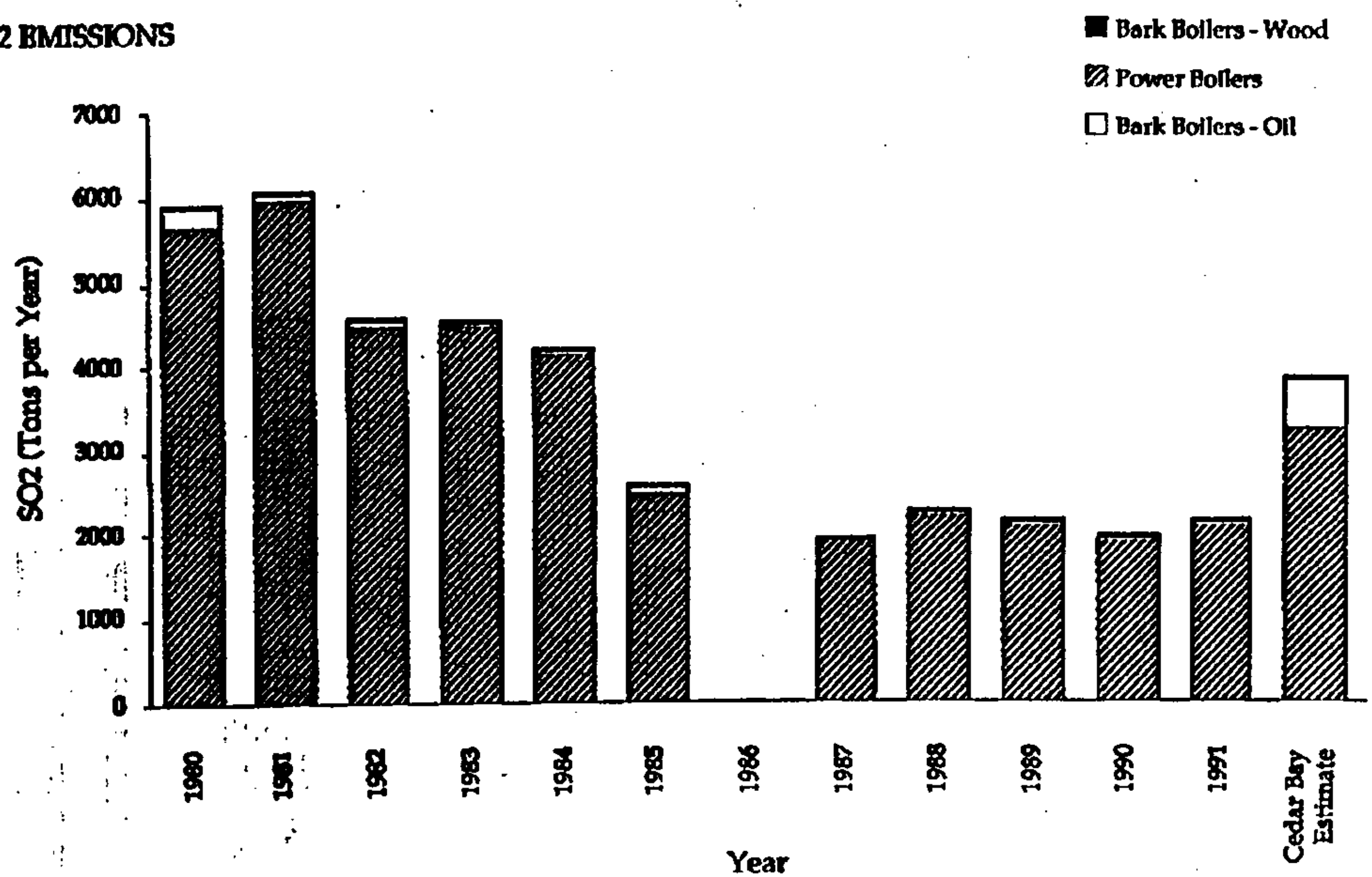
SKC SO2 EMISSIONS



Cedar Bay Report
Figure 3

APPENDIX I

NAAQS Modeling Results

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Appendix Summary of NAAQS Modeling Violations where CBCP or SKC Future Contribute to Violations

CBCP

SKC Recyling Max
Emissions, 125' stack

SKC Future Recycling
.4% Sulphur
50%/50% bark/oil max
700,000 lbs/hr steam max

so4max24

Date	UTM X	UTM Y	ELEV	ALL SRC	CFB	LSO1	LSO2	TOTAL	PACKG	ALL SRC	POWER	BARK	TOTAL	ALL SRC	POWER	BARK	TOTAL
840206	446500.	3362500.	9.1	342.45	1.12	.02	.02	1.16	.45	433.96	35.24	57.86	93.11	345.85	3.11	1.09	4.20
840214	446500.	3362500.	8.1	292.08	1.29	.03	.03	1.36	.50	404.08	25.91	87.95	113.87	294.50	2.73	1.56	4.29
840929	446500.	3362500.	9.1	354.32	1.15	.03	.03	1.20	.53	464.91	34.97	77.35	112.32	357.44	3.37	1.49	4.85

Violations Summary:

Cedar Bay: 0
Package Boilers: 0
SKC Recycling (125' stack): 724
SKC Recycling (reduced emissions): 0

Date	UTM X	UTM Y	ELEV	ALL SRC	CFB	LSO1	LSO2	TOTAL	PACKG	ALL SRC	POWER	BARK	TOTAL	ALL SRC	POWER	BARK	TOTAL
851109	440250.	3365750.	24.4	251.36	.59	.03	.02	.64	.68	411.77	39.13	82.60	121.74	295.35	3.61	1.72	5.32
851109	439875.	3365875.	15.2	264.90	1.24	.03	.03	1.29	.65	384.88	42.48	79.45	121.93	269.81	4.36	1.69	6.06

Violations Summary:

Cedar Bay: 0
Package Boilers: 0
SKC Recycling (125' stack): 831
SKC Recycling (reduced emissions): 2

Date	UTM X	UTM Y	ELEV	ALL SRC	CFB	LSO1	LSO2	TOTAL	PACKG	ALL SRC	POWER	BARK	TOTAL	ALL SRC	POWER	BARK	TOTAL
860405	437400.	3367000.	6.1	648.90	5.09	.02	.02	5.12	.37	713.81	24.24	45.36	69.60	647.47	3.14	.92	4.06
860405	437300.	3366990.	9.1	585.59	4.50	.01	.01	4.53	.34	642.10	21.33	40.04	61.38	584.29	2.75	.82	3.56
860405	436900.	3367250.	3.0	236.63	4.70	.01	.01	4.72	.32	291.42	21.31	38.53	59.84	235.15	2.78	.79	3.57

Violations Summary:

Cedar Bay: 1
Package Boilers: 0
SKC Recycling (125' stack): 632
SKC Recycling (reduced emissions): 0

Date	UTM X	UTM Y	ELEV	ALL SRC	CFB	LSO1	LSO2	TOTAL	PACKG	ALL SRC	POWER	BARK	TOTAL	ALL SRC	POWER	BARK	TOTAL
870826	439875.	3365625.	21.3	240.56	3.71	.01	.01	3.73	.37	301.77	25.92	39.39	65.31	240.55	3.21	.88	4.09
870920	446500.	3362500.	9.1	400.25	3.97	.02	.02	4.01	.26	466.12	13.55	47.59	61.14	407.73	1.94	.80	2.75

Violations Summary:

Cedar Bay: 0
Package Boilers: 0
SKC Recycling (125' stack): 709
SKC Recycling (reduced emissions): 0

APPENDIX II

Table A-II: Revised Estimates of Hazardous Emissions from CBCP (tons per year)

Pollutant	Revised Emissions
Lead	0.721
Beryllium	0.100
Mercury	0.351
Fluorides	8.905
Antimony	0.131
Arsenic	1.701
Barium	7.300
Bromine	0.00117
Cadmium	0.382
Cobalt	0.457
HCl	21.71
Indium	0.00271
Chromium VI	0.241
Copper	1.007
Formaldehyde	2.114
Manganese	6.002
Molybdenum	1.208
Nickel	15.39
Phosphorus	4.018
POM	0.222
Selenium	0.192
Tin	0.525
Vanadium	3.905
Zinc	44.52
Radionuclides	0.02

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APPENDIX 3

Results of Telephone Survey

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facility ID	Owner/Company	City	Emission Point	Source Description	Status	Start Up Date	Shut Down Date	Actual SO2 (tpy)	Allowable SO2 (tpy)	Actual NOX (tpy)	Allowable NOX (tpy)
31JAX140025	Seminole Electric Coop	Palatka	1	#1 unit w/esp and fgd	Active			12717	32761	10556	18380
			2	#2 unit w/esp & fgd	Active			12505	32761	9818	18380
	Confirmed/Corrected:	Putnam County	1	#1 unit w/esp and fgd	confirmed	June '83		11691	29900	9959	12900
			2	confirmed	confirmed	June '84		11691	29900	10175.5	12900
	Comments:	Amended figures in tpy are calculated from lb/MMbtu and heat input in MMbtu/yr.									

facility ID	Owner/Company	City	Emission Point	Source Description	Status	Start Up Date	Shut Down Date	Actual SO2 (tpy)	Allowable SO2 (tpy)	Actual NOX (tpy)	Allowable NOX (tpy)
31DVL160008	Anheuser Busch Inc	Jacksonville	1	#1 boiler no.6 fuel & nat gas	Active			1.09	520	11	85
			2	#2 boiler no.6 fuel & nat gas	Active			0.48	530	7	85
			3	#3 boiler	Active			0.32	530	0.6	85
			4	#4 boiler	Active			0.28		3	85
			5	grains dryer #1 w/scrubber	Active				269		45
			6	grains dryer #2	Active				396		80
			27	56.7 MMBtu/hr solar mars gas-fired turbine	Active			0	0	205	328
			28	duct burner & heat recovery boiler	Active			6	0	6	17
			30	wastewater boiler for anaerobic treatment facility	Active				18		5
			31	biogas flare for wastewater treatment facility	Active				37		21
	Confirmed/Corrected:		1	confirmed	confirmed	early '70's		confirmed	not confirmed	confirmed	not confirmed
			2	confirmed	confirmed	unknown		confirmed	not confirmed	confirmed	not confirmed
			3	confirmed	confirmed	unknown		confirmed	not confirmed	not correct	not confirmed
			4	confirmed	confirmed	unknown		confirmed	unknown	confirmed	not confirmed
			5	confirmed	inactive		few years				
			6	confirmed	inactive		few years				
			27	confirmed	confirmed	unknown		unknown	not stated	confirmed	confirmed
			28	confirmed	confirmed	unknown		confirmed	not stated	confirmed	confirmed
			30	confirmed	inactive	was not built					
			31	confirmed	currently under construction permit				not stated		not stated
			?	back-up biogas flare	currently under construction permit				not stated		not stated
			?	#28 scrubber	currently under construction permit				not stated		not stated
	Comments:	Confirmed actual figures and explained that the figures are calculated not measured.									

facility ID	Owner/Company	City	Emission Point	Source Description	Status	Start Up Date	Shut Down Date	Actual SO2 (tpy)	Allowable SO2 (tpy)	Actual NOX (tpy)	Allowable NOX (tpy)
31DVL140040	Jefferson Smurfit Corp Container Board	Jacksonville	4	#5 smelt dissolving tank	Active			14			
			5	black liquor recovery boiler #5	Active				761		
			6	lime kiln w/scrubber	Inactive				22		75
			7	#2 lime kiln w/scrubber	Inactive				23		76
			11	bark/wood boiler #10	Inactive			773	1265	1152	1352
			12	coal/bark boiler	Inactive				15		
			13	#10 coal/bark boiler	Active			773	1265	1152	1352
			23	#3 lime kiln	Active			21	46		
	Confirmed/Corrected:		4	Confirmed	Confirmed	Nov '85		Confirmed	not stated	none	not stated
			5	Confirmed	Confirmed	Nov '88		not tested	not stated		not stated
			6	with electrostatic precipitators	Confirmed	unknown	unknown		49.6		not stated
			7	Confirmed	Confirmed	unknown	approx. '83	unknown	unknown	unknown	unknown
			11	Confirmed	Confirmed	unknown	unknown	unknown	unknown	unknown	unknown
			12	Confirmed	Confirmed	unknown	unknown	unknown	unknown	unknown	unknown
			13	Confirmed	Confirmed	June '73		Confirmed	Confirmed	Confirmed	Confirmed
			23	with electrostatic precipitators	Confirmed	May '86		not tested	Confirmed	none	not stated
			24	lime storage silo	Active	unknown	unknown	not tested	not stated	none	not stated
	Comments:	Figures are unknown for inactive sources.									

facility ID	Owner/Company	City	Emission Point	Source Description	Status	Start Up Date	Shut Down Date	Actual SO2 (tpy)	Allowable SO2 (tpy)	Actual NOX (tpy)	Allowable NOX (tpy)
31DVL160042	Duval Asphalt Products	Jacksonville	1	asphalt batch plant	Active				4.68		
			2	asphalt drum mix plant	Active				99.37		
	Confirmed/Corrected:		1	unknown source							
			2	Confirmed	Inactive		app. '89 or '90	unknown	not stated		not stated
	Comments:	Recieved a new permit February 28, 1993 which does not state allowable SO2 or NOX levels for any source.									

facility ID	Owner/Company	City	Emission Point	Source Description	Status	Start Up Date	Shut Down Date	Actual SO2 (tpy)	Allowable SO2 (tpy)	Actual NOX (tpy)	Allowable NOX (tpy)
31JAX020001	Northeast Florida State Hospital	MacClenny	1	#1 hthw boiler, fired with fuel no gas	Active			30	205	4	
			2	#2 hthw boiler, fired with	Active			30	205	4	
			3	#3 hthw	Active			30	205	4	
		Confirmed/Corrected:	1	Confirmed	Confirmed	1987		32.99	unknown	9.71	unknown
			2	Confirmed	Confirmed	1987		10.14	unknown	1.85	unknown
			3	Confirmed	Confirmed	1987		24.12	unknown	4.20	unknown
		Comments:	Amended	figures are actual 1992 emissions based on hours of operation.							

facility ID	Owner/Company	City	Emission Point	Source Description	Status	Start Up Date	Shut Down Date	Actual SO2 (tpy)	Allowable SO2 (tpy)	Actual NOX (tpy)	Allowable NOX (tpy)
31DVL160071	Union Camp Corp (Terpene & Aromatics Div)	Jacksonville	1	waste incinerator	Active			200		4	
			3	boiler #2	Active-			200		4	
			14	boiler #3 77,000lb/hr Babcock & Wilcox	Active	10/5/78		35		17	
			23	tomato spray dryer (baghouse)	Inactive	7/15/83					10
		Confirmed/Corrected:	1	Confirmed	Confirmed	unknown		Confirmed	not stated	Confirmed	not stated
			3	Confirmed	Confirmed	unknown		21	350	19.2	not stated
			14	Confirmed	Confirmed	unknown		Confirmed	340	Confirmed	not stated
			23	Does Not Exist	Confirmed	unknown	unknown				not stated
		Comments:	Actual figures are calculated based on sulfur contents & AP 42.								

facility ID	Owner/Company	City	Emission Point	Source Description	Status	Start Up Date	Shut Down Date	Actual SO2 (tpy)	Allowable SO2 (tpy)	Actual NOX (tpy)	Allowable NOX (tpy)
31DVL160045	Jacksonville Electric Authority	Jacksonville	1	#1 steam generator	Active			7344	23898.5	1718	
			2	#2 steam generator	Active				20397.0		4540.0p
			3	#3 steam generator	Active			5052.2	43640.2	4368	5613
			6	combustion turbine #3 using 5000 gph	Active			8.50		8.35	827
			7	combustion turbine #4	Active			4.09		3.93	827
			8	combustion turbine #5	Active			12.24		11.88	827
			9	combustion turbine #6	Active			4.89		4.84	
			14	oil/gas fired auxiliary boiler "A"	Active			53.08	20	11.4	
		Confirmed/Corrected:	1	Confirmed	Confirmed						not stated
			2	Confirmed	Confirmed						not stated
			3	Confirmed	Confirmed						confirmed
			6	Confirmed	Confirmed						not stated
			7	Confirmed	Confirmed						not stated
			8	Confirmed	Confirmed						not stated
			9	Confirmed	Confirmed						not stated
			14	Confirmed	Confirmed						not stated
		Comments:	NOX is not stated in the permit (except for source 3). Other numbers are approximately correct.								

Facility ID	Owner/Company	City	Emission Point	Source Description	Status	Start Up Date	Shut Down Date	Actual SO2 (tpy)	Allowable SO2 (tpy)	Actual NOX (tpy)	Allowable NOX (tpy)
31DVL160045	Jacksonville Electric Authority	Jacksonville	1	#1 steam generator	Active				1830		
			2	#2 steam generator	Active				1830		
			3	#3 steam generator	Active				2775		
			4	#4 steam generator	Active			7.01	3835.1	23.37	
			5	#5 steam generator	Active			41.91	7227	921.21	
			10	oil/gas fired auxiliary boiler	Active	10/15/84		0.01		2.41	3
		Confirmed/Corrected:	1	permanently shut down	Inactive	1948	1992				not stated
			2	permanently shut down	Inactive	1950	1992				not stated
			3	Confirmed	Confirmed						not stated
			4	Confirmed	Confirmed						not stated
			5	Confirmed	Confirmed						not stated
			10	Confirmed	Confirmed						not stated
		Comments	NOX is not stated in the permit. Other numbers are approximately correct. Sources 1 & 2 are permanently shut down.								

Facility ID	Owner/Company	City	Emission Point	Source Description	Status	Start Up Date	Shut Down Date	Actual SO2 (tpy)	Allowable SO2 (tpy)	Actual NOX (tpy)	Allowable NOX (tpy)
31DVL160047	Jacksonville Electric Authority	Jacksonville	4	combustion turbine #4	Active			0.26		0.25	97.76
			5	combustion turbine #5	Active			2.9		2.71	97.7
			6	combustion turbine #6	Active				4e		5e
			7	#8 steam generator	Inactive				2607		
			8	#9 steam generator	Active				2608.5		
			9	#10 steam generator	Active			24.74	6432	150.54	
			13	Oil/gas fired auxiliary boiler	Active	10/15/84		0.01	42.6p	2.73	11.78p
		Confirmed/Corrected:	4	Confirmed	Confirmed						not stated
			5	Confirmed	Confirmed						not stated
			6	Confirmed	Confirmed						not stated
			7	Confirmed	Confirmed						not stated
			8	Confirmed	Confirmed						not stated
			9	Confirmed	Confirmed						not stated
			13	Confirmed	Confirmed						not stated
		Comments	NOX is not stated in the permit. Other numbers are approximately correct.								

Facility ID	Owner/Company	City	Emission Point	Source Description	Status	Start Up Date	Shut Down Date	Actual SO2 (tpy)	Allowable SO2 (tpy)	Actual NOX (tpy)	Allowable NOX (tpy)
31JAX160001	Jacksonville Electric Authority	Jacksonville	1	#1 steam generator unit	Active			8507	32283	12045	16148
			4	#2 steam generator	Active			10115	32282	12709	16148
		Confirmed/Corrected:	2	Confirmed	Confirmed				20998		conf(approx.)
			16	Confirmed	Confirmed				20998		conf(approx.)
		Comments	Allowable SO2 was incorrect in DER data.								

Facility ID	Owner/Company	City	Emission Point	Source Description	Status	Start Up Date	Shut Down Date	Actual SO2 (tpy)	Allowable SO2 (tpy)	Actual NOX (tpy)	Allowable NOX (tpy)
31DVL160202	[illegible] Corp	Jacksonville	7	[illegible] bottle burner #1	Active			0.0183		4	
			8	[illegible] model [illegible] burner	Active			0.091		21	
			11	[illegible] bottle burner #2	Active			0.0183		4	
			12	[illegible] bottle #3	Active			0.0183		4	
			13	Maxon model Lo-NOx burner	Active			0.09		21	
			14	Hauck model 794 gas lx burner	Active			0.09		21	
			15	Hauck model 794 gas lx burner	Active			0.09		21	
		Comments	Declined to respond to inquiry regarding accuracy of data.								

APPENDIX IV

SKC Operational Scenarios

RESOURCE
SYSTEMS
GROUP

Appendix 4: Emission Rates

Boiler	Fuel	SO2 ER lb/MMBTU	NOx ER lb/MMBTU	PM10 ER lb/MMBTU	CO lb/MMBTU	
Bark	Bark	0.014	0.294	0.141	0.923	From Test Results
Bark	Oil	0.850	0.447	0.100	0.030	From ENSR estimates
Power	Oil	1.047	0.447	0.071	0.033	From AP-42

Scenario 1: Average Fuel Use Over the Last 4 Years

Boiler	Fuel	MMBTU/hr	Emissions (g/s) SO2	NOx	PM10	CO	Emissions (TPY) SO2	NOx	PM10	CO
Bark	Bark	288	0.508	10.640	5.112	33.450	18	370	178	1163
Bark	Oil	16	1.800	0.878	0.196	0.066	38	31	7	2
Power	Oil	480	69.404	26.370	4.030	1.873	2065	882	140	65
							2120	1283	325	1230

Scenario 2: 840,000 lb Steam/hr based on boiler use over the last 4 years

Boiler	Fuel	MMBTU/hr	Emissions (g/s) SO2	NOx	PM10	CO	Emissions (TPY) SO2	NOx	PM10	CO
Bark	Bark	350	0.618	12.947	6.218	40.672	21	450	216	1414
Bark	Oil	19	1.319	1.067	0.239	0.079	46	37	8	3
Power	Oil	549	72.238	30.940	4.900	2.277	2511	1072	170	79
							2578	1560	395	1496
with 2.27% S:										
Bark	Oil		2.981							
Power	Oil		103.906							
With 0.4% S:										
Bark	Oil		0.525				18		4	
Power	Oil		28.893				1004		82	
							1044		312	

Scenario 3: Maximum Fuel Use Over the Last 4 Years

Boiler	Fuel	MMBTU/hr	Emissions (g/s) SO2	NOx	PM10	CO	Emissions (TPY) SO2	NOx	PM10	CO
Bark	Bark	304	0.530	11.243	5.399	35.319	19	391	188	1228
Bark	Oil	16	1.140	0.927	0.207	0.068	40	32	7	2
Power	Oil	476	62.784	26.787	4.256	1.979	2180	931	148	69
							2239	1354	343	1291
with 2.27% S:										
Bark	Oil		2.589							
Power	Oil		142.383							
With 0.4% S:										
Bark	Oil		0.456				16		4	
Power	Oil		25.090				872		80	
							907		271	

Scenario 4: Full Capacity, Maximum SO2 Emissions

Boiler	Fuel	MMBTU/hr	Emissions (g/s) SO2	NOx	PM10		Emissions (TPY) SO2	NOx	PM10
Bark	Bark	0	0.000	0.000	0.000	0.000	0	0	0
Bark	Oil	300	26.749	21.748	4.893	1.806	930	756	168
Power	Oil	677	89.261	38.129	6.056	2.815	3104	1325	211
							4033	2081	380
with 2.27% S:									
Bark	Oil		60.721						
Power	Oil		202.987						

Proposed Emissions Limitations of OBCP and SKO.

	SKO Units	system Dryers	CFB	Fugitive	Cooling Tower	Total
SO2	4	2.3	2566			2,604
NOx	310	0.5	2206			2,525
PM	6	0.04	234	6	25	260
CO	653	1.02	2273			2,928

HOPPING BOYD GREEN & SAMS

ATTORNEYS AND COUNSELORS

123 SOUTH CALHOUN STREET
POST OFFICE BOX 6526
TALLAHASSEE, FLORIDA 32314
(904) 222-7500
FAX (904) 224-8551
FAX (904) 681-2964

April 2, 1993

Clair Fancy
Division of Air Resources Management
Department of Environmental Regulation
2600 Blair Stone Road, Suite 306
Tallahassee, FL 32399

Re: Cedar Bay Cogeneration Project - DOAH Case No. 88-5740

Dear Clair:

Enclosed is a Subpoena Ad Testificandum requesting your availability to appear as a witness at the upcoming hearing. We realize you are listed to testify at this hearing. This subpoena is mostly a formality to preserve our ability to call you as a witness in this proceeding that has become highly contentious. Should some unanticipated event cause you to be unavailable to testify during the scheduled hearing dates, we would be able to get leave to have you testify at a later date. It is for that reason we must use this subpoena.

It is my understanding that, pursuant to §92.142(2), Fla. Stat., a witness fee is not required for an employee of the state who is required to appear as an official witness before a hearing officer. If this is not the case, a witness fee can be negotiated at a later time.

At this time we are uncertain of the exact time you will be required to testify. Our intent is to work with you in scheduling your appearance. If you are aware of any times you will not be available during the length of this hearing please contact Gail Steels at the above number and let her know. Otherwise we will assume you will be available throughout the hearing.

Should you have any questions please let me know.

Sincerely,

Douglas S. Roberts

cc: Richard T. Donelan, Jr.

HOPPING BOYD GREEN & SAMS

ATTORNEYS AND COUNSELORS

123 SOUTH CALHOUN STREET

POST OFFICE BOX 6526

TALLAHASSEE, FLORIDA 32314

(904) 222-7500

FAX (904) 224-8551

FAX (904) 681-2964

April 16, 1993

Clair Fancy
Division of Air Resources Management
Department of Environmental Regulation
2600 Blair Stone Road
Room 306
Tallahassee, FL 32399

Re: Cedar Bay Cogeneration Project - DOAH Case No. 88-5740

Dear Clair:

As you are no doubt aware, the above-referenced case has been concluded via a Settlement Stipulation amongst all the parties. The Hearing Officer has relinquished jurisdiction to the Governor and Cabinet and has ordered that a hearing will not be necessary. You are therefore released from the Subpoena Ad Testificandum served on you on April 5, 1993 to testify at the Cedar Bay modification hearing.

Sincerely,

Doug Roberts

Douglas S. Roberts

cc: Richard Donelan

STATE OF FLORIDA
DIVISION OF ADMINISTRATIVE HEARINGS

SEE ATTACHED FOR CASE STYLE AND CASE NUMBER

SUBPOENA AD TESTIFICANDUM

TO: CLAIR FANCY, P.E.
Division of Air Resources Management
Department of Environmental Regulation
2600 Blair Stone Road, Room 306
Tallahassee, FL 32399

YOU ARE HEREBY COMMANDED to appear at Holiday Inn Jacksonville Airport, Jacksonville, FL to testify at a xdepoxxxxxxn/final hearing (strike one) at 10 o'clock a .m., on the 13th day of April, 19 93.

YOU SHALL RESPOND to this subpoena as directed unless excused by the party who requested issuance of the subpoena or by order of the Division of Administrative Hearings.

ISSUED this 31st day of March, 1993, at Tallahassee, Florida.

ROBERT T. BENTON, II
Hearing Officer
Division of Administrative Hearings
The DeSoto Building
1230 Apalachee Parkway
Tallahassee, FL 32399-1550
(904) 488-9675

THIS SUBPOENA HAS BEEN ISSUED UPON THE REQUEST OF:

Name: Gary Sams, Esq.
HOPPING, BOYD, ET AL.
Address: P.O. Box 6526
Tallahassee, FL 32314

Phone: (904) 222-7500

* Beginning on this day and continuing through April 30, 1993, notification of exact date and location of required appearance at hearing will be given by telephone by Petitioner's counsel. If you are aware of any times during the scheduled period for the hearing when you will be unavailable to appear as a witness during normal business hours, you should inform the undersigned counsel of those periods you will be unavailable.

AUTHORITY:
Florida Statutes 120.58(1),(3)

(1)(b) An agency or its duly empowered presiding officer or a hearing officer has the power to swear witnesses and take their testimony under oath, to issue subpoenas upon the written request of any party or upon its own motion, and to effect discovery on the written request of any party by any means available to the courts and in the manner provided in the Florida Rules of Civil Procedure, including the imposition of sanctions, except contempt ....

(3) A party may seek enforcement of a subpoena, order directing discovery, or order imposing sanctions issued under the authority of this act by filing a petition for enforcement in the circuit court of the judicial circuit in which the person failing to comply with the subpoena or order resides. A failure to comply with an order of the court shall result in a finding of contempt of court. However, no person shall be in contempt while a subpoena is being challenged under subsection (2). The court may award to the prevailing party all or part of the costs and attorney's fees incurred in obtaining the court order whenever the court determines that such an award should be granted under the Florida Rules of Civil Procedure.

Florida Administrative Code Rule 60Q-2.021

(1) Upon request, the Hearing Officer before whom the case is pending shall issue subpoenas on forms supplied by the Division. Subpoenas shall issue in blank except for the style of the case, the case number, the name, address and telephone number of the attorney or party requesting the subpoena, and the Hearing Officer's signature, which may be by facsimile stamp.

(2) Any party or any person on whom a subpoena is served or to whom a subpoena is directed, may file a motion to quash or for protective order with the Hearing Officer before whom the case is pending.

(3) A subpoena may be served by any person authorized by law to serve process or by any person who is not a party and who is of majority age. Service shall be made by delivering a copy thereof to the person named in the subpoena. Proof of such service shall be made by affidavit of the person making service if not served by an officer authorized by law to do so.

(4) Witness fees shall be paid by the party at whose instance the witness is summoned. Witness fees shall be tendered at the time of service of a subpoena. Except in the case of state employees, the fees allowed shall be the same as those allowed by the circuit courts of the state. State employees shall be entitled to compensation at the rate provided under Section 112.061, Florida Statutes. This section shall not limit the fees of expert witnesses. Specific Authority 120.53(1), 120.65(7), F.S. Law implemented 120.57, 120.58, F.S.

Received this subpoena on

____,

19____, at ______________ o'clock ___.M.,

and served the same on ________________,

at _______________ o'clock ____.M., by

delivering a true copy thereof (together

with the fee for one day's attendance and

the mileage allowed by law*) to:

____

RETURN IF SERVED BY SHERIFF:

Dated ______________________________,

19____, ____________________________,

Sheriff of ____________________

County, Florida.

By: __________________________________

(Deputy Sheriff)

RETURN IF SERVED BY OTHER QUALIFIED PERSON:

Dated ___________________________, 19___.

By: __________________________________

Subscribed and sworn to before me,

a ____________________________________,

this _______ day of ____________, 19____.

By: __________________________________

NOTE: Affidavit required only if service is made by a person other than a Sheriff or a Deputy Sheriff.

*Fees and mileage need not be tendered to public employees.

STATE OF FLORIDA
DIVISION OF ADMINISTRATIVE HEARINGS

AES CEDAR BAY, INC. and SEMINOLE KRAFT CORPORATION,

Petitioners,

vs.

DEPARTMENT OF ENVIRONMENTAL REGULATION,

Respondent,

and

CITY OF JACKSONVILLE, DEPARTMENT OF COMMUNITY AFFAIRS, PUBLIC SERVICE COMMISSION, ST. JOHNS RIVER WATER MANAGEMENT DISTRICT, JACKSONVILLE ELECTRIC AUTHORITY, CHARLES W. BOSTWICK, WILLIAM C. BOSTWICK, BARNETT BANKS TRUST COMPANY, N.A., IMESON INTERNATIONAL PARK, INC., and INDUSTRIAL PARK DEVELOPMENT CORPORATION, CITIZENS COMMITTEE, INC., SIERRA CLUB, FLORIDA AUDUBON SOCIETY, THE DUVAL AUDUBON SOCIETY, INC. and STAFFORD CAMPBELL,

Intervenors.

CASE NO. 88-5740

DEPARTMENT OF REGULATORY &
ENVIRONMENTAL SERVICES
Air Quality Division

March 31, 1993

Colin J. High, Ph.D.
Resource Systems Group
Route 5 South
P. O. Box 1204
Norwich, Vermont 05055

RE: SKC's Modeled SO_2 Violations

Dear Dr. High:

The City's Air Quality Division (AQD) has determined that the existing Seminole Kraft Corporation facility contributes to a modeled violation of the sulphur dioxide ambient air quality standard in Jacksonville. To remedy this modeled violation, Seminole Kraft has proposed the joint venture with Cedar Bay Cogeneration Project. You have inquired what action AQD would take in the event the cogeneration project is not built and SKC continues to project a modeled SO_2 violation. In such an event AQD would require Seminole Kraft to reduce its emissions to the point that they no longer contribute to a modeled SO_2 violation.

As AQD has previously advised Seminole Kraft and other emission sources similarly situated, there are several remedies available, including, but not limited to, equipment retrofits, fuel changes, and or reduced operation hours.

If you have any questions concerning AQD's position on this matter, please call me. My telephone number is (904) 630-3666.

Very truly yours,

Robert S. Pace

Robert S. Pace, P.E., Chief
Air Quality Division

c: File, AQD general correspondence
SKC file
Greg Radlinski, Office of General Counsel

421 West Church Street · Suite 412
Jacksonville, Florida 32202-4111

Area Code 904/630-3666

ENVIRONMENT

Power-plant opponents call off their fight against the project

ASSOCIATED PRESS
JACKSONVILLE

A four-year fight against the Cedar Bay power plant has been called off by a group after the new owners made several environmental concessions.

"If you can't kill the project, then make sure it has less impact on the environment. I think we've done that," Barbara Broward, who has led the group protesting the plant, said Monday.

The decision by opponents to drop their fight apparently clears the way for the $450-million, 250-megawatt plant to be completed by next February.

The group ended its fight after confirming the results of a favorable state review of the plant in March that the coal-fired plant had met or exceeded state requirements on pollution, she said.

It also was pleased that U.S. Generating Co. of Bethesda, Md., the new owners, had proposed several favorable changes.

One of the changes is that the Seminole Kraft Co. paper mill will use natural gas to operate three new boilers.

~~----------Ash-Silo------------------0.06-------------0.25~~

~~----------Common-Feed-Hopper--------0.03-------------0.13~~

~~----------Ash-Unloader--------------0.01-------------0.06~~

4. ~~The-following-material-handling-and-treatment-area emission-points-shall-be-controlled-by-baghouses:~~

a. The material handling and treatment area sources with either fabric filter or baghouse controls are as follows:

Coal Crusher Building ~~Dust-Collector~~
Coal Silo Conveyor ~~Area-Dust-Collector~~
Limestone Pulverizer/Conveyor ~~Dust-Collectors-(2)~~
Limestone Storage Bin ~~Hopper-Vent-Filters-(2)~~
~~Limestone-Feeder-Vent-Filters-(6)~~
~~Ash-Silo-Unloaders-(2)~~
Bed Ash Hopper ~~Bin-Filter~~
Bed Ash Silo~~-Bag-Filter~~
Fly Ash Silo~~-Bag-Filters-(2)~~
Bed Ash ~~Silo~~ Bin ~~Vent~~
Fly Ash ~~Silo~~ Bin ~~Vent~~
~~Pelletizing-Bed-Ash-Receiver-Filter-~~
~~Pelletizing-Fly-Ash-Receiver-Filter~~
Pellet~~izing~~ Vibratory Screen ~~Filter~~
Pelletizing Ash Recycle Tank ~~Filter~~
Pelletizing Recycle Hopper ~~Filter~~
~~Pelletizing~~ Cured Pellet Recycle Conveyor ~~Filter~~
Pellet~~izing-Curing-Silo-Outlet~~ Recycle Conveyor~~-Dust~~

The emissions from the above listed sources are subject to the particulate emission limitation requirement of 0.003 gr/dscf **(applicant requested limitation, which is more stringent than what is allowed by Rule 17-296.711, F.A.C.). Since these sources are RACT standard type, then a one time verification test on each source shall be required for PM mass emissions to demonstrate that the baghouse control systems can achieve the 0.003 gr/dscf. The performance tests shall be conducted using EPA Method 5 pursuant to Rule 17-297, F.A.C., and 40 CFR 60, Appendix A (July, 1991 version).**

~~The-following-material-handling-and-treatment-area-sources shall-be-controlled-using-wet-dust-suppression-techniques:~~

b. The PM emissions from the following process, equipment, and/or facility in the material handling and treatment area sources shall be controlled using wet suppression/removal techniques as follows:

Coal Car Unloading ~~Wet-Suppression~~
Ash Pellet~~izing~~ Hydrator ~~Venturi-Scrubber~~
Ash Pellet~~izing~~ Curing Silo ~~Impingement-Scrubber~~
Ash Pelletizing Pan ~~Impingement-Scrubber~~

The above listed sources are subject to a visible emission (VE) and a particulate matter (PM) emission limitation requirement of 5% opacity and 0.02 gr/dscf (applicant requested limitation, which is more stringent than what is allowed by rule), respectively, in accordance with Rule 17-296.711, F.A.C. Initial and subsequent compliance tests shall be conducted for VE and PM using EPA Methods 9 and 5, respectively, in accordance with Rule 17-297, F.A.C., and 40 CFR 60, Appendix A (July, 1991 version).

5. Visible Emissions (VE) shall not exceed 5% opacity from any source in the material handling and treatment area listed in Condition II. B.4.a., in accordance with **Rule 17-296.711(2)(a), F.A.C. After the one-time PM mass verification tests have been performed,** neither DER nor RESD will require particulate **matter mass** tests in accordance with EPA Method 5 unless the VE limit of 5% opacity is exceeded for a given source, or unless DER or RESD, based on other information, has reason to believe the particulate emission limits are being violated **in accordance with Rule 17-297.620(4), F.A.C.**

6. All sources subject to a visible emissions and particulate matter mass emissions performance test shall conduct them concurrently, except where inclement weather interferes.

~~6~~.7. The maximum emissions from each of the limestone dryers while using oil shall not exceed the following (based on AP-42 factors, Table 1, 3-1, Industrial Distillate, 10/86):

Estimated Limitations

Pollutant	lbs/hr.	TPY	TPY for 2 dryers
PM/PM_{10}	~~0.25~~ 0.24	~~1.1~~ 0.32	~~2.2~~ 0.64
SO_2	~~5.00~~ 0.85	~~21.9~~ 1.15	~~43.8~~ 2.3
CO	0.60	~~2.6~~ 0.81	5.2 1.62
NOx	2.40	~~10.5~~ 3.25	~~21.0~~ 6.5
VOC	0.05	~~0.2~~ 0.06	~~0.4~~ 0.12

Visible emissions from the dryers shall not exceed 5% opacity. ~~If natural gas is used, emissions limits shall be determined by factors contained in AP-42 Table 1.-4-1, Industrial 10/86.~~

~~7~~.8. The maximum No. 2 fuel oil with maximum sulfur content of .05% by weight firing rate for each limestone dryer shall not exceed 120 gals/hr., or ~~1,050,000~~ 350,400 gals/year. This reflects a combined total fuel oil firing rate of 240 gals/hr., and ~~2,100,000~~ 700,800 gals/year, for the two dryers. ~~**The maximum natural gas firing rate for each limestone dryer shall not exceed 16,800 CF per hour, or 147 MMCF per year.**~~

8.**9.** Initial and annual **PM and** Visible Emission compliance tests for all the emission points in the material handling and treatment area, including but not limited to the sources specified in this permit, shall be conducted in accordance with the July 1, 199**1** version of 40 CFR 60**, Appendix A,** using EPA Methods **5 and** 9**, respectively.**

9.**10.** Compliance test reports shall be submitted to BRESD within 45 days of test completion in accordance with **Rule** 17-~~2.700(7)~~ 297.57**0**, F.A.C.

10.**11.** Any changes in the method of operation, raw materials processed, equipment, or operating hours or any other changes pursuant to F.A.C. Rule 17-212.200, defining modification, shall be submitted for approval to DER's Bureau of Air Regulation (BAR).

C. Requirements For the Permittees

1. Beginning one month after certification, ~~**AESCB**~~ CBCP shall submit to BRESD and DER's BAR, a quarterly status report briefly outlining progress made on engineering design and purchase of major equipment, including copies of technical data pertaining to the selected emission control devices. These data should include, but not be limited to, guaranteed efficiency and emission rates, and major design parameters such as air/cloth ratio and flow rate. The Department may, upon review of these data, disapprove the use of any such device. Such disapproval shall be issued within 30 days of receipt of the technical data.

2. The permittees shall report any delays in construction and completion of the project which would delay commercial operation by more than 90 days to the BRESD office.

3. Reasonable precautions to prevent fugitive particulate emissions during construction, such as coating of roads and construction sites used by contractors, regrassing or watering areas of disturbed soils, will be taken by the permittees. **The permittee is subject to all applicable provisions of Rule 17-296.310(3), F.A.C., Unconfined Emissions of Particulate Matter.**

4. Fuel shall not be burned in any unit unless the control devices are operating properly, pursuant to 40 CFR Part 60 Subpart Da.

5. The maximum sulfur content of the No. 2 fuel oil utilized in the CFBs and the two unit limestone dryers shall not exceed 0.3 percent by weight. Samples shall be taken of each fuel oil shipment received and shall be analyzed for sulfur content and heating value. Records of the analyses shall be kept a minimum of **three** years to be available for DER and BRESD inspection.

6. Coal fired in the CFBs shall have a sulfur content not to exceed ~~3.3~~ 1.7 percent by weight on a shipment (train load) basis. Coal sulfur content shall be determined and recorded in accordance with 40 CFR 60.47a.

7. ~~AESCB~~ USG shall maintain a daily log of the amounts and types of fuel used and copies of fuel analyses containing information on sulfur content and heating values.

8. The permittees shall provide stack sampling facilities as required by Rule 17-~~2.700(4)~~ 297.345 F.A.C.

9. Prior to commercial operation of each ~~source~~ CFB, the permittees shall each submit to the BAR a standardized plan or procedure that will allow that permittee to monitor emission control equipment efficiency and enable the permittee to return malfunctioning equipment to proper operation as expeditiously as possible.

10. All records of documentation shall be kept on file for a minimum of 3 years pursuant to Rule 17-4.160(14), F.A.C.

D. Contemporaneous Emission Reductions

This certification and any individual air permits issued subsequent to the final order of the Board certifying the power plant site under 403.509, F.S., shall require, that the following Seminole Kraft Corporation sources be permanently shut down and made incapable of operation, and shall turn in their operation permits to the Division of Air Resources Management's Bureau of Air Regulation, upon completion of the initial compliance tests on the ~~AESCB~~ CBCP boilers: the No. 1 PB (power boiler), the No. 2 PB, the No. 3 PB, the No. 1 BB (bark boiler), and the No. 2 BB. BRESD shall be specifically informed in writing within thirty days after each individual shut down of the above referenced equipment. This requirement shall operate as a joint and individual requirement to assure common control for purpose of ensuring that all commitments relied on are in fact fulfilled.

Seminole Kraft Corporation may construct natural gas-fired steam boilers at the SK mill provided that emissions from the generation of 375,000 lbs./hr. of steam generated by Seminole Kraft for its own use shall not exceed the following on an annual basis:

Tons Per Year	
CO	**553**
NO	**310**
SO_2	**41**

E. Mercury Control Testing

SEMINOLE

KRAFT

AIR QUALITY IMPACT ANALYSIS

I. Introduction

The proposed Seminole Kraft package boiler project, as submitted by the applicant, proposed emissions of sulfur dioxide (SO2) and beryllium (Be) in PSD significant amounts. The applicant submitted the air quality analysis required by the PSD regulations for these two pollutants. The department's BACT determination for this project substantially restricts the emissions of both pollutants. Re-calculation of the emissions form the proposed project, after the application of BACT shows that all projected emissions of all pollutants are below PSD significant amounts. Therefore, no air quality analysis for this project is required. Although no air quality analysis for this project is required, this evaluation contains the results of the SO2 air quality analysis submitted by the applicant. Because the permitted emissions of SO2 due to natural gas firing will be much lower than those projected and modeled by the applicant, the results shown here are conservative and reflect higher impacts than will be expected to occur as a result of the completion of this project.

The air quality impact analysis required by the PSD regulations for these pollutants includes:

* An analysis of existing air quality;
* A PSD increment analysis (SO_2);
* An Ambient Air Quality Standards (AAQS) analysis;
* An analysis of impacts on soils, vegetation, and visibility and of growth-related air quality modeling impacts; and
* A "Good Engineering Practice" (GEP) stack height determination.

The analysis of existing air quality generally relies on preconstruction monitoring data collected with EPA-approved methods. The PSD increment and AAQS analysis depends on air quality dispersion modeling carried out in accordance with EPA guidelines.

Based on the required analyses, the Department has reasonable assurance that the proposed project, as described in this report and subject to the conditions of approval proposed herein, will not cause or contribute to a violation of any AAQS or PSD increment. A discussion of the modeling methodology and required analysis follows.

II. Analysis of Existing Air Quality

Preconstruction ambient air quality monitoring is required for all pollutants subject to PSD review.

An exemption to the monitoring requirement can be obtained if the maximum air quality impact, as determined by air quality modeling, is less than a pollutant-specific "de minimus" concentration. In addition, if an acceptable ambient monitoring method for the pollutant has not been established by EPA, monitoring is not required.

The maximum 24-hour average SO_2 concentration due to the proposed package boilers is predicted to be 108 ug/m^3. The de minimus concentration level for SO_2 is 13 ug/m^3, 24-hour average. Therefore, an ambient monitoring analysis is required for SO_2.

According to the PSD monitoring guidelines, existing air quality data can be used to satisfy the preconstruction monitoring analysis requirement. An analysis of existing monitors in the area of the project was done. Based on this analysis, the second highest 3-hour and 24-hour and highest annual average SO_2 concentrations measured at the Minerva Street monitor during 1990 were used. These values are used as background SO2 concentrations to account for SO2 sources which were not explicitly included in the modeling analysis. The background SO_2 concentrations were determined to be 68 and 28 ug/m^3 for the 3- and 24-hour averaging periods, respectively, and 5 ug/m^3 for the annual averaging period.

III. Modeling Methodology

The EPA-approved Industrial Source Complex Short-Term (ISCST2) dispersion model was used to evaluate the pollutant emissions from the proposed facility and other existing major facilities. The model determines ground-level concentrations of inert gases or small particles emitted into the atmosphere by point, area and volume sources. The model incorporates elements for plume rise, transport by the mean wind, Gaussian dispersion, and pollutant removal mechanisms such as deposition. The ISCST2 model allows for the separation of sources, building wake downwash, and various other input and output features. A series of specific model features, recommended by the EPA, are referred to as the regulatory options. The applicant used the EPA recommended regulatory options in each modeling scenario. Direction-specific downwash parameters were used because the stacks were less than the good engineering practice (GEP) stack height.

Initially, for the significant impact analysis, concentrations were predicted at 288 receptors located in a radial grid centered on the proposed stacks for the new cogeneration units. Receptors were located in "rings", with 36 receptors per ring spaced at 10-degree intervals at distances of 5, 10, 15, 20, 25, 30, 40,and 50 km. For the AAQS and PSD Class II analyses, both near- and far-field receptor grids were used. The near-field screening grid included both regular grid and discrete receptors. The near-field regular (polar) grid included 36 receptors for each 10 degree sector located on the following rings: 1.5, 2.0, 3.0, 4.0, and 5.0 km. Discrete receptors included 36 receptors located on the plant property boundary at 10-degree intervals, plus additional off-property receptors at distances of 0.4, 0.6, 0.8, 1.0, and 1.2 km from the proposed stack to cover the area between the property boundary and the closest regular receptor ring of 1.5 km. The far-field receptor grid included five additional rings of receptors at distances of 7.0, 9.0, 11.0, and 13.0 km. For AAQS screening only, an additional grid was used for distances of 5.0, 5.5, 6.0, 6.5, 7.0, 7.5, 8.0, 8.5, 9.0, 9.5, 10.0, 10.5, and 11.0 km with radial directions of 200, 210, 220, 230, and 240 degrees.

The Okefenokee National Wilderness Area and the Wolf Island National Wilderness Area are two PSD Class I areas that are located within 100 km of the project site. Maximum impacts were predicted at eleven receptors along the southern and eastern edges of these areas.

Meteorological data used in the ISCST2 model to determine air quality impacts consisted of a concurrent 5-year period of hourly surface weather observations and twice-daily upper air soundings from the National Weather Service (NWS) stations at Jacksonville, FL and Waycross, GA. The 5-year period of meteorological data was from 1983 through 1987. The NWS station at Jacksonville, located approximately 12 km to the northwest of project site, was selected for use in the study because it is the closest primary weather station to the study area and is most representative of the plant site. The surface observations included wind direction, wind speed, temperature, cloud cover and cloud ceiling.

Since five years of data were used, the highest-second-high (HSH) short-term predicted concentrations were compared with the appropriate ambient air quality standards or PSD increments. For the annual averages, the highest predicted yearly average was compared with the standards.

IV. Significant Impact Analysis

The maximum predicted annual, 24-hour, and 3-hour air quality concentrations due to SO2 emissions from the proposed project only are 6.4, 105, and 428 ug/m3, respectively, which are above the respective SO2 significant impact levels of 1, 5, and 25 ug/m3. The distance of the project's significant impact for SO2 is 15 km. Therefore, a full impact assessment was performed for SO2. This analysis also indicated that the maximum impacts due to the proposed package boilers only occurs at the SKC property boundary.

V. PSD Increment Analysis

A. Class II Area

The PSD increment represents the amount that new sources in an area may increase ambient ground level concentrations of a pollutant. Atmospheric dispersion modeling, as previously described, was performed to quantify the amount of PSD increment consumed. Based on the screening results, a refined modeling analysis was performed for the 24-hour and 3-hour averaging times. The maximum annual average increment consumption was 0.4 ug/m3, which is well below the allowable increment of 20 ug/m3. The refined modeling results for all increment-consuming sources indicated numerous predicted violations of the 24-hour PSD Class II increment of 91 ug/m3. The major contributing facility to these violations is a source other than SKC or Cedar Bay. Further refined modeling shows that SKC and Cedar Bay sources combined do not significantly contribute to any predicted violations of the 24-hour increment. The refined modeling results for all increment-consuming sources for the 3-hour averaging time predicted a maximum increment consumption of 447 ug/m3, which is less than the 3-hour PSD Class II increment of 512 ug/m3.

B. Class I Area

A proposed source subject to PSD review must conduct a dispersion modeling analysis of its impacts on any PSD Class I area located near the source. The maximum predicted annual, 24-hour, and 3-hour increment consumption concentrations at the two Class I areas located near the project site are 0.00, 4.1, 19 ug/m, respectively. These values are less than their respective allowable PSD Class I increments of 2, 5, and 25 km. The proposed project along with other increment consuming sources will therefore meet all allowable PSD Class I increments for the two Class I areas.

VI. AAQS Analysis

For the pollutants subject to an AAQS review, the total impact on ambient air is obtained by adding a "background" concentration to the maximum modeled concentration. This "background" concentration takes into account all sources of a particular pollutant that are not explicitly modeled. The 1990 monitoring results from the Minerva Street monitor were used to determine the background SO2 concentrations. Based on screening results, refined modeling was done for all averaging times. The maximum predicted 3-hour concentration, including a background concentration of 68 ug/m3 was 932 ug/m3, which is less than the 3-hour AAQS of 1300 ug/m3. However, there were predicted violations of the annual (60 ug/m3) and 24-hour (260 ug/m3) standards along radials of 210 to 230 degrees and between distances of 5.0 and 11.0 km from the SKC site. This project and the Cedar Bay project are sufficiently linked so that their combined concentration contributions should be compared with significant impact levels when evaluating contributions to violations. With the applicant's proposed use of 0.5 per cent sulfur fuel oil there is one predicted violation of the 24-hour standard where SKC and Cedar Bay combined contribute significantly to the violation. However, restricting the use of the primary fuel to natural gas and the emergency fuel to fuel oil with a maximum sulfur content of 0.05 per cent for the package boilers lowers emissions substantially and results in modeled values showing no combined contributions which contribute significantly to this predicted violation of the 24-hour standard. SKC and Cedar Bay sources combined do not contribute significantly to any predicted violations of the annual standard. Therefore emissions from the proposed facility are not expected to cause or contribute to a violation of an AAQS.

VII. Additional Impacts Analysis

A. Impacts on Soils, Vegetation, and Wildlife

The maximum ground-level concentration predicted to occur for SO_2 as a result of the proposed project, including a background concentration and all other nearby sources, will be below the national secondary standard which was developed to protect public welfare-related values. As such, this project is not expected to have a harmful impact on soils and vegetation in the PSD Class II area. A thorough air quality related values (AQRV) analysis was done by the applicant for the Class I area. No significant impacts on this area are expected.

B. Impact on Visibility

Visual Impact Screening and Analysis (VISCREEN), the EPA-approved Level I visibility computer model was used to estimate the impact of proposed project's stack emissions on visibility in the Okefenokee Class I area.

The results indicate that the maximum visibility impacts caused by the facility do not exceed the screening criteria inside or outside the Class I area. As a result, there is no significant impact on visibility predicted for the Class I area.

C.Growth-Related Air Quality Impacts

No significant growth-related impacts on air quality are expected due to construction and operation of the three package boilers.

D. GEP Stack Height Determination

Good Engineering Practice (GEP) stack height means the greater of: (1) 65 meters (213 feet) or (2) the maximum nearby building height plus 1.5 times the building height or width, whichever is less.

The AES Cedar Bay fluidized bed boiler building, which is under construction, will be the significant structure associated with the proposed project. The building will be 161 feet tall with a resulting GEP stack height of 402 ft. The proposed stack height for this project is 200 ft, which will not exceed the GEP stack height. The potential for downwash of the emissions from the facility due to the presence of nearby structures was considered in the modeling study.

AIR QUALITY ANALYSIS FOR THE CEDAR BAY COGENERATION PROJECT

I. NET AIR QUALITY IMPACTS

A. Introduction

The objective of this comparison is to provide data useful for assessing whether applying standard modeling routines, taking into account maximum allowable emissions, 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 this comparison, the differences in air quality impacts based on routine application of atmospheric dispersion modeling taking into account maximum allowable emission rates are compared amongst five cases. These are:

Case 1: the three 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 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%) 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 4 vs. Case 2

Assessment B: Case 3 vs. Case 1

Assessment C: Case 4 vs. Case 1a

B. Methodology

Air quality impacts were modeled for the five emissions for which their are ambient standards (SO2, PM-10, NO2, CO, and Pb), and an aggregation of trace pollutants that are emitted by the CBCP and for which most are listed in the Draft Florida Air Toxics Permitting Strategy.

The model selected for this application was EPA's Industrial Source Complex Short Term (ISCST2) model (Version 92062). Meteorological data, required by the model, was 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. See ENSR Table 2-1 for the ISCST2 modeling options used.

Ground-level concentration were predicted at 1008 locations input as model receptors. A circular (polar) grid of receptors is represented by the intersection of 36 radials at 10 degree intervals and 28 concentric circles (rings) centered on the CBCP CFB stack location. The ring distances along the radials 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 km extends well beyond the distances where maximum impacts were modeled to occur. The receptor grid also included receptors located within the property boundaries of the two facilities. This type of grid is most dense closest to the source origin. A total of 720 of the 1008 receptors are located within 5 km (the significant impact area).

C. Analysis Results to be Presented

For each Assessment (A, B and C), three comparisons were made. First, the maximum predicted concentrations over all receptors, for each emission 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 example, for Assessment A, these maximum receptor-specific impacts for the CBCP as certified, Case 2, are subtracted from the maximum receptor-specific impacts of the CBCP with its new emission rates plus the package boilers, Case 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 receptors (1008) 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 17-212.500(7) (a), FAC. This rule applies directly to sources in a nonattainment area, but the methodology described by the rule is appropriate for these comparisons. The rule refers to a "uniform" receptor grid that could be construed to refer to a rectangular grid. Even though such a grid has a receptor 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."

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 1 subtracted from the impacts of Case 3. For Assessment C, the same analysis is performed with the impacts of Case 1a subtracted from the impacts of Case 4.

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

See Section 2.4 of the ENSR Report for details.

E. Findings

1. Assessment A (Case 4 vs. Case 2)

ENSR Table 2-13, with the exception of some short-term averaging times for SO2 and CO , the maximum predicted impacts of Case 4 are lower than those of Case 2. For SO2 the maximum predicted impacts for Case 4 are higher for some of the short-term averaging periods for some of the years modeled. The average net regional SO2 air quality effect of Case 4, although positive for all averaging periods and years, is not significant, demonstrating a small net improvement with Case 4 over Case 2. 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, the 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 and 8-hour CO concentrations.

For annual average PM-10 concentrations, although the maximum concentrations are lower, the net air quality effect on a regional basis is negative. The average net effects are much less than the annual PM-10 SIL. Thus, the net effect is insignificant.

ENSR Table 2-14 displays the findings for Assessment A for SKC's package boilers firing natural gas. Results are shown for CO and NO2 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, NO2 maximum impacts are again lower than Case 2, and a positive, although insignificant, average net air quality benefit is demonstrated.

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 there permitted capacity will be less than the air quality impacts of the CBCP as certified, although net regional differences are small.

2. Assessment B (Case 3 vs. Case 1)

ENSR Tables 2-15 and 2-16 indicate that the regional net air quality effect of Case 3 is positive, although not significant for all pollutants and averaging periods, indicating an average small net benefit to air quality over the entire model receptor grid with the CBCP.

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.

3. Assessment C (Case 4 vs. Case 1a)

ENSR Tables 2-17 and 2-18 indicate that 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 the air quality.

On balance, the air quality impacts of the CBCP, as proposed to be modified, and the addition of the boilers on 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.

II. Ambient Air Quality Standards (AAQS) Analysis

The results of the modeling for the CBCP alone, as proposed to be modified, are presented in ENSR Tables 3-24 through 3-28 for the pollutants CO, NO2, PM-10, Pb, and SO2. Each table lists the maximum predicted impact of the CBCP for each applicable AAQS. The significant impact level (SIL) is also listed for the applicable pollutant. The predicted impacts for CO are below the SILs. Therefore, CO was eliminated from further consideration, since the CBCP can neither cause nor contribute to an AAQS violation for CO. Lead concentrations were also found to be insignificant.

The remaining pollutants (PM-10, NO2 and SO2), were modeled for the CBCP, SKC's package boiler and all the other existing and permitted sources for each pollutant in the area. Monitored background concentrations for each pollutant were added to the model's predicted concentrations to obtain the total concentration, which was compared to the respective AAQS (ENSR Tables 3-29 through 3-31).

Based on this analysis, it can be concluded that the CBCP, as proposed to be modified, would neither cause nor contribute to a violation of the respective PM-10, NO2, or SO2 AAQSs.

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 require by either EPA or DER. However, 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.

III. PSD Class I and II Increment Compliance Analyses

The results of the maximum predicted SO2 Class I and Class II increment consumed by the CBCP itself are presented in ENSR Table 3-32. The maximum SO2 impacts of the CBCP by itself exceed neither the Class I nor Class II allowable increments.

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 to the Class II SILs. The results of this analysis are summarized in ENSR Table 3-33. As shown in this table, none of the total concentrations exceed the Class II PSD increments, where the CBCP has a significant impact. 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 SO2 increments.

For the Class I area, the total SO2 increment consumption due to all increment consuming and expanding sources was identified for each averaging period, modeled year and Class I area (Wolf Island Wilderness Area and Okefenokee Wilderness Area) (ENSR Table 3-34). 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 Class I SO2 increments.

A similar analysis was performed for Total Suspended Particulates (TSP). The results of this analysis are contained in ENSR Tables 3-35 through 3-37. None of the total concentrations exceed the Class I or Class II PSD TSP 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 I or Class II TSP increments.

A similar analysis was performed for NO2. The results of this analysis are contained in ENSR Tables 3-38 through 3-40. None of the total concentrations exceed the Class I or Class II PSD NO2 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 I or Class II NO2 increments.

IV. 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 ENSR Table 3-41. In each case the impacts are below the draft No Threat Levels.

V. Additional Analyses

A. Impact of Secondary Emissions Associated with any Residential, Commercial, or Industrial Growth Directly Related to the Construction or Operation of the CBCP

No significant adverse air quality impacts are expected from secondary emissions associated with the construction or operation of the CBCP. See ENSR Report Section 5.1 for details.

B. Impacts of the CBCP on Soils and Vegetation

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 the impacts (if any) of these substances on vegetation will be decreased. See ENSR Report Section 5.2 for details.

C. Visibility Assessment

The emissions from the proposed facility were shown to have an insignificant impact on visibility at both the Okefenokee and wolf Island Class I areas. The potential for a visible plume from the CBCP is expected to be localized (within 5 km) and occur only under light wind, neutral dispersion conditions which occur primarily during early daylight hours. See ENSR Report Section 5.3 for details.

D. CBCP Cooling Tower Impact Analysis

This section presents two analyses: the potential for fogging or icing conditions on nearby routes to be caused by the CBCP's cooling towers and salt deposition rates due to cooling tower operations. ENSR's analysis indicates that, based on the low probabilities predicted by the SACTI model, the visibility reduction due to the CBCP's cooling tower is not expect to pose a threat to local transportation routes. The effects of salt deposition on local vegetation is not expected to be significant. See ENSR Report Section 5.4 for details.

E. Screening Modeling Analysis for Low Load CFB Operation

A screening modeling analysis was conducted to compare four operating scenarios for the CBCP's CFBs as presented in ENSR 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 loads modeled were 100%, 67%, 40%, and 17%.

The results of the ISC modeling analysis for each meteorological condition and load case are presented in ENSR Table 5-25. From this table, 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.

Since ENSR 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 the low-load operation would not affect the estimation of that peak effect. Therefore, lower loads do not warrant additional analyses as they have no bearing on modeling results for critical parameters. See ENSR Report Section 5.5 for details.