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ANALYSIS OF CCA CONTRIBUTIONS TO MODEL EXCEEDANCES NEAR ITT

Container Corporation of America's (CCA's) contributions to the four highest predicted 24-hour SO_2 considerations near ITT Rayonier are presented in Table 1. For each case, results of two scenarios are presented:

1. Power Boiler No. 5 at CCA at existing conditions--2,133 lb/hr SO_2 and 227 ft stack height.
2. Power Boiler No. 5 at CCA at proposed conditions--1,511 lb/hr SO_2 and 257 ft stack height.

As indicated by the results, the proposed changes to Power Boiler No. 5 will significantly reduce CCA's contribution to the total predicted concentrations. This reduction ranges from 24 percent to 28 percent.

Table 1. Contributions to Four Highest Predicted 24-Hour SO_2 Concentrations ($\mu g/m^3$) Near ITT Rayonier

Source	Day 44/1983		Day 283/1983		Day 284/1983		Day 262/1984	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
CCA								
PB No. 5	52	33	35	21	48	29	34	21
Other	26	26	16	16	20	20	14	14
Total	78	59	51	37	68	49	48	35
ITT	222	222	230	230	221	221	234	234
Gilman	2	2	2	2	2	2	2	2
TOTAL	302	282	283	269	291	273	284	271

Note: Existing = Power Boiler No. 5 at current permitted conditions (2,133 lb/hr SO_2, 227 ft stack height).
Proposed = Power Boiler No. 5 at proposed conditions (1,511 lb/hr SO_2, 257 ft stack height).

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CONTAINER CORPORATION OF AMERICA

AN AFFILIATE OF JEFFERSON SMURFIT CORPORATION

Mill Division
NORTH 8TH STREET
P.O. BOX 2000
FERNANDINA BEACH, FL 32034
TELEPHONE: 904/261-5551

November 6, 1990

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Mr. Clair Fancy, Bureau Chief
Florida Department of Environmental Regulation
Suite 338
2600 Blairstone Road
Tallahassee, FL 32399-2400

Re: Container Corporation of America
AC 45-181406 and AC 45-181407

Dear Mr. Fancy:

As agreed in our meeting of October 25, 1990, Container has performed an ambient air quality analysis. Dave Buff, our consultant, and CCA are firmly convinced that this modeling satisfies the Department's reasonable assurance criteria and that construction permits for the brown stock washer and the No. 8 batch digester should proceed favorably.

The modeling information was presented to the Department on November 5, 1990, at a meeting with your staff. The analysis was based on current maximum allowable emissions which will not change as a result of the requested permits.

Initially, the modeling indicated a downwash problem with regard to the Mill's No. 5 power boiler. We have proposed the following corrective actions and conditions:

a. Stack Height - Increase height by 30 ft. from 227 ft. to 257 ft. above ground level.

b. No. 6 Fuel Oil Sulfur Content - Reduce maximum sulfur content to 2.5% from present 3%.

c. Fuel Oil Input Rate - Limit the 24 hour No. 6 fuel oil input to 92,400 gallons.

As discussed, CCA is willing to accept the above limitations as a specific condition of the subject permits. These changes will result in improved air quality in the vicinity of the Mill.

While unrelated to our proposed project, the model, which includes sources at ITT Rayonier as well as CCA, calculates an SO_2 concentration over the 24-hour ambient standard under certain meteorological conditions at one location near the Rayonier facility, due primarily to emissions from Rayonier. Because CCA is not requesting any increase in allowable SO_2 emissions from any source at our mill, and is indeed agreeing to reduce allowable SO_2 emissions from the No. 5 Power Boiler, there is no direct relationship between our applications and the modeled exceedance at Rayonier. While this should therefore not impact issuance of the requested permits, as discussed at our meeting, CCA will work with the Department and Rayonier to further evaluate and satisfactorily resolve this aspect of the modeling results.

We are confident the modeling has provided reasonable assurance for the Department. The proposed project will not cause or contribute to an exceedance of any Department standards.

We sincerely appreciate the Department's expeditious handling of these construction permits that are so critical to the economic welfare of Nassau County.

Sincerely,

Wayne Barlow

Wayne S. Barlow
Vice President and
General Manager

/js
AIRMODEL

90017A1/EXCEED
11/08/90

ANALYSIS OF CCA CONTRIBUTIONS TO MODEL EXCEEDANCES NEAR ITT

Container Corporation of America's (CCA's) contributions to the four highest predicted 24-hour SO_2 considerations near ITT Rayonier are presented in Table 1. For each case, results of two scenarios are presented:

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As indicated by the results, the proposed changes to Power Boiler No. 5 will significantly reduce CCA's contribution to the total predicted concentrations. This reduction ranges from 24 percent to 28 percent.

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	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
CCA								
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Other	26	26	16	16	20	20	14	14
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ITT	222	222	230	230	221	221	234	234
Gilman	2	2	2	2	2	2	2	2
TOTAL	302	282	283	269	291	273	284	271

Note: Existing = Power Boiler No. 5 at current permitted conditions (2,133 lb/hr SO_2, 227 ft stack height).
Proposed = Power Boiler No. 5 at proposed conditions (1,511 lb/hr SO_2, 257 ft stack height).

AIR QUALITY IMPACT ANALYSIS
CONTAINER CORPORATION
OF AMERICA, INC.

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Prepared For:

Container Corporation of America, Inc.
Fernandina Beach, Florida

Prepared By:

KBN Engineering and Applied Sciences, Inc.
Gainesville, Florida

November 1990
90017B1

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LIST OF ACRONYMS

$\mu g/m^3$	micrograms per cubic meter
AAQS	Ambient Air Quality Standards
APIS	Air Permit Inventory System
CCA	Container Corporation of America
CO	carbon monoxide
CRSTR	Single-Source Model with Terrain
EPA	U.S. Environmental Protection Agency
F.A.C.	Florida Administrative Code
FDER	Florida Department of Environmental Regulation
ft	feet
ISCST	Industrial Source Complex Short-Term
JIA	Jacksonville International Airport
LK	Lime Kilns
m	meter
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NWS	National Weather Service
PB	Power Boilers
PM(TSP)	total suspended particulate matter
PM10	particulate matter less than or equal to 10 micrometers
PSD	prevention of significant deterioration
RB	Recovery Boilers
SDT	Smelt Dissolving Tanks
SO_2	sulfur dioxide
UNAMAP	Users Network for Applied Modeling of Air Pollution

1.0 INTRODUCTION

Container Corporation of America, Inc. (CCA), of Fernandina Beach, Florida, recently submitted two air construction permit applications to the Florida Department of Environmental Regulation (FDER). The applications were for the addition of batch digester and a brown stock washer to the existing kraft paper mill. Because of the potential for the new digester and brown stock washer to increase production at the mill, and therefore potentially to increase air emissions, FDER has requested that CCA perform an ambient air quality analysis of the mill. The analysis must address compliance with the ambient air quality standards (AAQS) and with the prevention of significant deterioration (PSD) allowable air quality increments.

The analysis presented in this report addresses compliance with the Florida AAQS for sulfur dioxide (SO_2), particulate matter with aerodynamic diameter of 10 microns and less (PM10), nitrogen dioxide (NO_2), and carbon monoxide (CO). In addition, compliance with the allowable PSD increments for SO_2, total suspended particulate matter [PM(TSP)], and NO_2 are addressed. Regulatory requirements related to these standards are discussed in Section 2.0. The emission inventories used in the impact analysis are presented in Section 3.0, including both the PSD baseline and the future projected inventory.

Presented in Section 4.0 are the methodology and results of the PM(TSP)/PM10 air quality impact analysis. Similarly, the modeling methodology and impact results for SO_2, NO_2, and CO are presented in Sections 5.0, 6.0, and 7.0, respectively. Supportive calculations and information are presented in the appendices.

2.0 REGULATORY REQUIREMENTS

2.1 AMBIENT AIR QUALITY STANDARDS

FDER and U.S. Environmental Protection Agency (EPA) have promulgated AAQS for several air pollutants. The current federal and state AAQS are presented in Table 2-1. The AAQS apply only in areas designated as "ambient air." Ambient air is defined by EPA as those areas, external to buildings, to which the general public has access. Areas on plant property, which are restricted to public access either by physical barriers or by other means, are not considered to be ambient air.

2.2 PSD INCREMENTS

2.2.1 ALLOWABLE INCREMENTS

FDER has adopted regulations governing the prevention of significant deterioration of air quality. The regulations are contained in Chapter 17-2.500, Florida Administrative Code (F.A.C.). The Florida PSD regulations parallel PSD regulations promulgated by EPA. As a result, EPA has delegated federal PSD review authority to FDER.

The Florida PSD rules require that the allowable PSD increments not be exceeded as a result of the combined effects from all sources affecting increment consumption. Chapter 17-2.500(1)(b), F.A.C. provides that:

> ... the combined impact of all emissions shall not cause or contribute to an ambient concentration at any point within a baseline area that exceeds either the appropriate baseline concentration for the point plus the appropriate maximum allowable increase or the appropriate air quality standard, whichever is less.

PSD increments have been established for SO_2, PM(TSP), and NO_2. The maximum allowable PSD increments are shown in Table 2-2.

2.2.2 DESIGNATION OF AREA

The term "baseline area" is defined in Chapter 17-2.100(20), F.A.C., as all areas designated as PSD areas under Chapter 17-2.450, F.A.C. PSD areas are

Table 2-1. Federal and State of Florida Ambient Air Quality Standards

Pollutant	Averaging Time	AAQS ($\mu g/m^3$) National Primary Standard	AAQS ($\mu g/m^3$) National Secondary Standard	AAQS ($\mu g/m^3$) State of Florida
Particulate Matter (PM10)	Annual Arithmetic Mean	50	50	50
	24-Hour maximum[a]	150	150	150
Sulfur Dioxide	Annual Arithmetic Mean	80	NA	60
	24-Hour Maximum[b]	365	NA	260
	3-Hour Maximum[b]	NA	1,300	1,300
Carbon Monoxide	8-Hour Maximum[b]	10,000	10,000	10,000
	1-Hour Maximum[b]	40,000	40,000	40,000
Nitrogen Dioxide	Annual Arithmetic Mean	100	100	100
Ozone	1-Hour Maximum[c]	235	235	235
Lead	Calendar Quarter Arithmetic Mean	1.5	1.5	1.5

[a] Achieved when the expected number of exceedances per year is less than 1.
[b] Maximum concentration not to be exceeded more than once per year.
[c] Achieved when the expected number of days per year with concentrations above the standard is less than 1.

Note: PM10 = Particulate matter with an aerodynamic diameter less than or equal to 10 micrometers (μm).
$\mu g/m^3$ = micrograms per cubic meter.
NA = Not applicable (i.e., no standard exists).

Sources: 40 CFR 50
Chapter 17-2, F.A.C.

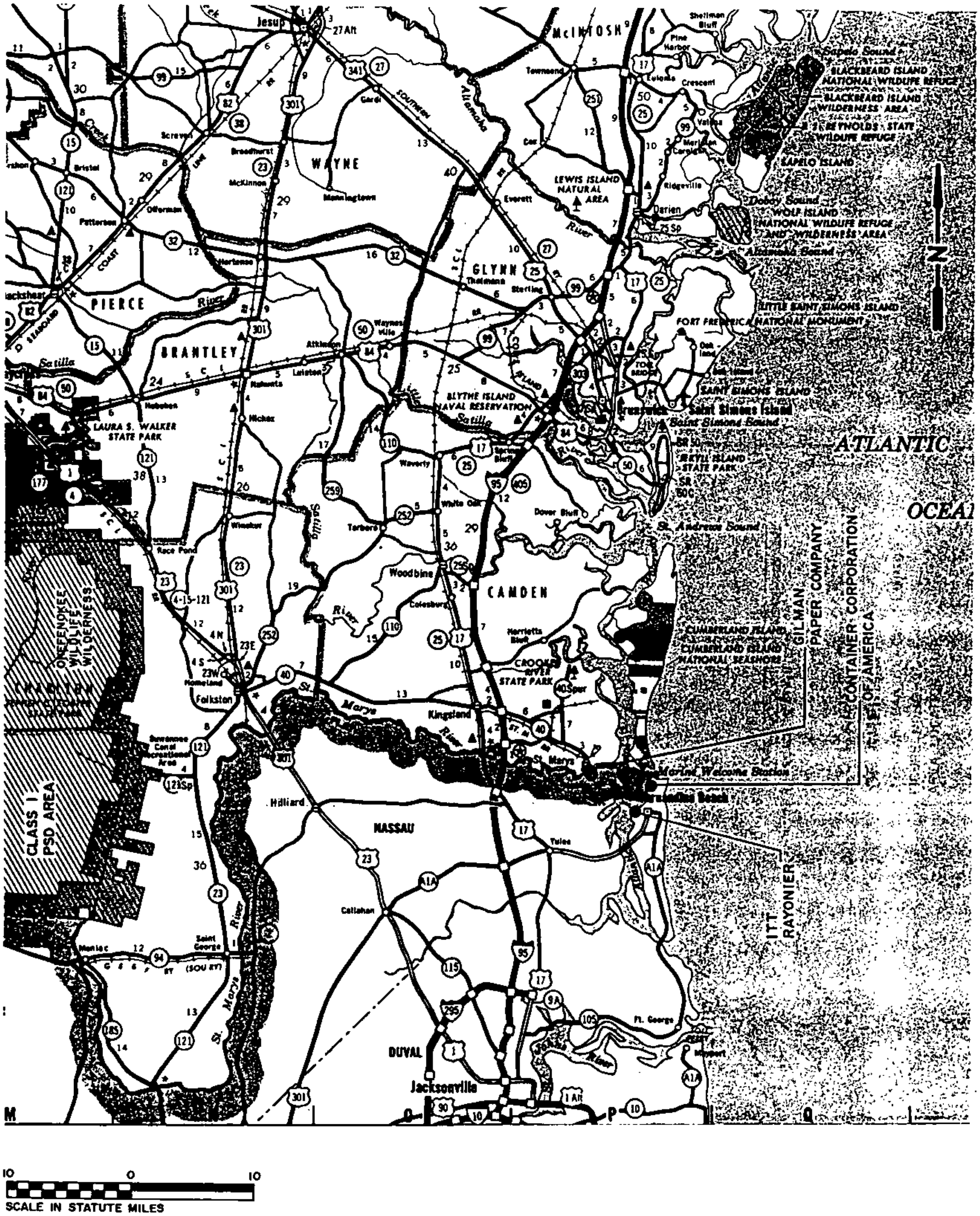

Figure 2-1 LOCATION OF CCA MILL IN RELATION TO PSD CLASS I AREA

KBN

Table 2-2. Federal and State Allowable PSD Increments

Pollutant	Averaging Time	PSD Increments ($\mu g/m^3$) Class I	Class II	Class III
Particulate Matter (TSP)	Annual Geometric Mean	5	19	37
	24-Hour Maximum[a]	10	37	75
Sulfur Dioxide	Annual Arithmetic Mean	2	20	40
	24-Hour Maximum[a]	5	91	182
	3-Hour Maximum[a]	25	512	700
Nitrogen Dioxide	Annual Arithmetic Mean	2.5	25	50

[a] Maximum concentration not to be exceeded more than once per year.

Sources: 40 CFR 52.21
Chapter 17-2, F.A.C.
54 Federal Register (FR) 192, pages 41218-41232.

defined as all areas of the state except those areas designated as nonattainment under Chapter 17-2.410, F.A.C. All of Nassau County, where the CCA mill is located, is designated as an attainment area. Therefore, CCA is located in a baseline area.

All areas of the state are classified as either Class I, Class II, or Class III for PSD purposes. Chapter 17-2.440, F.A.C., specifies that all areas of the state are Class II areas except those designated as Class I areas. Two Class I areas are located within 100 km of the CCA mill. The Okefenokee National Wilderness area has its closest border located approximately 63 km west of the CCA mill (see Figure 2-1), and the Wolf Island National Wilderness Area is located approximately 75 km to the north of the mill.

2.2.3 BASELINE CONCENTRATION

"Baseline Concentration" is defined in Chapter 17-2.100(21), F.A.C., as:

> The ambient concentration level, or set of levels, that is predicted to occur at each point within a baseline area for conditions existing at the time of the applicable baseline date. The concentration is comprised of the predicted impact of the baseline emissions, using an appropriate air quality model and meteorological data that are generally representative of the baseline area, plus a representative background concentration. A baseline concentration is determined for each pollutant for which a baseline date has been established and for each averaging time for which a maximum allowable increase is established....
>
> For the annual average, the baseline concentration is the average concentration that is predicted to occur at each point within the area for each calendar year modeled.
>
> For shorter term averages, the baseline concentration is the set of all such short-term concentrations predicted to occur at each point within the area for each calendar year modeled.

2.2.4 BASELINE DATE

Chapter 17-2.450, F.A.C., not only designates PSD areas, but also establishes PSD baseline dates for all areas. This provision establishes December 27, 1977, as the PSD baseline date for all PSD areas in the state for both SO_2 and PM(TSP). The baseline date for NO_2 for the entire state is March 28, 1988.

for both SO_2 and PM(TSP). The baseline date for NO_2 for the entire state is March 28, 1988.

2.2.5 BASELINE EMISSIONS

Baseline related provisions of the PSD regulations are contained in Chapter 17-2.500(4)(b), F.A.C. These rules provide requirements for establishment of baseline emissions. In general, the regulations provide that any changes in actual SO_2 or PM(TSP) emissions at a major facility that result from a physical change or change in the method of operation that occurred after January 6, 1975, affect PSD increment consumption (i.e., increases consume increment, and decreases expand the available increments). All changes in actual emissions at all facilities after the minor source baseline date of December 27, 1977, similarly affect PSD increment consumption. In addition, the allowable emissions from facilities (or sources located within facilities) that commenced construction prior to January 6, 1975, but were not operating as of January 6, 1975, are to be included in the baseline emissions and reflected in the baseline concentration. The January 6, 1975, date is termed the "major source baseline date" for SO_2 and PM(TSP) emissions.

CCA was an existing facility as of January 6, 1975, so all changes in actual emissions at the facility caused by a physical change or change in the method of operation that occurred after this date affect the available PSD increments. Other changes in actual emissions after December 27, 1977, also affect the increments. In essence, CCA's effect on SO_2 and PM(TSP) increment consumption is based on the mill's actual emissions as of January 6, 1975, and the mill's future maximum emissions.

NO_2 increment consumption is determined in a similar manner, except that the major source baseline date for NO_2 is March 28, 1988.

3.0 EMISSION INVENTORY

3.1 CCA BASELINE EMISSIONS

3.1.1 SO_2/PM(TSP) EMISSIONS AS OF JANUARY 6, 1975

Baseline emissions for the CCA mill representative of operation on January 6, 1975, have been documented previously in the PSD permit application for Power Boiler (PB) No. 7 at CCA. The application and PSD report (Roy F. Weston, 1980) presents actual annual average and short-term maximum emissions for SO_2 and PM(TSP). The baseline emissions are presented in Table 3-1 (short-term maximums) and in Table 3-2 (annual average). As indicated, operating sources at CCA in 1974 consisted of PB Nos. 3, 4, and 5; Recovery Boilers (RB) Nos. 3 and 4; Smelt Dissolving Tanks (SDT) Nos. 3 and 4; and Lime Kilns (LK) Nos. 2 and 3.

Baseline stack parameters, as presented in the Weston report, are presented in Table 3-3. Review of the Weston report baseline inventory indicated a discrepancy in the stack heights for the CCA sources. CCA information indicates all stack heights should be 16 feet (ft) lower than indicated to reflect height above ground level. The correct stack heights are shown in Table 3-3. A plot plan of the CCA mill representative of the baseline period showing stack locations, buildings, and property boundaries is presented in Figure 3-1. An expanded plan of the major buildings and stack locations is presented in Figure 3-2.

3.1.2 NO_x EMISSIONS AS OF MARCH 28, 1988

In the case of NO_2, there is only an annual average PSD increment, and therefore it is only necessary to address annual average nitrogen oxides (NO_x) emissions. Annual average NO_x emissions from the CCA mill representative of 1988 conditions are presented in Table 3-2. The basis for these actual emissions is presented in Appendix A. The sources operating at the CCA mill in the NO_x baseline period (i.e., as of March 28, 1988) are the same as those in operation today, except for the new Lime Kiln No. 4. The baseline sources consist of PB Nos. 5 and 7, RB Nos. 4 and 5, SDT Nos. 4 and 5, and LK Nos. 2 and 3.

Table 3-1. Container Corporation of America's Short-term Emission Rates

Source	Maximum Short-term Emission Rate									
	PM		PM10		SO2		NOx		CO	
	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)
				Future						
Power Boiler No. 5	137.1	17.3	91.9	11.6	1,511.0 +	190.4 +	296.0	37.3	274.2	34.5
Power Boiler No. 7	102.1	12.9	68.4	8.6	1,225.2	154.4	612.6	77.2	93.6	11.8
Recovery Boiler No. 4	137.5	17.3	103.1	13.0	278.6	35.1	170.1	21.4	567.2	71.5
Recovery Boiler No. 5*	83.3	10.5	62.5	7.9	247.6	31.2	194.0	24.4	646.7	81.5
Smelt Dissolving Tank No. 4	28.5	3.6	25.5	3.2	5.2	0.7	--	--	--	--
Smelt Dissolving Tank No. 5	15.7	2.0	14.1	1.8	5.9	0.7	--	--	--	--
Lime Kiln No. 4	43.5	5.5	38.5	4.9	26.8	3.4	187.7	23.6	78.8	9.9
Lime Bin No. 1	1.2	0.2	1.2	0.2	--	--	--	--	--	--
Lime Bin No. 2	0.7	0.1	0.7	0.1	--	--	--	--	--	--
Total	549.6	69.3	405.9	51.1	3,300.3	415.8	1,460.4	184.0	1,660.5	209.2
				1975 Baseline						
Power Boiler No. 3++	23.0	2.9	--	--	688.1	86.7	--	--	--	--
Power Boiler No. 4++	53.2	6.7	--	--	460.3	58.0	--	--	--	--
Power Boiler No. 5	125.4	15.8	--	--	1,349.2	170.0	--	--	--	--
Recovery Boiler No. 3	41.3	5.2	--	--	83.3	10.5	--	--	--	--
Recovery Boiler No. 4	136.5	17.2	--	--	278.6	35.1	--	--	--	--
Smelt Dissolving Tank No. 3	13.5	1.7	--	--	1.7	0.2	--	--	--	--
Smelt Dissolving Tank No. 4	28.6	3.6	--	--	5.6	0.7	--	--	--	--
Lime Kiln No. 2	17.5	2.2	--	--	9.9	1.3	--	--	--	--
Lime Kiln No. 3	19.8	2.5	--	--	9.9	1.3	--	--	--	--
Total	458.7	57.8	--	--	2,886.6	363.7	--	--	--	--

* Total for both stacks.

\+ Maximum 3-hour SO2 emission rate is 1,734 lb/hr (218.4 g/s).

++ Common stack.

Table 3-2. Container Corporation of America's Annual Average Emission Rates

Source	Annual Average Emission Rate									
	Particulate Matter (PM)		PM10		Sulfur Dioxide (SO2)		Nitrogen Dioxide (NOx)		Carbon Dioxide (CO)	
	(TPY)	(g/s)	(TPY)	(g/s)	(TPY)	(g/s)	(TPY)	(g/s)	(TPY)	(g/s)
					Future					
Power Boiler No. 5	598.9	17.2	402.5	11.6	6,618.2	190.6	1,296.5	37.3	1,201.0	34.5
Power Boiler No. 7	447.2	12.9	299.6	8.6	5,366.4	154.4	2,683.2	77.2	410.0	11.8
Recovery Boiler No. 4	602.3	17.3	451.7	13.0	1,220.3	35.1	647.2	18.6	2,157.4	62.1
Recovery Boiler No. 5	356.9	10.3	267.8	7.7	1,060.7	30.5	738.0	21.2	2,459.9	70.8
Smelt Dissolving Tank No. 4	124.8	3.6	111.7	3.2	22.6	0.7	--	--	--	--
Smelt Dissolving Tank No. 5	67.2	1.9	60.1	1.7	25.3	0.7	--	--	--	--
Lime Kiln No. 4	190.0	5.5	168.2	4.9	117.1	3.4	819.9	23.6	29.8	0.9
Lime Bin No. 1	5.3	0.2	5.3	0.2	--	--	--	--	--	--
Lime Bin No. 2	3.2	0.1	3.2	0.1	--	--	--	--	--	--
Total	2,395.8	68.9	1,770.1	50.9	14,430.5	415.3	6,184.8	178.0	6,258.1	180.0
					Baseline*					
Power Boiler No. 3+	80.0	2.3	--	--	2,409.0	69.3	--	--	--	--
Power Boiler No. 4+	184.2	5.3	--	--	1,613.0	46.4	--	--		
Power Boiler No. 5	441.5	12.7	--	--	4,727.7	136.0	602.4	17.3	--	--
Power Boiler No. 7	--	--	--	--	--	--	1,797.0	51.7		
Recovery Boiler No. 3	163.4	4.7	--	--	333.7	9.6	--	--	--	--
Recovery Boiler No. 4	549.2	15.8	--	--	1,115.9	32.1	514.7	14.8	--	--
Recovery Boiler No. 5	--	--	--	--	--	--	629.0	18.1		
Smelt Dissolving Tank No. 3	55.6	1.6	--	--	6.6	0.2	--	--	--	--
Smelt Dissolving Tank No. 4	118.2	3.4	--	--	22.2	0.6	--	--	--	--
Smelt Dissolving Tank No. 5	--	--	--	--	--	--	--	--		
Lime Kiln No. 2	69.3	2.0	--	--	43.3	1.3	418.0	12.0	--	--
Lime Kiln No. 3	86.7	2.5	--	--	43.3	1.3	418.0	12.0	--	--
Total	1,748.1	50.3	--	--	10,314.8	296.7	4,379.1	126.0	--	--

* January 6, 1975 conditions for PM and SO2; March 28, 1988 conditions for NOx.

\+ Common stack.

Table 3-3. Container Corporation of America's Stack Parameters and Flow Characteristics for Baseline Mill Configuration

Source Description	Stack Height		Stack Diameter		Flow Rate	Temperature		Velocity	
	(ft)	(m)	(ft)	(m)	(acfm)	(°F)	(°K)	(fps)	(m/s)
1975 Baseline Configuration for PM and SO2									
Power Boiler No. 3 & No. 4+	227	69.2	8.00	2.44	--	410	483	55.3	16.86
Power Boiler No. 5	227	69.2	11.00	3.35	--	405	480	53.3	16.25
Recovery Boiler No. 3	134	40.8	9.00	2.74	--	242	390	43.5	13.26
Recovery Boiler No. 4	249	75.9	11.50	3.51	--	428	493	61.6	18.78
Smelt Dissolving Tank No. 3	109	33.2	2.00	0.61	--	189	360	19.1	5.82
Smelt Dissolving Tank No. 4	228	69.5	6.00	1.83	--	171	350	17.1	5.21
Lime Kiln No. 2	44	13.4	3.50	1.07	--	190	361	40.2	12.25
Lime Kiln No. 3	44	13.4	4.50	1.37	--	189	360	57.7	17.59
1988 Baseline Configuration for NOx									
Power Boiler No. 5	227	69.2	11.00	3.35	287,134	358	454	50.36	15.35
Power Boiler No. 7	340	103.6	14.50	4.42	439,624	421	489	44.37	13.52
Recovery Boiler No. 4	249	75.9	12.33	3.76	388,969	464	513	54.29	16.55
Recovery Boiler No. 5*	288	87.8	9.00	2.74	179,817	434	496	47.11	14.36
Smelt Dissolving Tank No. 4	249	75.9	6.00	1.83	28,700	153	340	16.92	5.16
Smelt Dissolving Tank No. 5	288	87.8	4.00	1.22	41,488	162	345	55.02	16.77
Lime Kiln No. 2	44	13.4	3.50	1.07	--	190	361	40.20	12.25
Lime Kiln No. 3	44	13.4	4.50	1.37	--	189	360	57.70	17.59

+ Common stack

* Paramaters apply to each of two identical stacks.

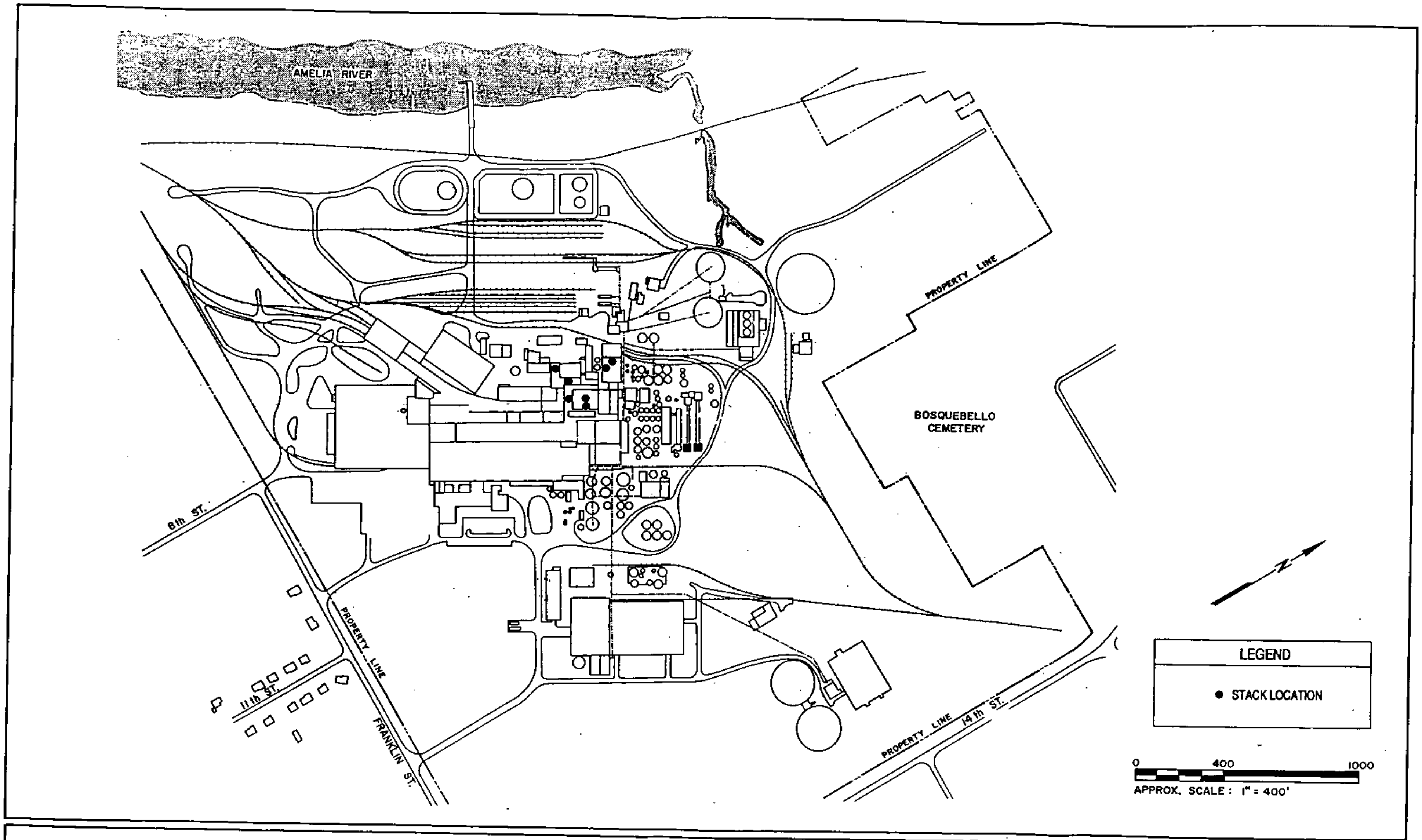

Figure 3-1 PLOT PLAN OF BASELINE MILL CONFIGURATION

KBN

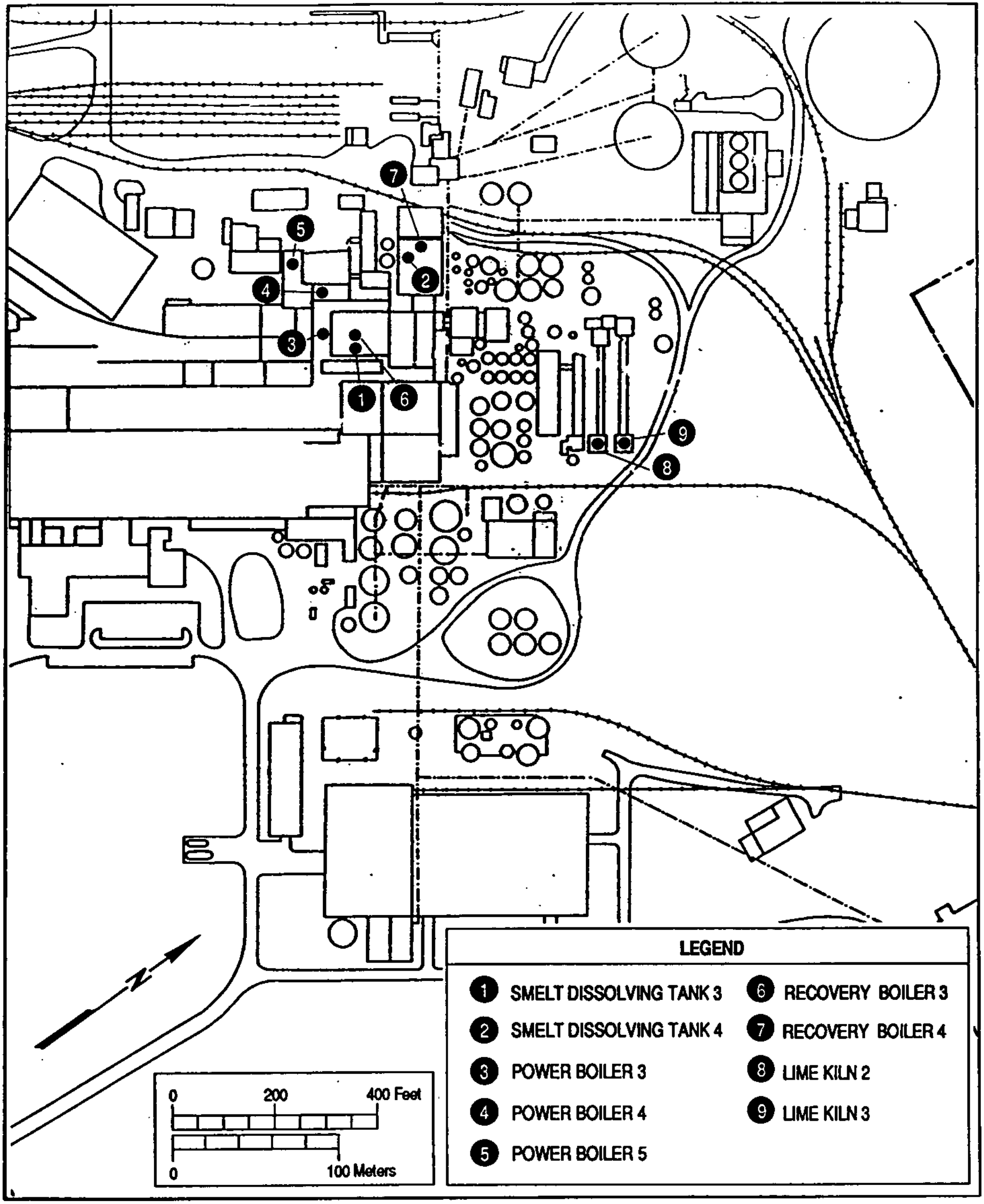

Figure 3-2 EXPANDED PLOT PLAN OF CCA MILL FOR BASELINE CONDITIONS

KBN

The only change in source configuration at CCA since March 28, 1988, has been the replacement of LK Nos. 2 and 3 with LK No. 4. LK No. 4 received its construction permit in April 1988, and its operation was contingent upon the shutdown of the two old lime kilns.

3.2 CCA FUTURE EMISSIONS

The future or projected emission inventory for CCA is based upon permitted allowable emissions or maximum emissions based upon maximum operating rates. The future maximum short-term and annual emission rates are shown in Tables 3-1 and 3-2, respectively. As shown, the future sources consist of PB Nos. 5 and 7, RB Nos. 4 and 5, SDT Nos. 4 and 5, and LK No. 4. The basis for the maximum projected emission rate for each source is presented in Appendix B.

Stack parameters for the projected CCA sources are presented in Table 3-4. All of these are based upon the most recent stack test conducted on the source, except for the two lime bins, which are based upon design information. A plot plan of the current CCA facility showing stack locations is presented in Figure 3-3. An expanded plot plan is presented in Figure 3-4.

Comparison of the baseline and future emission inventories for CCA shows that several changes have taken place at the mill since the PM/SO_2 baseline date. PB Nos. 3 and 4, RB No. 3, SDT No. 3, and LK Nos. 2 and 3 have all been retired since the baseline date. PB No. 7, RB No. 5, SDT No. 5, and LK No. 4 have all been added since the baseline date.

3.3 OTHER SOURCES

There are two other major sources located within 15 km of the CCA mill: the ITT Rayonier and the Gilman Paper Co. paper mills. The location of these sources in relation to CCA were shown in Figure 2-1. In order to address compliance with the AAQS and PSD increments, these two facilities explicitly were included in the modeling analysis.

Table 3-4. Container Corporation of America's Stack Parameters and Flow Characteristics for Future Mill Configuration

Source Description	Test Date	Stack Height		Stack Diameter		Flow Rate	Temperature		Velocity	
		(ft)	(m)	(ft)	(m)	(acfm)	(°F)	(°K)	(fps)	(m/s)
Power Boiler No. 5	11-Sep-90	257 +	78.3	11.00	3.35	287,134	358	454	50.36	15.35
Power Boiler No. 7	31-Jan-90	340	103.6	14.50	4.42	439,624	421	489	44.37	13.52
Recovery Boiler No. 4	08-May-90	249	75.9	12.33	3.76	388,969	464	513	54.29	16.55
Recovery Boiler No. 5*	10-Jan-90	288	87.8	9.00	2.74	179,817	434	496	47.11	14.36
Smelt Dissolving Tank No. 4	10-May-90	249	75.9	6.00	1.83	28,700	153	340	16.92	5.16
Smelt Dissolving Tank No. 5	15-Nov-88	288	87.8	4.00	1.22	41,488	162	345	55.02	16.77
Lime Kiln No. 4	27-Jul-90	102	31.1	4.75	1.45	73,500	325	436	69.13	21.07
Lime Bin No. 1	--	110	33.5	2.00	0.61	6,500	300	422	34.48	10.51
Lime Bin No. 2	--	110	33.5	1.50	0.46	3,000	90	305	28.29	8.62

* Paramaters apply to each of two identical stacks.

\+ Stack is currently at 227 feet height; this stack will be raised to 257 feet.

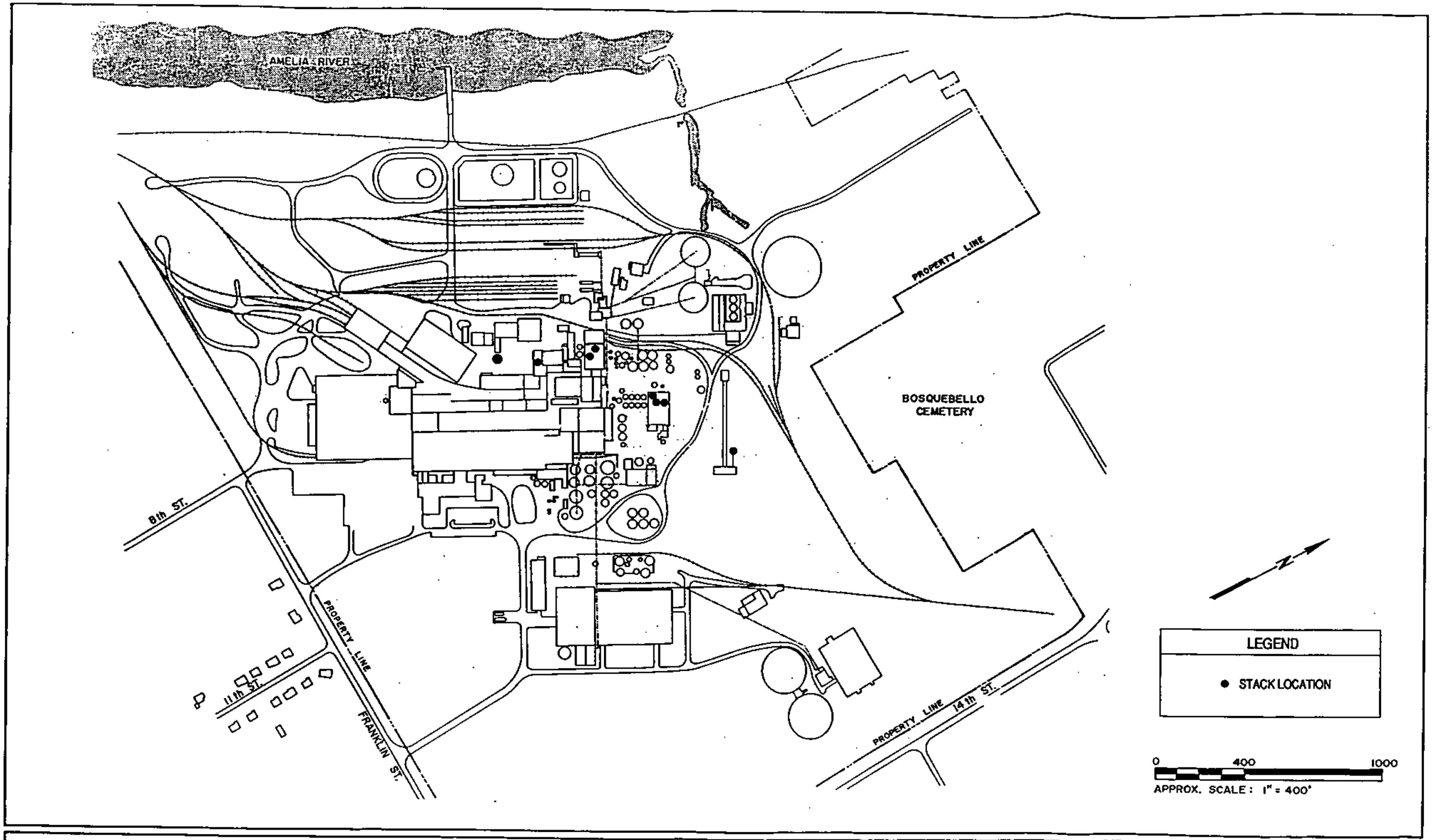

Figure 3-3 PLOT PLAN OF EXISTING AND FUTURE MILL CONFIGURATION

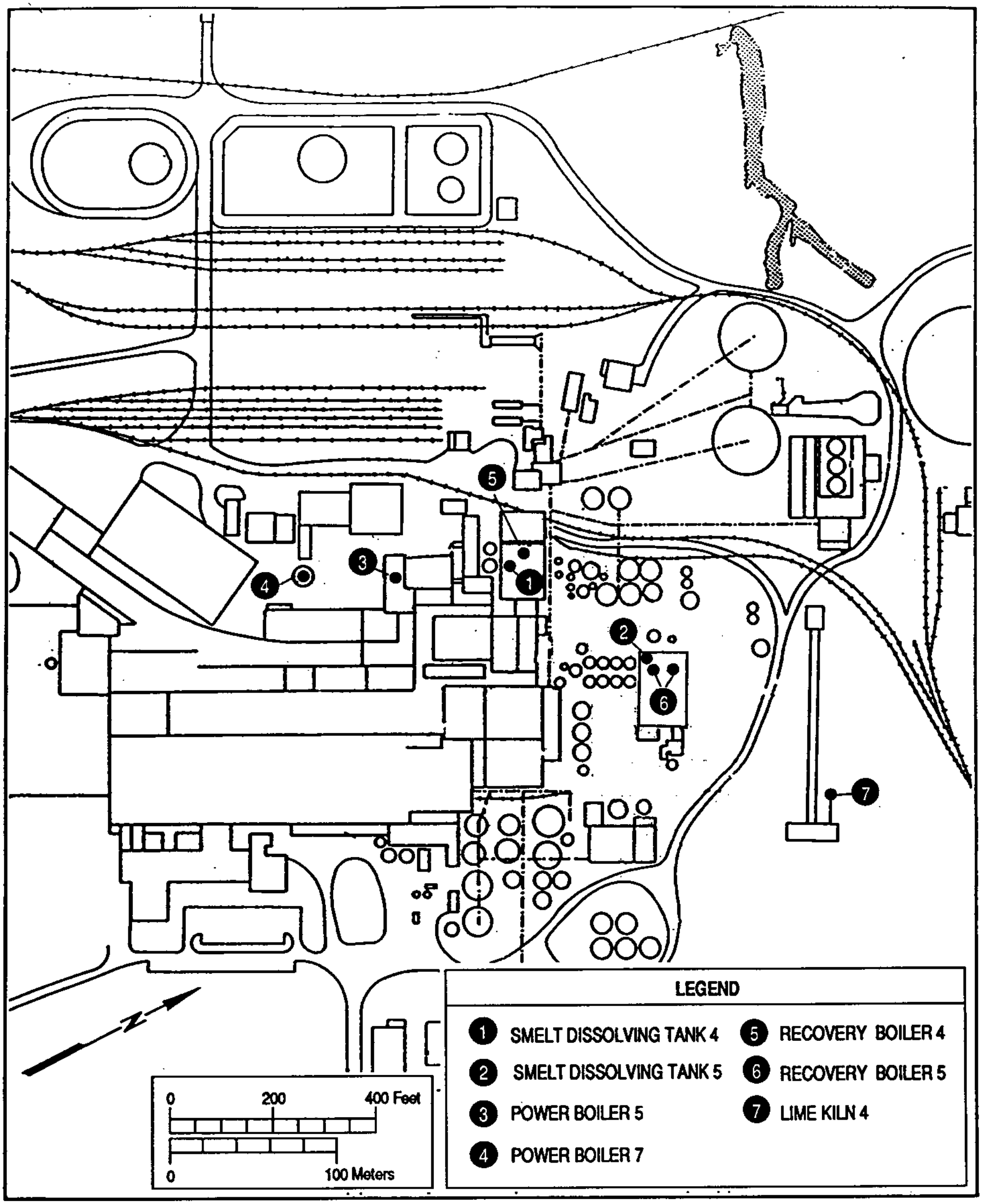

Figure 3-4 EXPANDED PLOT PLAN OF CCA MILL FOR EXISTING AND FUTURE CONDITIONS

The ITT Rayonier paper mill is located about 2.5 km south of CCA in Fernandina Beach. The current emissions for the facility are presented in Table 3-5, and stack parameters are presented in Table 3-6. The current permitted sources consist of three power boilers, a recovery boiler, and a vent scrubber. The emissions inventory is based upon the most recent FDER Air Permit Information System (APIS) listing and was confirmed by ITT Rayonier. Discussions with ITT Rayonier plant personnel revealed that the three power boilers were operational in 1975, the PSD baseline date. The last change to the boilers was the addition of wet scrubbers for particulate control. There has been no physical change or change in the normal operation of the boilers since the baseline date. As a result, the power boilers were not considered in the PSD increment consumption analysis.

Similarly, the recovery boiler and vent scrubber at ITT Rayonier were operational in 1975. These sources have not been modified physically and have not changed normal operation. As a result, these sources were not considered in the PSD increment consumption analysis.

The Gilman Paper mill is located about 10 km northwest of CCA. The current emissions and stack parameters for the facility are presented in Tables 3-5 and 3-6, respectively. The current sources consist of a power boiler, a coal-fired boiler, three recovery boilers and smelt dissolving tanks, two bark boilers, a lime kiln, and a recently permitted TRS incinerator. The current emission inventory is based on information obtained directly from Gilman Paper.

The history of air emission sources at Gilman Paper is not known. However, the baseline emission inventory for the mill was presented in the Weston report (1980). The report included short-term and annual emissions representative of PSD baseline conditions. The baseline inventory is presented in Tables 3-5 and 3-6. To determine PSD increment consumption for Gilman Paper, the baseline and future emission inventories were used.

Table 3-5. Emission Rates For ITT Rayonier and Gilman Paper Co.

	PM		PM10		SO2		NOx		CO	
Source	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)
Future										
ITT Rayonier										
Power Boiler Nos. 1 & 2	66.6	8.4	66.6	8.4	921.0	116.0 +	72.4	9.1	59.1	7.4
Power Boiler No. 3	50.6	6.4	50.6	6.4	459.0	57.8	41.8	5.3	56.4	7.1
Recovery Boiler	67.5	8.5	67.5	8.5	321.9	40.6	359.4	45.3	88.8	11.2
Vent Scrubber	--	--	--	--	63.2	8.0	--	--	--	--
Gilman Paper Company										
Power Boiler No. 3	50.0	6.3	50.0	6.3	692.8	87.3	NA	NA	NA	NA
Coal-Fired Boiler	58.7	7.4	58.7	7.4	704.4	88.8	NA	NA	NA	NA
Recovery Boiler No. 2	37.1	4.7	37.1	4.7	60.3	7.6	NA	NA	NA	NA
Recovery Boiler No. 3	37.1	4.7	37.1	4.7	60.3	7.6	NA	NA	NA	NA
Recovery Boiler No. 4	43.4	5.5	43.4	5.5	125.4	15.8	NA	NA	NA	NA
Bark Boiler No. 1	69.0	8.7	69.0	8.7	5.4	0.7	NA	NA	NA	NA
Bark Boiler No. 2	36.0	4.5	36.0	4.5	8.5	1.1	NA	NA	NA	NA
Smelt Dissolving Tank No. 2	3.9	0.5	3.9	0.5	2.4	0.3	NA	NA	NA	NA
Smelt Dissolving Tank No. 3	4.3	0.5	4.3	0.5	2.6	0.3	NA	NA	NA	NA
Smelt Dissolving Tank No. 4	10.3	1.3	10.3	1.3	6.3	0.8	NA	NA	NA	NA
Lime Kiln	32.3	4.1	32.3	4.1	16.9	2.1	NA	NA	NA	NA
TRS Incinerator	--	--	--	--	6.9	0.9	NA	NA	NA	NA
Total Future Emissions	566.8	71.4	566.8	71.4	3,457.3	435.6	473.6	59.7	204.3	25.7
1975 Baseline										
Gilman Paper Company										
Power Boiler Nos. 1-3	154.0	19.4	154.0	19.4	2,230.2	281	402.4	50.7	9.5	1.2
Power Boiler No. 4	46.8	5.9	46.8	5.9	475.4	59.9	93.7	11.8	2.4	0.3
Recovery Boiler No. 2	27.8	3.5	27.8	3.5	60.3	7.6	NA	NA	NA	78.5
Recovery Boiler No. 3	25.4	3.2	25.4	3.2	60.3	7.6	NA	NA	NA	88.2
Recovery Boiler No. 4	26.2	3.3	26.2	3.3	125.4	15.8	NA	NA	NA	176.6
Bark Boiler No. 1	104.0	13.1	104.0	13.1	319.8	40.3	169.1	21.3	25.4	3.2
Bark Boiler No. 2	19.8	2.5	19.8	2.5	104.8	13.2	169.1	21.3	25.4	3.2
Smelt Dissolving Tank No. 2	26.2	3.3	26.2	3.3	NA	NA	0.0	NA	NA	NA
Smelt Dissolving Tank No. 3	24.6	3.1	24.6	3.1	NA	NA	0.0	NA	NA	NA
Smelt Dissolving Tank No. 4	24.6	3.1	24.6	3.1	NA	NA	0.0	NA	NA	NA
Lime Kiln Nos. 2 & 3	30.2	3.8	30.2	3.8	NA	NA	0.0	NA	NA	NA
Total Baseline Emissions	509.5	64.2	509.5	64.2	3,376.2	425.4	834.1	105.1	62.7	351.2

NA = Not Available

Table 3-6. Stack Parameters and Flow Characteristics for ITT Rayonier and Gilman Paper Co.

Source Description	Stack Height		Stack Diameter		Flow Rate	Temperature		Velocity	
	(ft)	(m)	(ft)	(m)	(acfm)	(°F)	(°K)	(fps)	(m/s)
				Future					
ITT Rayonier									
Power Boiler Nos. 1 & 2	122	37.2	10.00	3.05	155,000	145	336	32.00	9.75
Power Boiler No. 3	122	37.2	10.00	3.05	155,000	133	329	32.00	9.75
Recovery Boiler	250	76.2	7.50	2.29	152,817	125	325	57.00	17.37
Vent Scrubber	123	37.5	3.00	0.91	28,350	130	328	66.00	20.12
Gilman Paper Company									
Power Boiler No. 3	275	83.8	14.10	4.30	NA	351	450	9.24	2.82
Coal-Fired Boiler	150	45.7	10.00	3.05	NA	128	326	25.50	7.77
Recovery Boiler No. 2	180	54.9	7.00	2.13	NA	305	425	55.00	16.76
Recovery Boiler No. 3	180	54.9	7.00	2.13	NA	305	425	55.00	16.76
Recovery Boiler No. 4	250	76.2	8.50	2.59	NA	280	411	40.00	12.19
Bark Boiler No. 1	120	36.6	8.46	2.58	NA	148	338	43.91	13.38
Bark Boiler No. 2	120	36.6	6.96	2.12	NA	148	338	74.66	22.76
Smelt Dissolving Tank No. 2	150	45.7	4.11	1.25	NA	153	340	20.84	6.35
Smelt Dissolving Tank No. 3	151	46.0	3.95	1.20	NA	150	339	25.07	7.64
Smelt Dissolving Tank No. 4	211	64.3	4.95	1.51	NA	137	331	29.64	9.03
Lime Kiln	100	30.5	5.00	1.52	NA	171	350	38.20	11.64
TRS Incinerator	100	30.5	NA	NA	NA	NA	NA	NA	NA
				1975 Baseline					
Gilman Paper Company									
Power Boiler Nos. 1-3	275	83.8	14.11	4.30	NA	350	450	23.9	7.3
Power Boiler No. 4	120	36.6	5.91	1.80	NA	800	700	65.6	20.0
Recovery Boiler No. 2	155	47.2	7.55	2.30	NA	307	426	43.0	13.1
Recovery Boiler No. 3	175	53.3	5.25	1.60	NA	250	394	82.7	25.2
Recovery Boiler No. 4	250	76.2	8.53	2.60	NA	309	427	72.5	22.1
Bark Boiler No. 1	120	36.6	7.87	2.40	NA	170	350	45.3	13.8
Bark Boiler No. 2	120	36.6	6.89	2.10	NA	151	339	61.7	18.8
Smelt Dissolving Tank No. 2	211	64.4	4.92	1.50	NA	160	344	31.2	9.5
Smelt Dissolving Tank No. 2	211	64.4	4.92	1.50	NA	160	344	31.2	9.5
Smelt Dissolving Tank No. 2	211	64.4	4.92	1.50	NA	160	344	31.2	9.5
Lime Kiln Nos. 2 & 3	100	30.5	4.92	1.50	NA	163	346	26.2	8.0

NA = Not Available.

Comparison of the two inventories shows that since the baseline period PB Nos. 1, 2, and 4, and LK No. 2 have shut down, while the coal-fired boiler and TRS incinerator have been added.

Since March 28, 1988, the NO_2 baseline date, there are no known changes at ITT Rayonier and Gilman Paper that would affect NO_2 increment consumption. As a result, these facilities were not considered in the NO_2 increment consumption analysis.

There are no other major sources located in Nassau County. Consequently, no other sources were included explicitly in the modeling analysis. Contributions from other sources to impacts near CCA were established by using ambient monitoring data. These data and their use are described in subsequent sections of this report.

4.0 PARTICULATE MATTER AIR IMPACT ANALYSIS

4.1 INTRODUCTION

The air quality impact analyses of PM(TSP) and PM10 concentrations to demonstrate compliance with the Florida AAQS and PSD Class I and II increments are presented in this section. AAQS and PSD increments for PM(TSP) and PM10 were presented in Tables 2-1 and 2-2.

4.2 METHODOLOGY

4.2.1 GENERAL MODELING APPROACH

The general modeling approach followed EPA and FDER modeling guidelines for determining compliance with AAQS. In general, when model predictions are used to determine compliance with AAQS, current EPA and FDER policies stipulate that the highest annual average and highest, second-highest short-term (i.e., 24 hours or less) concentrations can be compared to the applicable standard. This comparison is made with either 1 year of on-site meteorological data or 5 years of National Weather Service (NWS) data. The highest, second-highest concentration is calculated for a receptor field by:

1. Eliminating the highest concentration predicted at each receptor,
2. Identifying the second-highest concentration at each receptor, and
3. Selecting the highest concentration among these second-highest concentrations.

This approach is consistent with the air quality standards, which permit a short-term average concentration to be exceeded once per year at each receptor.

Model predictions for all averaging periods were performed using the Industrial Source Complex Short-Term (ISCST) model. To develop the maximum short-term concentrations caused by all modeled facilities, the general modeling approach was divided into screening and refined phases to reduce the computation time required to perform the modeling analysis. In this analysis, the basic difference between the two phases was the receptor grid used when predicting concentrations.

Concentrations for the screening phase were predicted using a coarse receptor grid and a 5-year meteorological record. The refined phase of the analysis was conducted by predicting concentrations for a refined receptor grid centered on the receptor at which the highest, second-highest concentration was produced from the screening analysis. The ISCST model was executed for the worst-case year(s) during which both the highest and second-highest concentrations were predicted to occur at that receptor, based on the screening analysis results. This approach was used to ensure that valid highest, second-highest concentrations were obtained.

4.2.2 MODEL SELECTION

The ISCST dispersion model (EPA, 1988a) was used to evaluate impacts from the PM emission sources considered in the modeling. This model is contained in EPA's User's Network for Applied Modeling of Air Pollution (UNAMAP), Version 6 (EPA, 1988b). The ISCST model was selected primarily for the following reasons:

1. EPA and FDER have approved the general use of the model for air quality dispersion analysis because the model assumptions and methods are consistent with those in the Guideline on Air Quality Models (EPA, 1987).
2. The ISCST model is capable of predicting the impacts from stack, area, and volume sources that are spatially distributed over large areas and located in flat or gently rolling terrain.
3. The results from the ISCST model are appropriate for addressing compliance with AAQS.

The ISCST model is an extended version of the single-source (CRSTER) model (EPA, 1977). The ISCST model is designed to calculate hourly concentrations based on hourly meteorological parameters (i.e., wind direction, wind speed, atmospheric stability, ambient temperature, and mixing heights). The hourly concentrations are processed into nonoverlapping short-term periods and an annual average period. For example, a 24-hour average concentration is based on twenty-four 1-hour averages calculated from midnight to midnight of each day. For each short-term averaging period selected, the highest and second-highest average concentrations are calculated for each receptor. As an option, a table of the 50 highest concentrations over the entire field of receptors can be produced.

Major features of the ISCST model are presented in Table 4-1. Concentrations due to stack and volume sources are calculated by the ISCST model using the steady-state Gaussian plume equation for a continuous source. The area source equation in the ISCST model is based on the equation for a continuous and finite crosswind line source.

The ISCST model has rural and urban options that affect the wind speed profile exponent law, dispersion rates, and mixing-height formulations used in calculating ground-level concentrations. The criteria used to determine when the rural or urban mode is appropriate are based on land use near the proposed plant's surroundings (Auer, 1978). If the land use is classified as heavy industrial, light-moderate industrial, commercial, or compact residential for more than 50 percent of the area within a 3-km radius circle centered on the proposed source, the urban option should be selected. Otherwise, the rural option is more appropriate.

For modeling analyses that will undergo regulatory review, the following model features are recommended by EPA (1987) and are referred to as the regulatory options in the ISCST model:

1. Final plume rise at all receptor locations,
2. Stack-tip downwash,
3. Buoyancy-induced dispersion,
4. Default wind speed profile coefficients for rural or urban option,
5. Default vertical potential temperature gradients,
6. Calm wind processing, and

Table 4-1. Major Features of the ISCST Model

ISCST Model Features
• Polar or Cartesian coordinate systems for receptor locations
• Rural or one of three urban options that affect wind speed profile exponent, dispersion rates, and mixing height calculations
• Plume rise as a result of momentum and buoyancy as a function of downwind distance for stack emissions (Briggs, 1969, 1971, 1972, and 1975)
• Procedures suggested by Huber and Snyder (1976); Huber (1977); and Schulmann and Hanna (1986) and Schulmann and Scire (1980) for evaluating building wake effects
• Procedures suggested by Briggs (1974) for evaluating stack-tip downwash
• Separation of multiple point sources
• Consideration of the effects of gravitational settling and dry deposition on ambient particulate concentrations
• Capability of simulating point, line, volume and area sources
• Capability to calculate dry deposition
• Variation of wind speed with height (wind speed-profile exponent law)
• Concentration estimates for 1-hour to annual average
• Terrain-adjustment procedures for elevated terrain including a terrain truncation algorithm
• Receptors located above local terrain, i.e., "flagpole" receptors
• Consideration of time-dependent exponential decay of pollutants
• The method of Pasquill (1976) to account for buoyancy-induced dispersion
• A regulatory default option to set various model options and parameters to EPA recommended values (see text for regulatory options used)
• Procedure for calm-wind processing

Source: EPA, 1988a.

7. A decay half life of 4 hours for SO_2 concentration calculations in urban areas.

In this analysis, the EPA regulatory options were used to address maximum impacts. Based on a review of the land use around the CCA facility, the rural mode was selected because of the location of water bodies adjacent to the facility and low density of residential, industrial, and commercial development within 3 km of the facility.

4.2.3 METEOROLOGICAL DATA

Meteorological data used in the ISCST model to determine air quality impacts consisted of a concurrent 5-year period (1983-1987) of hourly surface weather observations from the Jacksonville International Airport (JIA) and upper air data from Waycross, Georgia. JIA is located approximately 35 km to the south of the CCA facility, and Waycross is located about 125 km to the northwest.

Data from these locations were selected for use in the study because these stations are the closest weather stations to the study area and have similar surrounding topographical features. These stations also have the most readily available and complete databases that are representative of the CCA site. Based on discussions with FDER staff, these data are acceptable for analyzing impacts from sources at the CCA facility.

The hourly surface observations included wind direction, wind speed, temperature, total cloud cover, and cloud ceiling height. The wind speed, total cloud cover, and cloud ceiling values were used in the EPA meteorological preprocessor program (RAMMET) to determine atmospheric stability using the Turner stability scheme. Although stability is generally determined using opaque cloud cover, the difference between the stability classes estimated with total cloud cover rather than opaque cloud cover is expected to be minimal.

Based on the temperature measurements at JIA, morning and afternoon mixing heights were calculated with the radiosonde data at Waycross using the Holzworth approach (1972). Hourly mixing heights were derived from the morning and afternoon mixing heights using the interpolation method developed by EPA (Holzworth, 1972). The hourly surface data and mixing heights were used to develop a sequential series of hourly meteorological data (i.e., wind direction, wind speed, temperature, stability, and mixing heights). Because the observed hourly wind directions were classified into one of thirty-six 10-degree sectors, the wind directions were randomized within each sector by the RAMMET preprocessing program to account for the expected variability in air flow.

4.2.4 EMISSION INVENTORY

The stack, operating, and PM emission data for PSD baseline sources and for all future sources at the CCA facility were presented in Tables 3-1 through 3-4. Stack coordinates for sources considered in the modeling analysis are presented in Table 4-2. For modeling of PM10, it was conservatively assumed that all PM emissions from ITT Rayonier and Gilman Paper are PM10.

For addressing compliance with the Florida AAQS, all sources to be operated in the future at CCA, ITT Rayonier, and Gilman Paper were modeled. For addressing compliance with PSD Class I and II increments, both the baseline and projected sources were modeled with the baseline sources' emissions modeled as negative values. Sources with low emissions (less than 2.0 g/s) were eliminated in the screening analysis to reduce the model computation time. In general, sources with similar stack and operating characteristics that were located near one another also were combined and modeled as one source. The sources that were eliminated or combined are identified below:

Table 4-2. Coordinates for Sources Considered in Modeling Analysis

Source		Location (m)[a] X	Y
Container Corp. of America			
Power Boiler No.	3	42.7	39.6
	4	42.7	39.6
	5	23.4	34.4
	7	0.0	0.0
Recovery Boiler No.	3	35.0	44.0
	4	57.0	100.6
	5	170.7	114.6
Smelt Diss. Tank No.	3	35.0	44.0
	4	58.5	88.4
	5	155.0	115.8
Lime Kiln No.	2	201.2	106.7
	3	208.8	116.1
	4	271.3	153.9
ITT Rayonier		-1,500.0	-2,000.0
Gilman Paper Co.		-8,000.0	7,100.0

[a] Relative to location of CCA Power Boiler No. 7 stack.

Case	Source	Screening Analysis
AAQS Analysis-PM10		
Future	CCA Lime Bins	Eliminated
	Gilman Paper SDT Nos. 2, 3, and 4	Eliminated
	RB Nos. 2 and 3	Combined
	ITT Rayonier PB Nos. 1, 2, and 3	Combined
PSD Analysis-PM(TSP)		
Future	CCA Lime Bins	Eliminated
	SDT Nos. 4 and 5	Eliminated
	Gilman RB Nos. 2 and 3	Combined
	SDT Nos. 2, 3, and 4	Eliminated
Baseline	CCA PB Nos. 3 and 4	Combined
	SDT Nos. 3 and 4	Eliminated
	Gilman SDT Nos. 2, 3, and 4	Combined
	LK Nos. 2 and 3	Combined

All sources were included in the refined modeling analysis where refined analyses were performed.

4.2.5 BUILDING DOWNWASH

The effect of building downwash was simulated in the modeling analysis. Building dimensions for structures located at the CCA facility are presented in Table 4-3. Locations of buildings in relation to emission stacks at CCA were shown in Figures 3-1 through 3-4. Direction-specific information for the influencing structure for each source is presented in Tables 4-4 and 4-5 for projected and baseline sources, respectively.

4.2.6 RECEPTOR LOCATIONS

The general modeling approach incorporated screening and refined phases to address compliance with the AAQS and PSD Class I and II increments. Only receptors located off CCA plant property in areas defined as ambient air

Table 4-3. Summary of Actual and Modeled Building Dimensions

Structure	Actual Building Dimensions (m) Height	Length	Width	Modeled Building Dimensions (m) Height	Maximum Projected Width
Future					
No. 7 Power Boiler Building	46.6	33.4	31.4	46.6	45.8
No. 5 Power Boiler ESP	45.7	66.4	16.3	45.7	68.4
No. 4 and 5 Power Boiler and No. 5 Power Boiler ESP	40.8	57.3	32.1	40.8	65.7
No. 4 Recovery Boiler Building	50.0	33.0	24.3	50.0	40.9
No. 5 Recovery Boiler Building	72.8	38.5	25.0	72.8	45.9
No. 4 Kiln Building	19.5	31.3	12.9	19.5	33.9
Baseline					
No. 5 Power Boiler Building	40.8	28.2	17.7	40.8	33.3
No. 4 Recovery Boiler	50.0	33.0	24.3	50.0	40.9
No. 3, 4, and 5 Power Boiler and No. 3 Recovery Boiler	30.5	42.6	39.6	30.5	58.2

Table 4-4. Direction Specific Downwash Used in the Modeling Analysis for Projected Sources

Modeled Source Number	Source Description	Direction[a] (deg.)	Influencing Structure
7	No. 7 Power Boiler	10 - 90	No. 5 Power Boiler ESP
		100 - 130	None (No Downwash)
		140 - 150	No. 7 Power Boiler Building
		160 - 210	No. 5 Power Boiler ESP
		220 - 250	No. 5 Recovery Boiler Building
		260 - 270	No. 5 Power Boiler ESP
		280 - 310	None (No Downwash)
		320 - 330	No. 7 Power Boiler Building
		340 - 360	No. 5 Power Boiler ESP
5	No. 5 Power Boiler	10 - 70	No. 5 Power Boiler ESP
		90 - 150	No. 7 Power Boiler Building
		160 - 220	No. 5 Power Boiler ESP
		230 - 260	No. 5 Recovery Boiler Building
		270 - 330	No. 7 Power Boiler Building
		340 - 360	No. 5 Power Boiler ESP
14	No. 4 Recovery Boiler	10 - 50	No. 5 Power Boiler ESP
		60 - 70	No. 5 Recovery Boiler Building
		80 - 90	No. 7 Power Boiler Building
		100 - 160	No. 4 Recovery Boiler Building
		170 - 230	No. 5 Power Boiler ESP
		240 - 280	No. 5 Recovery Boiler Building
		290 - 340	No. 4 Recovery Boiler Building
		350 - 360	No. 5 Power Boiler ESP
15	No. 5 Recovery Boiler	10 - 360	No. 5 Recovery Boiler Building
24	No. 4 Lime Kiln	10 - 40	None (No Downwash)
		50 - 90	No. 5 Recovery Boiler Building
		100 - 180	No. 4 Lime Kiln Building
		190 - 220	None (No Downwash)
		230 - 270	No. 5 Recovery Boiler Building
		280 - 360	No. 4 Lime Kiln Building
34	No. 4 Smelt Dissolving Tank	10 - 70	No. 5 Power Boiler ESP
		80 - 100	No. 7 Power Boiler Building
		110 - 160	No. 4 Recovery Boiler Building
		170 - 220	No. 5 Power Boiler ESP
		230 - 280	No. 5 Recovery Boiler Building
		290 - 340	No. 4 Recovery Boiler Building
		350 - 360	No. 5 Power Boiler ESP
35	No. 5 Smelt Dissolving Tank	10 - 360	No. 7 Power Boiler Building

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[a] All directions relative to the given source.

Table 4-5. Direction Specific Downwash Used in the Modeling Analysis for Baseline Sources

Modeled Source Number	Source Description	Direction[a] (deg.)	Influencing Structure
70134	No. 3 and 4 Power Boiler	10 - 70	No. 4 Recovery Boiler Building
		90 - 150	No. 5 Power Boiler Building
		160 - 250	No. 4 Recovery Boiler Building
		260 - 330	No. 5 Power Boiler Building
		340 - 360	No. 4 Recovery Boiler Building
70005	No. 5 Power Boiler	10 - 70	No. 4 Recovery Boiler Building
		80 - 170	No. 5 Power Boiler Building
		180 - 250	No. 4 Recovery Boiler Building
		260 - 350	No. 5 Power Boiler Building
		360	No. 4 Recovery Boiler Building
70014	No. 4 Recovery Boiler	10 - 360	No. 4 Recovery Boiler Building
70013	No. 3 Recovery Boiler	10 - 70	No. 4 Recovery Boiler Building
		80 - 160	No. 5 Power Boiler Building
		170 - 250	No. 4 Recovery Boiler Building
		260 - 340	No. 5 Power Boiler Building
		350 - 360	No. 4 Recovery Boiler Building
70033	No. 3 Smelt Dissolving Tank	10 - 70	No. 4 Recovery Boiler Building
		80 - 160	No. 5 Power Boiler Building
		170 - 250	No. 4 Recovery Boiler Building
		260 - 340	No. 5 Power Boiler Building
		350 - 360	No. 4 Recovery Boiler Building
70034	No. 4 Smelt Dissolving Tank	10 - 70	No. 5 Power Boiler ESP
		80 - 100	No. 7 Power Boiler Building
		110 - 160	No. 4 Recovery Boiler Building
		170 - 220	No. 5 Power Boiler ESP
		230 - 280	No. 5 Recovery Boiler Building
		290 - 340	No. 4 Recovery Boiler Building
		350 - 360	No. 5 Power Boiler ESP
70022	No. 2 Lime Kiln	10 - 40	None (No Downwash)
		50 - 60	No. 3, 4, and 5 Power Boiler Building
		70 - 100	No. 4 Recovery Boiler Building
		110 - 360	None (No Downwash)
70023	No. 3 Lime Kiln	10 - 40	None (No Downwash)
		50	No. 3, 4, and 5 Power Boiler Building
		60 - 100	No. 4 Recovery Boiler Building
		110 - 360	None (No Downwash)

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[a] All directions relative to the given source.

were considered. The distances from CCA's PB No. 7 stack to the nearest off-plant property locations around the facility are shown in Table 4-6.

For the screening phase of the AAQS analysis, concentrations were predicted for 226 receptors located in a radial grid centered on the stack for PB No. 7 at CCA. Receptors were located along 36 radials, spaced at 10-degree increments at distances of 400, 700, 1,000, 1,300, and 1,700 meters (m) from the grid center. However, any receptors falling within the plant property boundary were eliminated before modeling. An additional 36 receptors were placed along the radials described above at the extent of the plant property boundary. Plant property boundaries for the CCA facility are shown in Figures 3-1 and 3-3.

In the refined analysis, receptors were placed along nine radials spaced at 2-degree intervals and centered on the receptor of maximum impact determined in the screening analysis. Spacing of the receptors along each radial was no more than 100 m. If maximum concentrations were predicted at locations where receptor spacing was already less than 100 m, no refined analysis was performed.

For the PM(TSP) increment screening analysis, the AAQS receptors described above were used, except an additional ring distance of 2,100 m was added. Because of the low predicted increment consumption values, no refined modeling was performed.

For the PSD Class I increment analysis, concentrations were predicted along the eastern boundary of the Okefenokee PSD Class I area and along the southern boundary of the Wolf Island Class I area. The Okefenokee Class I area is located approximately 63 km to the east of the facility (i.e., radial directions of 260 to 300 degrees). The Wolf Island Class I area is located 74 km to the north of CCA. One receptor was placed along the southern boundary of this area. Locations of receptors in the Class I areas are presented in Table 4-7 (with respect to the CCA plant location).

Table 4-6. Approximate Distance from Power Boiler No. 7 Stack at CCA Plant Property Line

Direction	Distance to Plant Property Boundary ft	m	Direction	Distance to Plant Property Boundary ft	m
10	2,250	686	190	1,150	351
20	2,300	701	200	1,188	362
30	1,675	511	210	1,250	381
40	1,313	400	220	1,475	450
50	1,500	457	230	1,550	472
60	2,000	610	240	1,688	514
70	2,400	647	250	2,150	655
80	2,275	693	260	1,725	526
90	2,200	671	270	1,413	431
100	2,175	663	280	1,225	373
110	2,225	678	290	1,138	347
120	2,350	716	300	1,113	339
130	2,175	663	310	1,113	339
140	1,725	523	320	1,175	358
150	1,450	442	330	1,288	393
160	1,300	396	340	1,375	419
170	1,213	370	350	1,750	533
180	1,163	354	360	1,625	495

Table 4-7. Class I Receptors Used in Modeling Analysis

Class I Area	Direction[a] (Deg)	Distance[a] (km)
Okefenokee	262	66.961
	267	64.316
	275	63.699
Wolf Island	12	73.961

[a] Relative to location of CCA Power Boiler No. 7 stack.

4.2.7 BACKGROUND CONCENTRATIONS

A background PM10 concentration (i.e., impacts from sources not modeled in the analysis) is added to the maximum predicted concentration from modeled sources to produce a total concentration for comparison with the PM10 AAQS. Background concentrations were developed from ambient monitoring data available from FDER.

Based on a review of historic monitoring data reported by FDER, there are four monitors that measured TSP concentrations in Fernandina Beach during 1989. The locations of these stations are shown in Figure 4-1. Three of these stations are located in the vicinity of the CCA mill (Stations 003, 008, and 009). A summary of the maximum PM(TSP) concentrations measured at these sites is presented in Table 4-8.

The historic data show that the second-highest PM(TSP) concentration measured at any of the three nearby stations was 124 micrograms per cubic meter (124 $\mu g/m^3$), while the highest annual average concentration was 59 $\mu g/m^3$. These values were used as conservative TSP background concentrations in the modeling analysis.

Since there are no PM10 measurements from sites in Nassau County, the PM(TSP) data were used to estimate PM10 background concentrations. EPA recommends using the national average PM(TSP)/PM10 distribution in cases where site-specific data are not available (EPA, 1985). This national distribution of PM(TSP)/PM10 ratios is based on evaluating high PM(TSP) concentrations [i.e., data when PM(TSP) concentrations exceeded 100 $\mu g/m^3$ for a 24-hour period or 55 $\mu g/m^3$ for an annual average]. This distribution is, therefore, appropriate for estimating maximum background concentrations.

The national distribution of PM(TSP)/PM10 ratios shows that the 50-percentile PM10/PM(TSP) ratio (i.e., average ratio) is 0.48 for both the

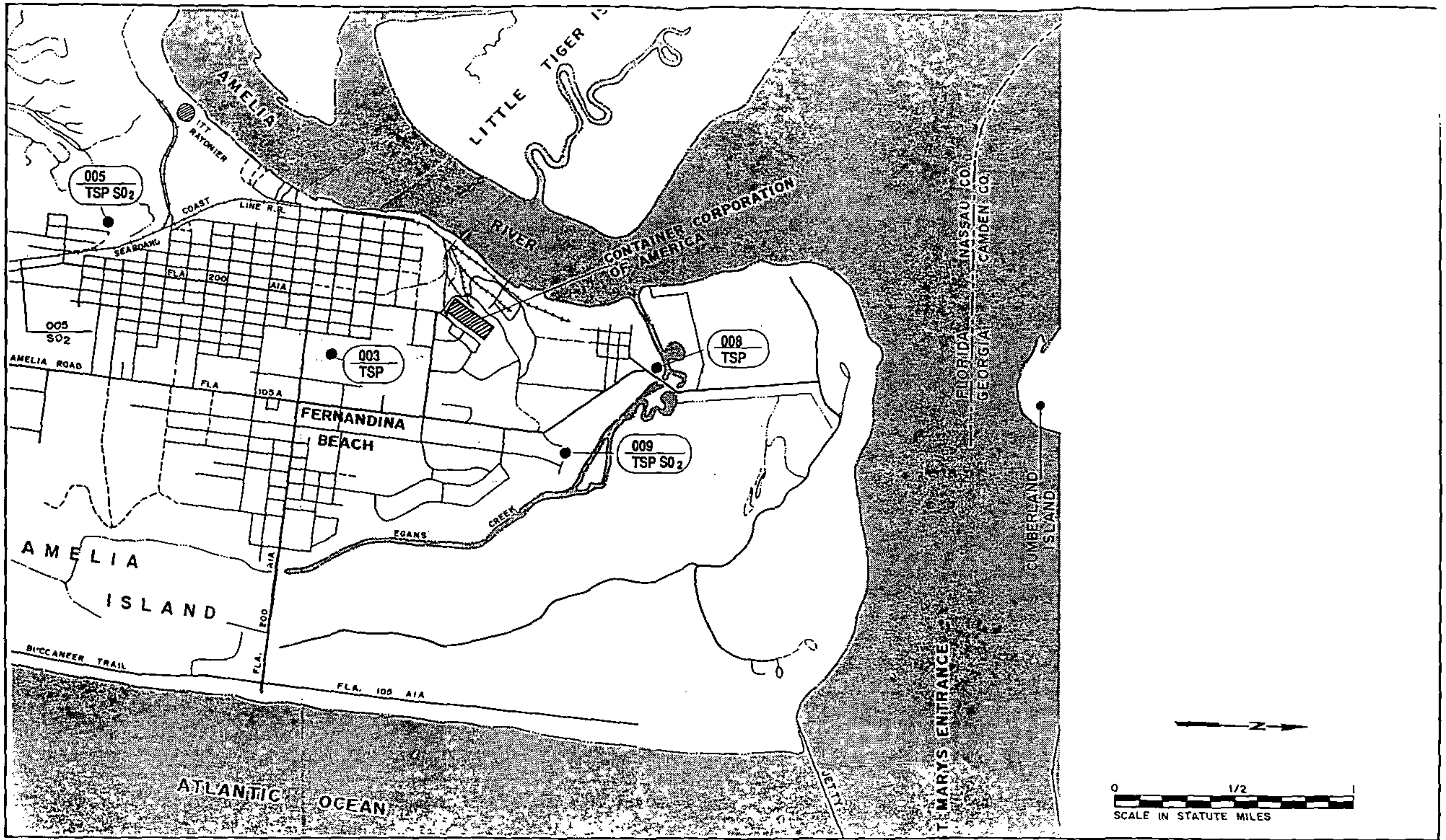

Figure 4-1 EXISTING MONITORING SITES

Table 4-8. Maximum PM(TSP) Concentrations Measured During 1989 at the Monitoring Stations in Fernandina Beach

Site Number	Location	Number of Observations	Measured Concentration ($\mu g/m^3$) 24-Hour Highest	Measured Concentration ($\mu g/m^3$) 24-Hour Second-Highest	Measured Concentration ($\mu g/m^3$) Annual Arithmetic Mean
1200-003-F02	J.C. HS, Atlantic Avenue UTM: 456.45 E, 3393.15 N	61	110	97	49
1200-005-F02	WWTP, 5th Street & Lime Avenue UTM: 455.60 E, 3391.65 N	61	201	174	61
1200-008-F02	Nassau Fertilizer Co., N. 14th St. UTM: 456.60 E, 3395.40 N	59	174	124	59
1200-009-F02	Fernandina Beach, Lift Station UTM: 457.15 E, 3394.73 N	59	102	95	45

24-hour averaging time and the annual averaging time. Using this ratio, the PM10 background concentrations are calculated as follows:

24-hour average--124 μg/m^3 x 0.48 = 60 μg/m^3
Annual average--59 μg/m^3 x 0.48 = 28 μg/m^3

4.3 RESULTS OF AAQS MODELING ANALYSIS

The predicted maximum PM10 concentrations from all modeled sources at the CCA, ITT Rayonier, and Gilman Paper facilities for the screening phase of the analysis, added to the background concentration, are presented in Table 4-9. The maximum 24-hour and annual average concentrations are predicted to be 132 and 41 μg/m^3, respectively.

Based on the results of the screening analysis, refined modeling analysis was performed. For the 24-hour averaging time, the maximum concentrations from the years 1983, 1984, and 1986 were refined. The resulting maximum concentrations are as follows (not including background):

1983	73 μg/m^3	56°, 553m	Day 143
1984	81 μg/m^3	58°, 572m	Day 225
1986	75 μg/m^3	58°, 572m	Day 277

The maximum predicted concentration, including the 24-hour background concentration of 60 μg/m^3, is 141 μg/m^3. This maximum predicted 24-hour concentration is less than the PM10 AAQS of 150 μg/m^3.

For the annual averaging time, the maximum concentrations from the years 1983 and 1986 were refined. The results are as follows (not including background):

1983	11 μg/m^3	58°, 572m
1986	14 μg/m^3	58°, 572m

The maximum refined annual concentration, including background, is 42 μg/m^3, which is less than the 50 μg/m^3 annual standard.

Table 4-9. Maximum PM10 Concentrations Predicted in the Screening Phase

Averaging Period/ Year	Maximum Concentration ($\mu g/m^3$) Total	Modeled Sources	Back-ground[b]	Location[a] Direction (degree)	Distance (km)	Julian Day
24-Hour Average[c]						
1983	127	67	60	60	0.610	206,203
1984	128	68	60	60	0.610	30,109
1985	121	61	60	60	0.610	106,142
1986	132	72	60	60	0.610	57,53
1987	123	63	60	70	0.647	34,12
Annual Average						
1983	39	11	28	60	0.610	-
1984	38	10	28	60	0.610	-
1985	38	10	28	60	0.610	-
1986	41	13	28	60	0.610	-
1987	37	9	28	60	0.610	-

Note: Florida 24-hour AAQS is 150 $\mu g/m^3$, respectively, not to be exceeded more than once per year, and annual AAQS is 50 $\mu g/m^3$.

[a] Relative to Power Boiler No. 7 stack at CCA.
[b] Background concentration estimated from monitoring data.
[c] Highest, second-highest concentration is shown for this averaging period.

4.4 RESULTS OF THE PSD PM(TSP) MODELING ANALYSIS

Maximum predicted PM(TSP) concentrations from all PSD increment expanding and consuming sources, from the screening analysis, are presented in Table 4-10. The maximum 24-hour and annual average increment consumption concentrations are predicted to be 22 and 0.3 $\mu g/m^3$, respectively. These maximum concentrations are below the 24-hour and annual PSD Class II increments of 37 and 19 $\mu g/m^3$, respectively.

Further modeling was performed to refine the predicted maximum 24-hour PM(TSP) increment consumption concentration. The maximum concentrations produced in 1983, 1984, and 1985 were refined. The results are as follows:

1983	15.9 $\mu g/m^3$	292°, 0.343km	Day 29
1984	19.6 $\mu g/m^3$	282°, 0.366km	Day 42
1985	16.8 $\mu g/m^3$	288°, 0.351km	Day 79

The maximum predicted 24-hour concentration determined in the refined analysis was 19.6 $\mu g/m^3$, which is 53 percent of the PSD Class II increment.

The PSD Class I increment analysis predicted the annual PM(TSP) PSD increment consumption to be less than 0.0 $\mu g/m^3$ and the maximum 24-hour increment consumption to be less than 0.1 $\mu g/m^3$. Results are summarized in Table 4-11. Because the maximum predicted concentrations are low compared to the PSD Class I increments, no refined modeling analysis was performed.

Table 4-10. Maximum PM(TSP) Concentrations Predicted in the Screening Phase for Comparison to PSD Class II Increments

		Location[a]		
Averaging Period/ Year	Maximum Concentration ($\mu g/m^3$)	Direction (degree)	Distance (km)	Julian Day
24-Hour Average[b]				
1983	19	300	0.339	29
1984	22	280	0.373	42
1985	20	280	0.373	79
1986	13	300	0.339	283
1987	14	70	0.647	7
Annual Average				
1983	0.0	-	-	-
1984	0.1	0.373	280	-
1985	0.2	0.347	290	-
1986	0.3	0.373	280	-
1987	0.0	-	-	-

Note: PSD Class II 24-hour increment is 37 $\mu g/m^3$, not to be exceeded more than once per year, and annual increment is 19 $\mu g/m^3$.

[a] Relative to Power Boiler No. 7 stack at CCA.

[b] Highest, second-highest concentrations are shown for this averaging period.

Table 4-11. Maximum PM(TSP) Concentrations Predicted in the Screening Phase for Comparison to PSD Class I Increments

Averaging Period/ Year	Maximum Concentration ($\mu g/m^3$)	Location[a] Direction (degree)	Location[a] Distance (km)	Julian Day
24-Hour Average[b]				
1983	0.05	262	66.961	172
1984	0.03	262	66.961	365
1985	0.03	12	73.961	185
1986	0.03	262	66.961	17
1987	0.07	275	63.699	85
Annual Average				
1983	<0.0	-	-	-
1984	<0.0	-	-	-
1985	<0.0	-	-	-
1986	<0.0	-	-	-
1987	<0.0	-	-	-

Note: PSD Class I 24-hour increment is 10 $\mu g/m^3$, not to be exceeded more than once per year, and annual increment is 5 $\mu g/m^3$.

[a] Relative to Power Boiler No. 7 stack at CCA.

[b] Highest, second-highest concentrations are shown for this averaging period.

5.0 SULFUR DIOXIDE AIR IMPACT ANALYSIS

5.1 INTRODUCTION

The SO_2 air quality impact analysis to demonstrate compliance with the Florida AAQS and PSD increments is presented in this section. AAQS and PSD increments for SO_2 were presented in Tables 2-1 and 2-2.

5.2 METHODOLOGY

5.2.1 GENERAL MODELING APPROACH

The general modeling approach for SO_2 followed the general modeling approach for the PM modeling analysis. The ISCST model was used in conjunction with 5 years of JIA meteorological data.

5.2.2 EMISSION INVENTORY

The stack, operating, and SO_2 emission data for PSD baseline sources and all future sources at CCA, ITT Rayonier, and Gilman Paper were presented in Tables 3-1 through 3-4. As in the PM modeling analysis, certain sources were eliminated from the screening analysis because of a small emission rate or were combined based on similar or identical stack parameters. These sources are identified below:

Case		Source	Screening Analysis
AAQS Analysis			
Future	CCA	SDT Nos. 4 and 5	Eliminated
	Gilman	RB Nos. 2 and 3	Combined
		Bark Boiler Nos. 1 and 2	Eliminated
		SDT Nos. 2, 3, and 4	Eliminated
		TRS Incinerator	Eliminated
	ITT	PB Nos. 1, 2, and 3	Combined

PSD Increment

Future	CCA SDT Nos. 4 and 5	Eliminated
	Gilman RB Nos. 2 and 3	Combined
Baseline	CCA PB Nos. 3 and 4	Combined
	SDT Nos. 3 and 4	Eliminated
	Gilman Bark Boiler Nos. 1 and 2	Eliminated
	SDT Nos. 2, 3, and 4	Eliminated
	LK Nos. 2 and 3	Eliminated

For refined modeling analysis, all sources were explicitly included in the modeling.

5.2.3 BUILDING DOWNWASH

The effects of building downwash at CCA were treated in the same manner as described in Section 4.2.5 for the PM modeling analysis. Building downwash information was presented in Tables 4-3 through 4-5.

5.2.4 RECEPTOR LOCATIONS

For the SO_2 screening modeling analysis, the same receptor grid employed for the PM(TSP) increment analysis was used. This consisted of a radial grid extending out 2,100 m from the PB No. 7 stack location at the CCA plant. In addition to this grid, a separate grid located to the southwest of ITT Rayonier, in directions that would align CCA and ITT (195° to 240°) and extending out to 3,300 m from CCA, was employed. This grid was used to determine if source interaction between CCA and ITT would cause exceedances of the SO_2 AAQS. Refinements were performed as needed, using the same methodology as described in Section 4.2.6 for PM.

Receptors for the Class I impact analysis were the same as those described in Section 4.2.6 for PM.

5.2.5 BACKGROUND CONCENTRATIONS

A background SO_2 concentration (i.e., impacts from sources not modeled in the analysis) is added to the maximum predicted concentration from modeled sources to produce a total concentration for comparison to the SO_2 AAQS. Background concentrations were developed from ambient monitoring data available from FDER.

Based on a review of historic monitoring data reported by FDER, there are two monitors that measured SO_2 concentrations in Fernandina Beach during 1989. The locations of these stations are shown in Figure 4-1. One of the stations is located north of the CCA mill (Station 008), and the other is located east of ITT Rayonier (Station 005). A summary of the maximum SO_2 concentrations measured at these sites is presented in Table 5-1.

The two monitoring sites are located close to major sources of SO_2 and therefore would reflect impacts from these sources. These major sources are explicitly included in the modeling analysis. In order to account for minor and distant SO_2 sources, the highest annual average concentration of 16 $\mu g/m^3$ measured at either monitor was used as the background SO_2 concentration.

5.3 RESULTS OF AAQS MODELING ANALYSIS

5.3.1 CCA SITE

The predicted maximum SO_2 concentrations caused by all modeled sources in the vicinity of the CCA facility for the screening phase of the analysis, added to the background concentration, are presented in Table 5-2. The maximum 3-hour, 24-hour, and annual average concentrations are predicted to be 783, 230, and 42 $\mu g/m^3$, respectively.

Based on the results of the screening analysis, an extended grid was added to include interaction with ITT. The maximum concentrations were predicted in the directions of 200° through 230° from CCA.

Table 5-1. SO_2 Concentrations Measured in 1989 at Monitoring Stations Located in Nassau County

Site Number	Location	Number of Observations	Measured Concentration ($\mu g/m^3$) 3-Hour Highest	3-Hour Second Highest	24-Hour Highest	24-Hour Second-Highest	Annual
1200-005-F02	WWTP, 5th Street & Lime Avenue UTM: 455.60 E, 3391.65 N	8,517	977	556	309	210	16
1200-009-F02	Fernandina Beach Lift Station UTM: 457.15 E, 3394.73 N	8,665	162	157	64	53	12

Table 5-2. Maximum SO_2 Concentrations Predicted in the Screening Phase - CCA Site Grid

	Maximum Concentration ($\mu g/m^3$)			Location[a]		
Averaging Period/ Year	Total	Modeled Sources	Background[b]	Direction (degree)	Distance (km)	Julian Day/Period
3-Hour Average[c]						
1983	738	722	16	220	2.100	201/5
1984	674	658	16	200	2.100	67/5
1985	783	767	16	210	2.100	230/4
1986	763	747	16	210	2.100	190/5
1987	737	721	16	200	2.100	232/4
24-Hour Average[c]						
1983	183	167	16	200	1.700	249
1984	217	201	16	210	1.700	225
1985	230	214	16	210	2.100	115
1986	192	176	16	210	1.700	201
1987	203	187	16	210	1.700	279
Annual Average						
1983	40	24	16	230	0.472	-
1984	38	22	16	210	1.700	-
1985	40	24	16	230	0.472	-
1986	42	26	16	60	0.610	-
1987	41	25	16	230	0.472	-

Note: Florida 3-hour and 24-hour AAQS are 1,300 $\mu g/m^3$ and 260 $\mu g/m^3$, respectively, not to be exceeded more than once per year, and annual AAQS is 60 $\mu g/m^3$.

[a] Relative to Power Boiler No. 7 stack at CCA.

[b] Background concentration estimated from monitoring data.

[c] Highest, second-highest concentration is shown for this averaging period.

5.3.2 EXTENDED GRID

The predicted maximum SO_2 concentrations caused by all modeled sources in the extended grid over ITT for the screening phase of the analysis, added to the background concentration, are presented in Table 5-3. The maximum 3-hour, 24-hour, and annual average concentrations are predicted to be 952, 297, and 45 $\mu g/m^3$, respectively.

The results of the screening analysis indicated that 24-hour exceedances occurred for the years 1983, 1984, and 1986. Refinements and facility contributions were performed for each 24-hour exceedance, as summarized below:

Year	Modeled Concentration ($\mu g/m^3$)	CCA ($\mu g/m^3$)	ITT ($\mu g/m^3$)	Distance (km)	Direction (°)	Julian Day
1983	282	50	232	4.0	220	283
1984	254	36	217	4.3	218	262
	250	51	200	4.6	220	361
1986	259	0	259	2.7	230	188

A 3-hour refinement was made for 1986. The results are summarized as follows:

Year	Modeled Concentration ($\mu g/m^3$)	CCA ($\mu g/m^3$)	ITT ($\mu g/m^3$)	Distance (km)	Direction (°)	Julian Day Period
1986	936	0	936	2.4	205	189/4

5.4 RESULTS OF THE PSD SO_2 MODELING ANALYSIS

Maximum predicted SO_2 concentrations caused by all PSD increment expanding and consuming sources, from the screening analysis, are presented in Table 5-4. The maximum 3-hour, 24-hour, and annual average increment

Table 5-3. Maximum SO_2 Concentrations Predicted in the Screening Phase - Interaction Grid Aligned with ITT

Averaging Period/ Year	Maximum Concentration (μg/m³) Total	Modeled Sources	Background[b]	Location[a] Direction (degree)	Distance (km)	Julian Day/Period
3-Hour Average[c]						
1983	757	741	16	205	2.400	221/4
1984	849	833	16	230	2.700	218/6
1985	829	813	16	230	2.400	208/5
1986	952	936	16	205	2.400	189/4
1987	759	743	16	195	2.100	80/5
24-Hour Average[c]						
1983	297	281	16	225	3.900	283
1984	265	249	16	220	4.500	361
1985	247	231	16	235	2.700	195
1986	275	259	16	230	2.700	188
1987	232	216	16	200	2.700	194
Annual Average						
1983	42	26	16	220	3.600	-
1984	43	27	16	245	2.700	-
1985	42	26	16	230	3.300	-
1986	44	28	16	235	2.700	-
1987	45	29	16	195	2.700	-

Note: Florida 3-hour and 24-hour AAQS are 1,300 μg/m³ and 260 μg/m³, respectively, not to be exceeded more than once per year, and annual AAQS is 60 μg/m³.

[a] Relative to Power Boiler No. 7 stack at CCA.

[b] Background concentration estimated from monitoring data.

[c] Highest, second-highest concentration is shown for this averaging period.

Table 5-4. Maximum SO_2 Concentrations Predicted in the Screening Phase for Comparison to PSD Class II Increments

Averaging Period/ Year	Maximum Concentration ($\mu g/m^3$)	Location[a]		Julian Day/Period
		Direction (degree)	Distance (km)	
3-Hour Average[b]				
1983	108	260	0.526	59/1
1984	132	260	0.526	160/8
1985	127	260	0.526	245/7
1986	76	260	0.526	133/7
1987	86	260	0.526	200/8
24-Hour Average[b]				
1983	14	260	0.526	59
1984	20	260	0.526	160
1985	21	260	0.526	78
1986	11	260	1.700	59
1987	11	280	2.100	316
Annual Average				
1983	<0.0	-	-	-
1984	<0.0	-	-	-
1985	<0.0	-	-	-
1986	<0.0	-	-	-
1987	<0.0	-	-	-

Note: PSD Class II increments are as follows:

3-hour = 512 $\mu g/m^3$
24-hour = 91 $\mu g/m^3$
Annual = 20 $\mu g/m^3$

[a] Relative to Power Boiler No. 7 stack at CCA.

[b] Highest, second-highest concentrations are shown for this averaging period.

consumption concentrations are predicted to be 132, 21, and 0.0 $\mu g/m^3$, respectively. These maximum concentrations are below the 3-hour, 24-hour, and annual PSD Class II increments of 512, 91, and 20 $\mu g/m^3$, respectively.

Further modeling was performed to refine the predicted maximum 3-hour and 24-hour SO_2 concentrations. The refined concentrations, which are well below the Class II allowable increments, are as follows:

3-hour:	147 $\mu g/m^3$	266°, 0.465 km	Day 84 (7)
	148 $\mu g/m^3$	262°, 0.503 km	Day 267 (1)
24-hour:	23 $\mu g/m^3$	262°, 0.503 km	Day 78
	24 $\mu g/m^3$	262°, 0.503 km	Day 268

The PSD Class I increment analysis predicted maximum 3-hour, 24-hour, and annual SO_2 PSD increment consumption to be less than 8.4, 1.2, and 0.0 $\mu g/m^3$. The Class I impact results are presented in Table 5-5. Because the maximum predicted concentrations are low compared to the PSD Class I increments, no refined modeling analysis was performed.

Table 5-5. Maximum SO_2 Concentrations Predicted in the Screening Phase for Comparison to PSD Class I Increments

Averaging Period/ Year	Maximum Concentration ($\mu g/m^3$)	Location[a] Direction (degree)	Location[a] Distance (km)	Julian Day/Period
3-Hour Average[b]				
1983	1.8	12	73.961	150/5
1984	6.7	12	73.961	200/3
1985	6.8	12	73.961	185/3
1986	2.2	12	73.961	39/5
1987	8.4	275	63.699	85/4
24-Hour Average[b]				
1983	0.3	262	66.961	91
1984	0.9	262	66.961	204
1985	0.8	12	73.961	277
1986	0.4	12	73.961	39
1987	1.2	275	63.699	85
Annual Average				
1983	<0.0	-	-	-
1984	<0.0	-	-	-
1985	<0.0	-	-	-
1986	<0.0	-	-	-
1987	<0.0	-	-	-

Note: PSD Class I increments are as follows:

3-hour = 25 $\mu g/m^3$
24-hour = 5 $\mu g/m^3$
Annual = 2 $\mu g/m^3$

[a] Relative to Power Boiler No. 7 stack at CCA.
[b] Highest, second-highest concentrations are shown for this averaging period.

6.0 NITROGEN OXIDES AIR IMPACT ANALYSIS

6.1 METHODOLOGY

6.1.1 GENERAL

The general modeling approach for NO_x followed the general modeling approach used for PM and SO_2. The ISCST model was used in conjunction with 5 years of meteorological data from JIA. In the case of NO_2, the AAQS and PSD increments are in terms of annual averages, and therefore only the annual averaging time was considered in the modeling.

6.1.2 EMISSION INVENTORY

In the case of NO_2, only CCA and ITT Rayonier were included in the emission inventory. For addressing compliance with AAQS, other sources such as Gilman Paper, mobile sources, etc., were accounted for by selection of a conservative NO_2 background concentration (see Section 6.1.5). In the case of NO_2 PSD increment consumption, only CCA is increment consuming.

The stack, operating, and annual average NO_x emission data for CCA and ITT Rayonier were presented in Tables 3-1 through 3-4. In the AAQS modeling analysis, the three power boilers were combined since they have identical stack parameters. All other sources were modeled as shown in the inventory tables. Annual average emission rates were used for NO_x modeling since the AAQS and PSD increments are expressed as an annual average.

6.1.3 BUILDING DOWNWASH

The effects of building downwash were considered in the NO_2 analysis in the same manner as the PM (TSP)/PM10 analysis. Building parameters were presented in Tables 4-3 through 4-5.

6.1.4 RECEPTOR LOCATIONS

Receptor locations used for the NO_2 screening modeling were identical to those used in the PM and SO_2 analysis, except that the farthest receptor ring considered was 1.7 km from CCA. Since maximum NO_2 concentrations were predicted for receptors along CCA plant property, no further refinements were performed.

6.1.5 BACKGROUND CONCENTRATIONS

A background NO_2 concentration (i.e., impacts from sources not modeled in the analysis) is added to the maximum predicted concentration from modeled sources to produce a total concentration for comparison to the NO_2 AAQS. Background concentrations were developed from ambient monitoring data available from FDER.

Based on a review of historic monitoring data reported by the FDER, there were no monitors that measured NO_2 concentrations in Nassau County during 1989. However, there is one monitor located in Jacksonville. A summary of the NO_2 concentrations measured at this site in 1989 is presented in Table 6-1.

Since the NO_2 monitor in Jacksonville would measure the impacts caused by considerable vehicular traffic, as well as many major air emission sources, data from this site was used to represent a conservative NO_2 background concentration. The annual average measured at Kooker Park of 29 $\mu g/m^3$ was used as the background concentration.

6.2 <u>RESULTS OF AAQS MODELING ANALYSIS</u>

The predicted maximum annual average NO_2 concentration caused by all modeled sources at the CCA and ITT Rayonier facilities for the screening phase of the analysis, added to the background concentration, are presented in Table 6-2. The maximum annual average concentration is predicted to be 76 $\mu g/m^3$. This maximum concentration is below the NO_2 AAQS of 100 $\mu g/m^3$, annual average.

Based on the results of the screening analysis, refined modeling analysis was performed. The maximum concentration from year 1986 was refined and

Table 6-1. NO_x Concentrations Measured in 1989 at Monitoring Stations Located in Nassau County

Site Number	Location	Number of Observations	Measured Annual Concentration ($\mu g/m^3$)
1960-032-H02	Kooker Park, Jacksonville	7,815	29

Table 6-2. Maximum NO_2 Concentrations Predicted in the Screening Phase

	Maximum Concentration ($\mu g/m^3$)			Location[a]	
Averaging Period/ Year	Total	Modeled Sources	Background[b]	Direction (degree)	Distance (km)
<u>Annual Average</u>					
1983	69	40	29	60	0.610
1984	65	36	29	60	0.610
1985	66	37	29	60	0.610
1986	76	47	29	60	0.610
1987	63	34	29	60	0.610

Note: Florida AAQS is 100 $\mu g/m^3$, annual average.

[a] Relative to Power Boiler No. 7 stack at CCA.
[b] Background concentration estimated from monitoring data.

was determined to be 54 μg/m³, and was predicted at the CCA plant property boundary (572 m) in a direction of 58°. With the background concentration, the refined maximum concentration is 83 μg/m³, which is below the Florida AAQS of 100 μg/m³.

6.3 RESULTS OF THE PSD NO_2 MODELING ANALYSIS

The maximum predicted NO_2 concentrations caused by all PSD increment expanding and consuming sources, from the screening analysis, is predicted to be less than 0.0 μg/m³. The annual PSD Class II increment is 25 μg/m³. Since the predicted concentration is less than 0.0 μg/m³, no further refinements were performed.

The PSD Class I increment analysis predicted the annual NO_2 PSD increment consumption to be less than 0.04 μg/m³. Results are summarized in Table 6-3. Because the maximum predicted concentrations are low compared to the PSD Class I increment of 2.5 μg/m³, no refined modeling analysis was performed.

Table 6-3. Maximum NO_2 Concentrations Predicted in the Screening Phase for Comparison to PSD Class I Increments

Averaging Period/ Year	Maximum Concentration ($\mu g/m^3$)	Location[a] Direction (degree)	Location[a] Distance (km)
Annual Average			
1983	0.02	262	66.961
1984	0.03	262	66.961
1985	0.03	262	66.961
1986	0.02	262	66.961
1987	0.03	262	66.961

Note: PSD Class I increment is 2.5 $\mu g/m^3$, annual average.

[a] Relative to Power Boiler No. 7 stack at CCA.

7.0 CARBON MONOXIDE AIR IMPACT ANALYSIS

7.1 INTRODUCTION

The CO air quality impact analysis to demonstrate compliance with the Florida AAQS is presented in this section. AAQS for CO were presented in Tables 2-1 and 2-2. There is no PSD increment for CO.

7.2 METHODOLOGY

7.2.1 GENERAL MODELING APPROACH

The general modeling approach for CO followed the general modeling approach for the PM modeling analysis. The ISCST model was used in conjunction with 5 years of JIA meteorological data.

7.2.2 EMISSION INVENTORY

Only CCA was considered in the CO modeling analysis. The stack, operating, and CO emission data for all future sources at CCA were presented in Tables 3-1 through 3-4. All CO sources were explicitly included in the modeling analysis.

7.2.3 BUILDING DOWNWASH

The effects of building downwash at CCA were treated in the same manner as described in Section 4.2.5 for the PM modeling analysis. Building downwash information was presented in Tables 4-3 through 4-5.

7.2.4 RECEPTOR LOCATIONS

For the CO screening modeling analysis, the same receptor grid employed for the PM(TSP) increment analysis was used. This consisted of a radial grid extending out 2,100 m from the PB No. 7 stack location at the CCA plant.

7.3 RESULTS OF AAQS MODELING ANALYSIS

The predicted maximum CO concentrations caused by all modeled sources at the CCA for the screening phase of the analysis are presented in Table 7-1. The maximum 1-hour and 8-hour concentrations are predicted to be 629 and

Table 7-1. Maximum CO Concentrations Predicted in the Screening Phase

Averaging Period/ Year	Maximum Concentration Caused by CCA (µg/m³)	Location[a]		
		Direction (degree)	Distance (km)	Julian Day/Period
1-Hour Average[b]				
1983	521	60	0.610	319/24
1984	605	270	0.431	348/19
1985	544	70	0.700	91/24
1986	629	280	0.373	94/22
1987	525	70	0.700	207/23
8-Hour Average[b]				
1983	249	70	0.647	77/16
1984	248	60	0.610	29/8
1985	211	60	0.610	335/16
1986	261	60	0.610	336/24
1987	247	70	0.647	34/8

Note: Florida 1-hour AAQS is 40,000 µg/m³, and 8-hour is 10,000 µg/m³ not to be exceeded more than once per year.

[a] Relative to Power Boiler No. 7 stack at CCA.

[b] Highest, second-highest concentration is shown for this averaging period.

261 μg/m3, respectively. These maximum concentrations are below the CO significance level of 2,000 μg/m3, 1-hour average, and 500 μg/m3, 8-hour average. Based on the results of the screening analysis, no refined modeling analysis was performed. CCA impacts are below significance levels, and no further modeling is required.

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APPENDIX A

Calculation of Baseline NO_x Emissions for CCA

SUMMARY OF PRODUCTION DATA AT CCA

Parameter	1989	1988
BLS(TPY)		
No. 4 RB	340,337	332,770
No. 5 RB	415,967	406,718
	756,304	739,488
Bark/Wood (TPY)		
No. 4 Power Boiler	-	13,475
No. 5 Power Boiler	347,495	357,000
	347,495	370,475
No. 6 Fuel Oil (10^3 gal)		
No. 4 Power Boiler	-	99
No. 5 Power Boiler	3,527(2.5)	2,999
(Excludes Lime Kilns)	3,527(2.5)	3,098(2.5)
Lime Production (TPY)		
No. 2 LK	50,831	60,000
No. 3 LK	75,751	76,000
No. 4 LK	-	-
	126,582	136,000
Pulp (TPY)		
Batch Digesters	225,797	214,579
Ramyr	471,112	474,809
	696,909	689,388
Coal		
No.7 Power Boiler (1.1 lb/10^6 Btu) (12,500 Btu/lb	248,621	230,644

CURRENT ACTUAL NO_x EMISSIONS

Current actual NO_x emission calculations are based on actual mill operating data over the past 2 years (1988 and 1989). The NO_x emission sources at CCA include the following:

1. Power Boiler No. 5,
2. Power Boiler No. 7,
3. Recovery Boiler No. 4,
4. Recovery Boiler No. 5,
5. Lime Kiln.

I. Power Boiler No. 5

No. 6 oil burning in Power Boiler No. 5:
1988 -- 3.527 x 10^6 gal
1989 -- 2.999 x 10^6 gal
Average -- 3.263 x 10^6 gal

Bark Burning
Bark burning in Power Boiler No. 5:
1988 -- 357,000 TPY
1989 -- 347,495 TPY
Average -- 352,248 TPY

1. Fuel Oil Burning
   AP-42: 67 lb/10^3 gal
   3.263 x 10^6 gal x 67/10^3 / 2,000 = 109.3 TPY

2. Bark Burning
   From AP-42: 2.8 lb/ton bark
   352,248 TPY x 2.8 lb/ton / 2,000 = 493.1 TPY

3. Total
   109.3 + 493.1 = 602.4 TPY

II. Power Boiler No. 7

Power Boiler No. 7 burns compliance coal. Average sulfur content was 1.1 lb/10^6 Btu in 1988 and 1989. Total coal burned in the boiler was 248,621 tons in 1989 and 230,644 tons in 1988, for an average of 239,633 TPY.

The coal averages 12,500 Btu/lb.
239,633 TPY x 2,000 x 12,500 Btu/lb = 5.99 x 10^{12} Btu/yr

AP-42 emission factor for dry-bottom pulverized coal boiler:
21 lb/ton.

Based on coal at 12,500 Btu/lb, this results in 0.84 lb/10^6 Btu. Boiler is limited to 0.6 lb/10^6 Btu by NSPS. Therefore, use NSPS limit:

5.99×10^{12} Btu x 0.6 lb/10^6 Btu / 2,000 = 1,797.0 TPY

III. Recovery Boiler No. 4

From 1980 NCASI paper on NO_x emissions, NO_x emissions can be as high as 3.30 lb/ton ADUP.

Pulp production:	1988 --	689,388 TPY
	1989 --	696,909 TPY
	Average --	693,149 TPY

Total NO_x = 693,149 TPY x 3.30 lb/ton / 2,000 = 1,143.7 TPY
Prorate total emissions between the two recovery boilers based on black liquor solids (BLS) fired.

	RB No. 4	RB No. 5	Total	
1988	- 332,770	406,718	739,488	Tons
1989	- 340,337	415,967	756,304	Tons
Average	- 336,554	411,343	747,896	Tons
	(45.0%)	(55.0%)		

Recovery Boiler No. 4 NO_x = 1,143.7 TPY x 0.45 = 514.7 TPY

IV. Recovery Boiler No. 5

Based on Recovery Boiler No. 4 calculations:
Recovery Boiler No. 5 NO_x = 1,143.7 TPY x 0.55 = 629.0 TPY

V. Lime Kiln No. 4

Since new lime kiln started operation in 1990, there are no historical operating data. Therefore, actual emissions are assumed equal to permitted emissions. From construction permit:

NO_x = 819.9 TPY

APPENDIX B

Calculation of Maximum Future Emissions
Container Corporation of America, Inc.

FUTURE MAXIMUM EMISSIONS

I. Power Boiler No. 5

A. PM
Based on current permit limit--137.1 lb/hr, 598.9 TPY

B. PM10
PB No. 5 is bark/oil fired boiler with ESP control. AP-42 contains no PM10 information for bark firing with ESP. Therefore, PM10 factors for coal firing with ESP were used. PM10 is 67 percent of PM.

137.1 lb/hr x 0.67 = 91.9 lb/hr
598.9 TPY x 0.67 = 401.3 TPY

C. SO_2
Current permit limit is 2,133.4 lb/hr; 9,318.7 TPY. This is based on 4,417 gal/hr No. 6 fuel oil and 3.0 percent sulfur. In future, CCA will limit sulfur content to 2.5 percent. Maximum SO_2 emissions using AP-42 factor of 157(S) lb/1,000 gal:

4,417 gal/hr x 157 (2.5)/1,000 = 1,733.7 lb/hr

For a 24-hour period, CCA will limit fuel oil burning to 3,850 gal/hr.

3,850 x 157 (2.5)/1,000 = 1,511 lb/hr

Annual maximum = 1,511 lb/hr x 8,760 hr/yr / 2,000 lb/ton
= 6,618.2 TPY

D. NO_x
Base on AP-42 factors

1. No. 6 Fuel Oil
   Factor is 67 lb/1,000 gal
   Permit -- 4,417 gal/hr
   4,417 gal/hr x 67 lb/1,000 gal = 296.0 lb/hr = 1,296.5 TPY
2. Bark
   Factor is 2.8 lb/ton bark
   Permit -- 457 x 10^6 Btu/hr from bark
   457 x 10^6 Btu/hr/4,250 Btu/lb / 2,000 = 53.76 TPH bark
   53.76 TPH x 2.8 lb/ton = 150.5 lb/hr

E. CO
1. No. 6 Fuel Oil
   Base on AP-42 factors
   Factor is 5 lb/1,000 gal
   4,417 gal/hr x 5 lb/1,000 gal = 22.1 lb/hr
2. Bark
   From NCASI Technical Bulletin No. 109, maximum is 0.60 lb/10^6 Btu
   457 x 10^6 x 0.60/10^6 = 274.2 lb/hr = 1,201.0 TPY

II. Power Boiler No. 7

A. PM
Based on permit limit -- 102.1 lb/hr, 447.2 TPY

B. PM10
PB No. 7 is coal fired with ESP control
From AP-42, 67 percent of PM is PM10
102.1 lb/hr x 0.67 = 68.4 lb/hr = 299.6 TPY

C. SO_2
Based on permit limit--1,225.2 lb/hr, 5,366.4 TPY

D. NO_x
Based on permit limit--612.6 lb/hr, 2,683.2 TPY

E. CO
Based on permit limit--93.6 lb/hr, 410.0 TPY

III. Recovery Boiler No. 4

A. PM
Based on permit limit -- 137.5 lb/hr, 602.3 TPY

B. PM10
RB No. 4 is controlled by ESP.
From AP-42, 75 percent of PM is PM10
137.5 lb/hr x 0.75 = 103.1 lb/hr, 451.7 TPY

C. SO_2
Based on 1980 permit application--278.6 lb/hr; 1,220.3 TPY

D. NO_x
Based on NCASI factor of 3.30 lb/ton (1980 NCASI Paper on NO_x emissions)
Maximum pulp production = 137,500 lb/hr BLS / 2,667 lb BLS/ton ADUP
= 51.56 TPH pulp
Maximum NO_x = 51.56 TPH x 3.3 lb/ton = 170.1 lb/hr

Annual NO_x based on maximum pulp production for mill of 2,300 TPD.
2,300 TPD x 365 days/yr x 3.30 lb/ton / 2,000 = 1,385.2 TPY
Divide between Recovery Boiler No. 4 and Recovery Boiler No. 5 based on permitted BLS input.
1,385.2 TPY x 137,500 / (137,500 + 156,780) = 647.2 TPY

E. CO
Based on AP-42 factor of 11.0 lb/ton
Maximum CO = 51.56 TPH x 11.0 lb/ton = 567.2 lb/hr
2,300 TPD x 365 x 11.0 / 2,000 = 4,617.3 TPY
Recovery Boiler No. 4 = 4,617.3 TPY x 137,500/294,280
= 2,157.4 TPY

IV. Recovery Boiler No. 5

A. PM
Based on permit limit -- 83.3 lb/hr, 356.9 TPY

B. PM10
RB No. 5 is controlled by ESP.
From AP-42, 75 percent of PM is PM10
83.3 lb/hr x 0.75 = 62.5 lb/hr
356.9 TPY x 0.75 = 267.7 TPY

C. SO_2
Based on 1977 PSD permit application and 8,568 hr/yr--
247.6 lb/hr; 1,060.7 TPY

D. NO_x
Based on NCASI factor of 3.30 lb/ton.
Maximum pulp production = 156,780 lb/hr BLS / 2,667 lb BLS/ton ADUP
= 58.79 TPH pulp
Maximum NO_x = 58.79 TPH x 3.3 lb/ton = 194.0 lb/hr
Annual NO_x based on maximum pulp production for mill of 2,300 TPD.
2,300 TPD x 365 days/yr x 3.30 lb/ton / 2,000 = 1,385.2 TPY
Divide between Recovery Boiler No. 4 and Recovery Boiler No. 5 based on permitted BLS input.
1,385.2 TPY x 156,780/(137,500 + 156,780) = 738.0 TPY

E. CO
Based on AP-42 factor of 11.0 lb/ton
Maximum CO = 58.79 TPH x 11.0 lb/ton = 646.7 lb/hr
2,300 TPD x 365 x 11.0 / 2,000 = 4,617.3 TPY
Recovery Boiler No. 5 = 4,617.3 TPY x 156,780/294,280
= 2,459.9 TPY

V. Smelt Dissolving Tank No. 4

A. PM
Based on current permit limit--28.5 lb/hr, 124.8 TPY

B. PM10
SDT No. 4 is controlled by wet scrubber.
Based on AP-42, Table 10.1-7, PM10 is 89.5 percent of PM emissions.
28.5 lb/hr x 0.895 = 25.5 lb/hr = 111.7 TPY

C. SO_2
AP-42 factor is 0.2 lb/ton pulp, uncontrolled.
Wet scrubber estimated to provide at least 50 percent control.
51.56 TPH x 0.2 lb/ton x 0.50 = 5.2 lb/hr = 22.6 TPY

VI. Smelt Dissolving Tank No. 5

A. PM

Based on current permit limit--15.7 lb/hr, 67.2 TPY

B. PM10

SDT No. 5 is controlled by wet scrubber.
Based on AP-42, Table 10.1-7, PM10 is 89.5 percent of PM emissions.
15.7 lb/hr x 0.895 = 14.1 lb/hr = 60.1 TPY

C. SO_2

AP-42 factor is 0.2 lb/ton pulp, uncontrolled.
Wet scrubber estimated to provide at least 50 percent control.
58.79 TPH x 0.2 lb/ton x 0.50 = 5.9 lb/hr = 25.3 TPY

VII. Lime Kiln No. 4

Maximum emissions based on construction permit limits or permit application:

PM--43.5 lb/hr, 190.0 TPY
PM10--38.5 lb/hr, 168.2 TPY
SO_2--26.8 lb/hr, 117.1 TPY
NO_x--187.7 lb/hr, 819.9 TPY
CO--78.8 lb/hr, 29.8 TPY
VOC--15.2 lb/hr, 44.7 TPY
TRS--2.63 lb/hr, 11.5 TPY