RECEIVED

NOV 13 2000

STATE OF FLORIDA
DEPT. OF ENV. PROTECTION
NORTHEAST DISTRICT-JAX

AMBIENT IMPACT ANALYSIS FOR THE BUCKEYE FLORIDA FOLEY MILL

Prepared For:

Buckeye Florida, L.P.
Foley, Florida

Prepared By:

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

November 2000
0037580Y/F1

DISTRIBUTION:
5 Copies - FDEP
2 Copies - Buckeye
2 Copies - Golder

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF TABLES

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF FIGURES

1.0 INTRODUCTION

Buckeye Florida, Limited Partnership (Buckeye) has proposed changes to its pulp mill located in Foley, Taylor County, Florida. In separate air construction permit applications submitted recently to the Florida Department of Environmental Protection (FDEP), Buckeye has proposed two projects:

- Implementation of the No. 1 Power Boiler as a backup control device for Low Volume High Concentration (LVHC) non-condensable gases (NCGs), to comply with Maximum Achievable Control Technology (MACT) regulations promulgated by the U.S. Environmental Protection Agency (EPA); and
- Replacement of the No. 2 Mill Brown Stock Washer and other changes to the Brown Sock Washing System, which will result in reduction in pulping liquor losses to the wastewater treatment system, a pollution prevention project according to EPA. Due to this project, a small increase in the permitted black liquor solids (BLS) throughput capacity is required for the No. 4 Recovery Boiler and the No. 4 Smelt Dissolving Tank. This in turn will affect other downstream emission units, i.e., the No. 4 Lime Kiln, the causticizing system, lime bins and lime slakers.

These projects may result in an increase of emissions of particulate matter less than 10 microns (PM_{10}), sulfur dioxide (SO_2), carbon monoxide (CO), and nitrogen dioxide (NO_2).

To accommodate these separate requests by the FDEP, atmospheric dispersion modeling analyses of the Buckeye Foley Mill have been conducted in support of these permit applications and combined in this report. The air dispersion modeling analysis demonstrates that these projects will be in compliance with ambient air quality standards (AAQS) and prevention of significant deterioration (PSD) Class II and Class I allowable increments. Air dispersion modeling for SO_2 emissions were considered for the proposed changes to the No. 1 Power Boiler. Air dispersion modeling for SO_2, PM_{10}, CO, and NO_x emissions were modeled for the proposed changes to the Brown Stock Washing System project.

This report contains the technical information and analysis developed in accordance with the PSD regulations as promulgated by the EPA and implemented through delegation to the FDEP. It presents an assessment of air quality impacts associated with the Buckeye Foley Mill.

The existing applicable national and Florida Ambient Air Quality Standards (AAQS) are presented in Table 1-1. Primary national AAQS were promulgated to protect the public health, and secondary national AAQS were promulgated to protect the public welfare from any known or anticipated adverse effects associated with the presence of pollutants in the ambient air.

Florida has adopted state AAQS in Rule 62-204.240. These standards are the same as the national AAQS, except in the case of SO_2. For SO_2, Florida has adopted the former 24-hour secondary standard of 260 $\mu g/m^3$, and former annual average secondary standard of 60 $\mu g/m^3$.

EPA has promulgated allowable PSD air quality increments, which limit increases in air quality levels above an air quality baseline concentration level for SO_2, PM_{10}, and NO_2. Increases above these increments would constitute significant deterioration. The EPA class designations and allowable PSD increments are presented in Table 1-1. The magnitude of the allowable increment depends on the classification of the area in the source is located or will have an impact. Three classifications are designated based on criteria established in the Clean Air Act Amendments. Congress promulgated areas as Class I (international parks, national wilderness areas, and memorial parks larger than 5,000 acres and national parks larger than 6,000 acres) or as Class II (all areas not designated as Class I). No Class III areas, which would be allowed greater deterioration than Class II areas, were designated. The State of Florida has adopted the EPA class designations and allowable PSD increments for SO_2, PM_{10}, and NO_2.

EPA has also adopted significant impact levels for air quality modeling purposes. These are shown in Table 1-1. These levels establish threshold impact levels to determine if a proposed project causes an insignificant impact upon ambient air quality, and therefore can be exempted from a detailed air modeling analysis. EPA has proposed significant impact levels for Class I areas. The EPA action to incorporate Class I significant impact levels in the PSD process is part of implementing new source review provisions of the 1990 Clean Air Act Amendments.

Taylor County has been designated as an attainment or unclassifiable area for all criteria pollutants. The county is also classified as a PSD Class II area for PM_{10}, SO_2, and NO_2. The nearest PSD Class I areas are the St. Marks National Wilderness Area (NWA) and the Bradwell Bay NWA, located about 43 km and 96 km to the west of the Buckeye Foley Mill, respectively.

The air quality impact analysis demonstrates that emissions from the Buckeye Foley Mill will not result in ambient concentrations above the AAQS or the PSD Class II or Class I increments.

This report is divided into four major sections, including this introduction:

- Section 2.0 presents a description of the Buckeye Foley facility, along with source emission rates and stack parameters;
- Section 3.0 presents existing air quality data for purposes of determining suitable background air quality concentrations for each pollutant;
- Section 4.0 presents the air modeling methodology, emissions inventories and data used in the analysis;
- Section 5.0 presents the results that demonstrate compliance of the Buckeye Foley Mill with AAQS and PSD increments.

Table 1-1. National and State AAQS, Allowable PSD Increments, and Significant Impact Levels

		AAQS ($\mu g/m^3$)			PSD Increments ($\mu g/m^3$)		Significant Impact Levels[d] ($\mu g/m^3$)	
Pollutant	Averaging Time	National Primary Standard	National Secondary Standard	State of Florida	Class I	Class II	Class I	Class II
Particulate Matter[a] (PM_{10})	Annual Arithmetic Mean	50	50	50	4	17	0.2	1
	24-Hour Maximum	150[b]	150[b]	150[b]	8	30	0.3	5
Sulfur Dioxide	Annual Arithmetic Mean	80	NA	60	2	20	0.1	1
	24-Hour Maximum	365[b]	NA	260[b]	5	91	0.2	5
	3-Hour Maximum	NA	1,300[b]	1,300[b]	25	512	0.3	25
Carbon Monoxide	8-Hour Maximum	10,000[b]	10,000[b]	10,000[b]	NA	NA	NA	500
	1-Hour Maximum	40,000[b]	40,000[b]	40,000[b]	NA	NA	NA	2,000
Nitrogen Dioxide	Annual Arithmetic Mean	100	100	100	2.5	25	0.1	1
Ozone[a]	1-Hour Maximum	235[c]	235[c]	235[c]	NA	NA	NA	NA
Lead	Calendar Quarter Arithmetic Mean	1.5	1.5	1.5	NA	NA	NA	NA

Note: Particulate matter (PM_{10}) = particulate matter with aerodynamic diameter less than or equal to 10 micrometers.

NA = Not applicable, i.e., no standard exists.

[a] On July 18, 1997, EPA promulgated revised AAQS for particulate matter and ozone. For particulate matter, $PM_{2.5}$ standards were introduced with a 24-hour standard of 65 $\mu g/m^3$ (3-year average of 98th percentile) and an annual standard of 15 $\mu g/m^3$ (3-year average at community monitors). Implementation of these standards are many years away. The ozone standard was modified to be 0.08 ppm for 8-hour average; achieved when 3-year average of 99th percentile is 0.08 ppm or less. FDEP has not yet adopted these standards.

[b] Short-term maximum concentrations are 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 fewer than 1.

[d] Maximum concentrations. EPA has proposed Class I significant impact levels.

Sources: Federal Register, Vol. 43, No. 118, June 19, 1978. 40 CFR 50. 40 CFR 52.21. Rule 62-204, F.A.C.

2.0 PROJECT DESCRIPTION

2.1 SITE DESCRIPTION AND PROPOSED PROJECTS

The Buckeye Foley Mill is located in Perry, Taylor County, Florida. A site map of the area, showing the Buckeye plant boundaries, is provided in Figure 2-1. The Buckeye Foley Mill is a kraft pulp mill which has two power boilers, two bark boilers, three recovery boilers, three smelt dissolving tanks, a lime kiln, two lime slakers, two lime storage bins, a tall oil plant, and other kraft pulping equipment. This document presents the air dispersion modeling analysis for two air construction permit applications previously submitted to FDEP by Buckeye: the No. 2 Mill Brown Stock Washer System application and the application for the No. 1 Power Boiler used as a backup NCG combustion device for LVHC gases. These projects are described briefly below.

2.1.1 NO. 2 BROWN STOCK WASHER SYSTEM

The proposed project will change the No. 2 Mill Brown Stock Washing System in two ways. First, the existing 3-stage rotary drum washer will be replaced with a new multi-stage, pressure-type brown stock washer. Second, the existing decker will be eliminated. The benefit to the environment will be to reduce generation of fiber solid waste, reduce fresh water consumption and eliminate VOC, TRS, and HAP air emissions from the old brown stock washing system.

With the new No. 2 Mill Brown Stock Washing System, there will be a reduction in the overall fugitive emissions of VOC, TRS, and HAP air emissions. Less fiber solids will be lost to the sewer, and instead will be recovered. Also, more black liquor solids will be retained in the process and sent to the recovery system. The improved chemical recovery will achieve environmental improvements, such as reduced chemical loss to the sewer; reduced organic loading to the effluent treatment system; and improved energy recovery.

As a result, a small increase in the permitted black liquor solids (BLS) throughput capacity is required for the No. 4 Recovery Boiler and the No. 4 Smelt Dissolving Tank. This in turn will affect other downstream emission units, i.e., the No. 4 Lime Kiln, the causticizing system, lime bins and lime slakers, although the current permitted capacities for these units are adequate. Therefore, this project may result in an increase of emissions of PM_{10}, SO_2, CO, and NO_2.

2.1.2 NO. 1 POWER BOILER AS A BACKUP NCG COMBUSTION DEVICE

This proposed project would allow Buckeye to use the No. 1 Power Boiler as a backup to the No. 1 Bark Boiler for burning LVHC gases. Buckeye will burn only natural gas (i.e. no fuel oil) while LVHC NCGs are incinerated in the No. 1 Power Boiler. Therefore, this project will not result in an increase in allowable emissions of SO_2 from the No. 1 Power Boiler. However, actual emissions to the atmosphere of SO_2 may increase as a result of this project due to the NCGs containing total reduced sulfur compounds.

2.2 BUCKEYE FOLEY EMISSIONS

2.2.1 SIGNIFICANT IMPACT ANALYSIS

The first step in the modeling analysis is to determine whether the proposed projects' impacts are predicted to be greater than EPA's significant impact levels. In this significant impact analysis, the increases in emissions due to the proposed projects only are modeled.

The increase in emissions due only to the Brown Stock Washer project is presented in Tables 2-1 and 2-2. Current actual emissions are presented in Table 2-1, while future maximum emissions from all affected sources are presented in Table 2-2. The background documentation for these two tables is presented in Appendix A. These emissions are used in the significant impact analysis for the Brown Stock Washer project.

The increase in emissions from the No. 1 Power Boiler project is based on combustion of the LVHC gases with natural gas being fired in the boiler. This project only affects SO_2 emissions, and the emission increases utilized in the significant impact model are 517.2 lb/hr and 124.1 TPY. These emissions represent the estimated increase in SO_2 emissions due solely to burning the LVHC gases.

No PM

How do you know?

The significant impact analysis results, presented in Section 5.0, demonstrate that the Brown Stock Washing project's impacts due to PM_{10} emissions only and the No. 1 Power Boiler project's impacts due to SO_2 emissions, are predicted to be greater than the significant impact levels.

2.2.2 AAQS ANALYSIS

Future maximum PM_{10} and SO_2 emissions for all sources located at the Buckeye Foley Mill, used in the AAQS analysis, are presented in Tables 2-3 and 2-4. These emissions were developed from current operating and/or construction permits, the proposed Title V permit, and from the Title V permit application.

2.2.3 PSD CLASS II AND CLASS I INCREMENT ANALYSIS

For PM_{10} and SO_2, the major source PSD baseline date is January 6, 1975. To determine Buckeye Foley's air emissions and stack parameters representative of this date, available air permit applications and air construction and operating permits were reviewed. Based on review of these documents, and discussions with plant personnel, the following changes as they relate to the PSD increment consumption and expansion were identified:

- No. 2 Recovery Boiler. Operating prior to 1/6/75 and has had no modification since.
- No. 3 Recovery Boiler. Before 1974 only one ESP was installed with a 92-percent efficiency. In mid-1975, a second ESP was added with 93.7-percent efficiency. This reduced actual PM_{10} emissions and resulted in increment expansion. This modification reduced PM_{10} emissions but did not alter SO_2 emissions levels; therefore there is no change in SO_2 emissions since the baseline date.
- No. 4 Recovery Boiler. The original construction permit to build this new boiler was issued on 3/14/73, to be completed as of 6/1/75. Therefore, the potential emissions of this boiler are included in the PSD baseline. The proposed Brown Stock Washer project will result in an increase in emissions which consumes PSD increment for both PM_{10} and SO_2.
- No. 2 Smelt Dissolving Tank. Only a mesh pad for particulate control was in use as of 1/6/75. An application dated 3/15/74 was submitted for a new scrubber, with a compliance date of 7/1/75, and the new scrubber was installed after 1/6/75. This modification reduced PM_{10} emissions but did not alter SO_2 emissions levels; therefore there is no change in SO_2 emissions since the baseline date.
- No. 3 Smelt Dissolving Tank. Only a mesh pad for particulate control was in use as of 1/6/75. An application dated 5/9/74 was submitted for a new scrubber, with a compliance date of 7/1/75. The new scrubber was installed after 1/6/75. This modification reduced PM_{10} emissions but did not alter SO_2 emissions levels; therefore there is no change in SO_2 emissions since the baseline date.

+24.22
+20.06

- No. 4 Smelt Dissolving Tank. The original construction permit to build this source was issued on 3/14/73, to be completed as of 6/1/75. Therefore, the potential emissions of this source are included in the PSD baseline. The proposed Brown Stock Washer project will result in an increase in emissions which consumes PSD increment for both PM_{10} and SO_2. ok ✓
- East/West Lime Bins. Not in operation prior to 1/6/75; source is increment consuming.
- Nos. 1 and 2 Lime Slakers. Not in operation prior to 1/6/75; source is increment consuming.
- No. 1 Bark Boiler (Combination Stack). An application was submitted to operate 1/6/71 with multi-cyclones and an operating application was submitted 5/18/73 which added a mechanical dust collector. This was the source configuration as of 1/6/75. A construction permit application dated 3/1/77 was submitted adding a scrubber, which still exists today. This modification reduced PM_{10} emissions and did not alter SO_2 emissions levels; therefore there is no change in SO_2 emissions since the baseline date. ok
- Nos. 1 and 2 Power Boilers (Combination Stack). Operating prior to 1/6/75 and has had no modification since. ok
- No. 3 Power Boiler (Combination Stack). This boiler is presently called No. 2 Bark Boiler and prior to 5/18/73 was operating as the No. 1 Recovery Boiler. This recovery boiler was converted to the No. 3 Power Boiler prior to 1/6/75, as documented by an operating permit issued 8/6/75. By 9/77 the conversion to No. 2 Bark Boiler was completed along with installation of a new scrubber and a mechanical dust collector.
- Nos. 1, 2, and 3 Lime Kilns. All three kilns were issued construction permits on 1/20/71 and by 1974 all three had operating permits. By 7/23/87 the No. 4 Lime Kiln was on-line, replacing the Nos. 1, 2, and 3 Lime Kilns which were shut down. ✓ Sov

PM_{10} and SO_2 emissions that affect PSD increment consumption and expansion are presented in Tables 2-5 and 2-6. The information supporting these two tables are presented in Appendix B.

2.3 SITE LAYOUT AND STRUCTURES

A facility plot plan of the Buckeye Foley Mill facility is presented in Figure 2-2. A graphic representation of the stack locations and their relationship to building locations is presented in Figure 2-3. The dimensions of the major buildings at the facility are presented in Section 4.0,

Table 4-6. A graphic representation of the buildings with their relationship to Buckeye Foley's property boundary, used in the modeling analysis, is presented in Figure 2-4.

2.4 STACK PARAMETERS

Stack parameters for the future and PSD baseline case are presented in Tables 2-7 and 2-8, respectively.

Table 2-1. Current Actual Emissions, Brown Stock Washing Project, Buckeye Florida, Foley Mill

	Pollutant Emission Rates									
Source Description	SO_2		NO_x		CO		PM		PM_{10}	
	Current Actual Short-term Emissions									
	lb/hr	g/s	lb/hr	g/s	lb/hr	g/s	lb/hr	g/s	lb/hr	g/s
I. Pulping Area General	0	0	0	0	0	0	0	0	0	0
II. Brown Stock Washing System	0	0	0	0	0	0	0	0	0	0
III. No. 4 Recovery Boiler	162.66	20.49	96.12	12.11	2464.52	310.53	29.80	3.75	23.12	2.91
IV. No. 4 Smelt Dissolving Tank	0.99	0.12	2.03	0.26	0.00	0.00	6.10	0.77	5.46	0.69
V. No. 4 Lime Kiln	25.90	3.26	56.72	7.15	10.62	1.34	3.40	0.43	3.40	0.43
VI. Lime Slakers/Causticizer	0	0	0	0	0	0	4.16	0.52	4.16	0.52
VII. Lime Storage Bins	0	0	0	0	0	0	0.34	0.04	0.34	0.04
VIII. White Liquor Pressure Filter	0	0	0	0	0	0	0	0	0	0
IX. Lime Mud Filter	0	0	0	0	0	0	0	0	0	0
	Current Actual Annual Emissions									
	TPY	g/s	TPY	g/s	TPY	g/s	TPY	g/s	TPY	g/s
I. Pulping Area General	0	0	0	0	0	0	0	0	0	0
II. Brown Stock Washing System	0	0	0	0	0	0	0	0	0	0
III. No. 4 Recovery Boiler	623.36	17.93	368.35	10.60	2502.90	72.00	114.95	3.31	89.20	2.57
IV. No. 4 Smelt Dissolving Tank	3.78	0.11	7.79	0.22	0.00	0.00	23.53	0.68	21.06	0.61
V. No. 4 Lime Kiln	87.65	2.52	191.94	5.52	35.93	1.03	12.46	0.36	12.46	0.36
VI. Lime Slakers/Causticizer	0	0	0	0	0	0	17	0.48	17	0.48
VII. Lime Storage Bins	0	0	0	0	0	0	1	0.04	1	0.04
VIII. White Liquor Pressure Filter	0	0	0	0	0	0	0	0	0	0
IX. Lime Mud Filter	0	0	0	0	0	0	0	0	0	0

Note:
Supporting Tables 3-3 through 3-28 are in Appendix A.

Table 2-2. Future Maximum Emissions, Brown Stock Washing Project, Buckeye Florida, Foley Mill

See p. 2-1

Source Description	SO$_2$		NO$_x$		CO		PM		PM$_{10}$	
Future Maximum Short-term Emissions										
	lb/hr	g/s	lb/hr	g/s	lb/hr	g/s	lb/hr	g/s	lb/hr	g/s
I. Brown Stock Washers	0	0	0	0	0	0	0	0	0	0
II. No. 4 Recovery Boiler	176.66	22.26	104.39	13.15	2,676.50	337.24	113.40	14.29	88.00	11.09
III. No. 4 Smelt Dissolving Tank	1.07	0.13	2.21	0.28	0.00	0.00	30.19	3.80	27.02	3.40
IV. No. 4 Lime Kiln	31.25	3.94	68.44	8.62	12.81	1.61	20.00	2.52	20.00	2.52
V. Lime Slakers/Causticizer	0	0	0	0	0	0	4.16	0.52	4.16	0.52
VI. Lime Storage Bins	0	0	0	0	0	0	0.34	0.04	0.34	0.04
VII. White Liquor Pressure Filter	0	0	0	0	0	0	0	0	0	0
VIII. Lime Mud Pressure Filter	0	0	0	0	0	0	0	0	0	0
Future Maximum Annual Emissions										
	TPY	g/s	TPY	g/s	TPY	g/s	TPY	g/s	TPY	g/s
I. Brown Stock Washers	0	0	0	0	0	0	0	0	0	0
II. No. 4 Recovery Boiler	773.77	22.26	457.23	13.15	3,106.61	89.37	496.69	14.29	385.43	11.09
III. No. 4 Smelt Dissolving Tank	4.69	0.13	9.67	0.28	0	0	132.23	3.80	118.35	3.40
IV. No. 4 Lime Kiln	136.88	3.94	299.76	8.62	56.12	1.61	87.60	2.52	87.60	2.52
V. Lime Slakers/Causticizer	0	0	0	0	0	0	18.22	0.52	18.22	0.52
VI. Lime Storage Bins	0	0	0	0	0	0	1.49	0.04	1.49	0.04
VII. White Liquor Pressure Filter	0	0	0	0	0	0	0	0	0	0
VIII. Lime Mud Pressure Filter	0	0	0	0	0	0	0	0	0	0

Pollutant Emission Rates

Note:
Supporting Tables 3-3 through 3-28 are in Appendix A.

Table 2-3. Maximum Future PM_{10} Emissions for Buckeye Florida, Foley Mill

	Plant Source ID	Model ID	PM (lb/hr)	PM_{10} Emission Factor	Ref.	PM_{10} Emissions lb/hr	PM_{10} Emissions g/s	
No. 4 Lime Kiln	024	LK4	20.0 [a]	100%	1	20.0	2.52	✓ ✓
No. 2 Recovery Boiler	006	RB2	97.6 [b]	75.0%	2	73.2	9.22	✓
No. 3 Recovery Boiler	007	RB3	82.35 [b]	75.0%	2	61.8	7.78	✓
No. 4 Recovery Boiler	011	RB4	113.4 [b]	77.6%	3	88.0	11.09	✓ ✓
No. 2 Smelt Dissolving Tank	021	SDT2	26.7 [c]	89.5%	4	23.9	3.01	✓
No. 3 Smelt Dissolving Tank	027	SDT3	24.05 [c]	89.5%	4	21.5	2.71	✓
No. 4 Smelt Dissolving Tank	023	SDT4	30.19 [a]	89.5%	4	27.0	3.40	✓ ✓
E. & W. Lime Bins	026	EWLB	0.34 [a]	100%	5	0.343	0.04	✓ ✓
No. 1 & 2 Lime Slakers	025	12LS	4.16 [a]	100%	5	4.16	0.52	✓ ✓
Combined stack:								
No. 1 Bark Boiler	004		47.30 [a]	98%	6	46.4	5.84	✓
No. 2 Bark Boiler	019		106.73 [a]	98%	6	104.6	13.18	✓
No. 1 Power Boiler	002		47.90 [d]	86%	7	41.19	5.19	✓
No. 2 Power Boiler	003		47.90 [d]	86%	7	41.19	5.19	✓
Totals		COMBO				233.3	29.4	

[a] Based on current permit limit.

[b] Based on Rule 62-296.404(2)(a), F.A.C.

[c] Based on Rule 62-296.310(1)(b), F.A.C.

[d] Based on AP-42, Table 1.3-1

References:

1. Based on permit limit.
2. Based on AP-42, Figure 10.2-2, for DCE recovery boilers with ESP.
3. Based on AP-42, Table 10.2-1, 10.2-2, and Figure 10.2-2 for NDCE recovery boiler, with ESP.
4. Based on AP-42, Table 10.2-7, for SDT with a venturi scrubber.
5. Assumed to be 100% of PM.
6. Based on AP-42, Table 1.6-7 for bark/wood boiler with scrubber.
7. Based on AP-42, Table 1.3-5, for industrial boilers (SCC code 1-02-004-01) with no control.

Table 2-4. Maximum Future SO_2 Emissions for Buckeye Florida, Foley Mill

	Plant Source ID	Model ID	SO_2 Emission Factor	Ref.	Activity Factor	SO_2 Emissions lb/hr	g/s	
No. 4 Lime Kiln	024	LK4	31.25 lb/hr	1	--	31.25	3.94	✓
No. 2 Recovery Boiler	006	RB2	0.18 lb/MMBtu	2	586 MMBtu/hr	105.48	13.29	✓
No. 3 Recovery Boiler	007	RB3	0.18 lb/MMBtu	2	494 MMBtu/hr	88.92	11.20	✓
No. 4 Recovery Boiler	011	RB4	0.22 lb/MMBtu	3	803 MMBtu/hr[a]	176.66	22.26	✓
No. 2 Smelt Dissolving Tank	021	SDT2	0.016 lb/ton BLS	4	97,600 lb BLS/hr	0.78	0.10	✓
No. 3 Smelt Dissolving Tank	027	SDT3	0.016 lb/ton BLS	4	82,350 lb BLS/hr	0.66	0.08	✓
No. 4 Smelt Dissolving Tank	023	SDT4	0.016 lb/ton BLS	4	133,825 lb BLS/hr[b]	1.07	0.13	✓
E. & W. Lime Bins	026	EWLB	--		--	--	--	
No. 1 & 2 Lime Slakers	025	12LS	--		--	--	--	
Combined stack:								
No. 1 Bark Boiler	004		675.10 lb/hr	1	--	675.10	85.06	}
No. 2 Bark Boiler	019		498.96 lb/hr	1	--	498.96	62.87	
No. 1 Power Boiler	002		671.96 lb/hr	1	--	671.96	84.67	
No. 2 Power Boiler	003		671.96 lb/hr	1	--	671.96	84.67	
Totals		COMBO				2,518.0	317.3	

PB 2 does not operate when PB 1

Note:

[a] Based on proposed operating rate of 133,825 lb BLS/hr and 12 MMBtu/ton BLS.

[b] Based on proposed maximum allowable operating rate of 133,825 lb BLS/hr.

References:

1. Based on maximum permited emission rate.
2. Based on NCASI, TB No. 646,Table 10 for DCE recovery furnace.
3. Based on NCASI, TB No. 646,Table 10 for NDCE recovery furnace.
4. Based on NCASI, TB No. 646,Table 17 for smelt desolving tanks.

1BB 85.06
2BB 62.87
2PB 84.67
232.6

Table 2-5. PM$_{10}$ PSD Emissions for Buckeye Florida, Foley Mill

	Plant Source ID	Model ID	Short-term PM$_{10}$ Emissions lb/hr	Short-term PM$_{10}$ Emissions g/s	Annual PM$_{10}$ Emissions[a] TPY	Annual PM$_{10}$ Emissions[a] g/s
PSD Increment Consuming Sources[b]						
No. 4 Lime Kiln	024	LK4	20.0	2.52 ✓	87.6	2.52 ✓
No. 3 Recovery Boiler	007	RB3	61.8	7.78 ✓	270.5	7.78 ✓
No. 4 Recovery Boiler	011	RB4	88.0	11.09 ✓	385.4	11.09 ✓
No. 2 Smelt Dissolving Tank	021	SDT2	23.9	3.01 ✓	104.7	3.01 ✓
No. 3 Smelt Dissolving Tank	027	SDT3	21.5	2.71 ✓	94.3	2.71 ✓
No. 4 Smelt Dissolving Tank	023	SDT4	27.0	3.40 ✓	118.3	3.40 ✓
E. & W. Lime Bins	026	EWLB	0.343	0.04 ✓	1.5	0.04 ✓
No. 1 & 2 Lime Slakers	025	12LS	4.16	0.52 ✓	18.2	0.52 ✓
Combined stack						
No. 1 Bark Boiler	004		46.4	5.84	203.0	5.84
No. 2 Bark Boiler	019		104.6	13.18	458.1	13.18
Totals:	Same as	COMBO	150.95	19.02 ✓	661.2	19.02 ✓
PSD Increment Expanding sources[c]						
No. 3 Recovery Boiler	007	RB3B	294.75	37.14 ✓	986.1	28.37 ✓
No. 4 Recovery Boiler	011	RB4B	84.88	10.69 ✓	314.3	9.04 ✓
No. 2 Smelt Dissolving Tank	021	SDT2B	27.60	3.48 ✓	76.4	2.20 ✓
No. 3 Smelt Dissolving Tank	027	SDT3B	24.43	3.08 ✓	81.1	2.33 ✓
No. 4 Smelt Dissolving Tank	023	SDT4B	26.69	3.36 ✓	28.8	0.83 ✓
Combination Stack						
No. 1 Bark Boiler	004		118.7	14.95	505.5	14.54 ✓
No. 3 Power Boiler	019		10.8	1.35	37.0	1.07
Totals:	004, 019	COMBOB	129.4	16.31 ✓	542.5	15.61
No. 1 Lime Kiln		LK1B	8.62	1.09 ✓	25.46	0.73 ✓
No. 2 Lime Kiln		LK2B	11.11	1.40 ✓	32.98	0.95 ✓
No. 3 Lime Kiln		LK3B	7.23	0.91 ✓	24.53	0.71 ✓

---

[a] For increment consuming sources, TPY based on 8,760 hr/yr permitted operation.

[b] See Table 2-3 for basis of emissions.

[c] See Appendix B for the basis of emissions.

Table 2-6. SO_2 PSD Emissions for Buckeye Florida, Foley Mill

	Plant Source ID	Model ID	Short-term SO2 Emissions		Annual SO2 Emissions[a]	
			lb/hr	g/s	TPY	g/s
PSD Increment Consuming Sources[b]						
No. 4 Lime Kiln	024	LK4	31.25	3.94 ✓	136.88	3.94
No. 4 Recovery Boiler	011	RB4	176.66	22.26 ✓	773.77	22.26
No. 4 Smelt Dissolving Tank	023	SDT4	1.07	0.13 ✓	4.69	0.13
No. 2 Bark Boiler	019	COMBO	498.96	62.87 ✓	2,185.44	62.87
PSD Increment Expanding sources[c]						
No. 4 Recovery Boiler	011	RB4B	118.0	14.86 ✓	442.2	12.72
No. 4 Smelt Dissolving Tank	023	SDT4B	0.825	0.10 ✓	2.68	0.08
No. 3 Power Boiler	019	COMBOB	519.7	65.49 ✓	1,790.1	51.50
No. 1 Lime Kiln		LK1B	4.33	0.55 ✓	12.78	0.37
No. 2 Lime Kiln		LK2B	4.78	0.60 ✓	14.11	0.41
No. 3 Lime Kiln		LK3B	5.53	0.70 ✓	16.31	0.47

---

[a] For increment consuming sources, TPY based on 8,760 hr/yr permitted operation.

[b] See Table 2-4 for basis of emissions.

[c] See Appendix B for the basis of emissions.

Table 2-7. Future Stack Parameters and Locations Used in the Modeling Analysis, Buckeye Florida, Foley Mill

Emission Unit	Plant Source ID	Model ID	Relative Location[a] X ft	X m	Y ft	Y m	Height ft	Height m	Diameter ft	Diameter m	Temperature °F	Temperature °K	Flow (acfm)	Velocity ft/s	Velocity m/s
No. 4 Lime Kiln	024	LK4	879.5	268.1	320.7	97.8	125	38.10	7.3	2.23	550	560.9	135,800	54.1	16.48
No. 2 Recovery Boiler	006	RB2	258.2	78.7	102.9	31.4	225	68.58	11.0	3.35	350	449.8	250,000	43.8	13.36
No. 3 Recovery Boiler	007	RB3	0.0	0.0	0.0	0.0	225	68.58	9.0	2.74	350	449.8	235,000	61.6	18.77
No. 4 Recovery Boiler	011	RB4	-248.5	-75.8	-39.6	-12.1	225	68.58	9.5	2.90	450	505.4	350,000	82.3	25.08
No. 2 Smelt Dissolving Tank	021	SDT2	129.8	39.6	219.3	66.8	142	43.28	3.0	0.91	170	349.8	22,000	51.9	15.81
No. 3 Smelt Dissolving Tank	027	SDT3	-147.7	-45.0	41.8	12.7	140	42.67	4.0	1.22	165	347.0	21,800	28.9	8.81
No. 4 Smelt Dissolving Tank	023	SDT4	-202.7	-61.8	-18.9	-5.8	162	49.38	4.0	1.22	175	352.6	27,700	36.7	11.20
E. & W. Lime Bins	026	EWLB	725.1	221.0	534.1	162.8	124	37.80	1.0	0.30	77	298.2	2,000	42.4	0.01[b]
No. 1 & 2 Lime Slakers	025	12LS	762.1	232.3	500.0	152.4	133	40.54	1.9	0.58	141	333.7	657	3.9	1.18
Combined Stack:		COMBO	58.5	17.8	62.7	19.1	225	68.58	13.0	3.96	192	362.0	515,400	64.7	19.73
No. 1 Bark Boiler	004										142	334.3	100,700		
No. 2 Bark Boiler	019										148	337.6	254,700		
No. 1 Power Boiler	002										325	435.9	80,000		
No. 2 Power Boiler	003										325	435.9	80,000		

[a] Relative to No. 3 Recovery Boiler, oriented to true north.

[b] Source with horizontal stack modeled with 0.01 m/s velocity.

Table 2-8. Baseline (1974) Stack Parameters and Locations Used in the Modeling Analysis, Buckeye Florida, Foley Mill

Emission Unit	Plant Source ID	Model ID	Relative Location [a] X ft	X m	Y ft	Y m	Height ft	Height m	Diameter ft	Diameter m	Temperature °F	Temperature °K	Flow (acfm)	Velocity ft/s	Velocity m/s
No. 3 Recovery Boiler [b]	007	RB3B	0	0.0	0	0.0	225	68.6	9.0	2.74	300	422	220,000	57.6	17.57
No. 4 Recovery Boiler [c]	011	RB4B	-249	-75.8	-40	-12.1	225	68.6	9.5	2.90	380	466	303,000	71.2	21.72
No. 2 Smelt Dissolving Tank [d]	021	SDT2B	130	39.6	219	66.8	142	43.3	3.0	0.91	170	350	21,800	51.4	15.67
No. 3 Smelt Dissolving Tank [e]	027	SDT3B	-148	-45.0	42	12.7	140	42.7	4.0	1.22	170	350	21,800	28.9	8.81
No. 4 Smelt Dissolving Tank [c]	023	SDT4B	-203	-61.8	-19	-5.8	162	49.4	4.0	1.22	170	350	25,600	34.0	10.35
Combined Stack:		COMBOB	58.5	17.8	63	19.1	225	68.6	13.0	3.96	435	497	385,300	48.4	14.75
No. 1 Bark Boiler [f]	004										450	505	79,300		
No. 3 Power Boiler [g]	019										585	580	146,000		
No. 1 Power Boiler [h]	002										325	436	80,000		
No. 2 Power Boiler [h]	003										325	436	80,000		
No. 1 Lime Kiln [i]		LK1B	261	79.7	273	83.3	96	29.3	4.0	1.22	150	339	18,500	24.5	7.48
No. 2 Lime Kiln [j]		LK2B	252	76.8	290	88.3	96	29.3	4.0	1.22	150	339	37,600	49.9	15.20
No. 3 Lime Kiln [k]		LK3B	236	72.0	317	96.5	96	29.3	4.0	1.22	150	339	24,000	31.8	9.70

---

[a] Relative to No. 3 Recovery Boiler, oriented to true north.

[b] Air Construction Permit Application, 3/15/74.

[c] Air Construction Permit Application, 3/15/74.

[d] Air Construction Permit Application, 4/15/74. Flow data from 9/4/75 stack test.

[e] Air Operating Permit Application, 6/22/76. Flow data from 6/25/75 stack test.

[f] Air Operating Permit Application, 1/6/71

[g] Air Operating Permit Application, 6/25/75.

[h] Air Operating Permit Application, 5/25/83.

[i] Air Operating Permit Application, 8/7/81, flow data from 10/28/80 stack test.

[j] Air Operating Permit Application, 6/22/76 and 12/9/75 test data.

[k] Air Operating Permit Application, 8/3/81 and 11/4/80 test data.

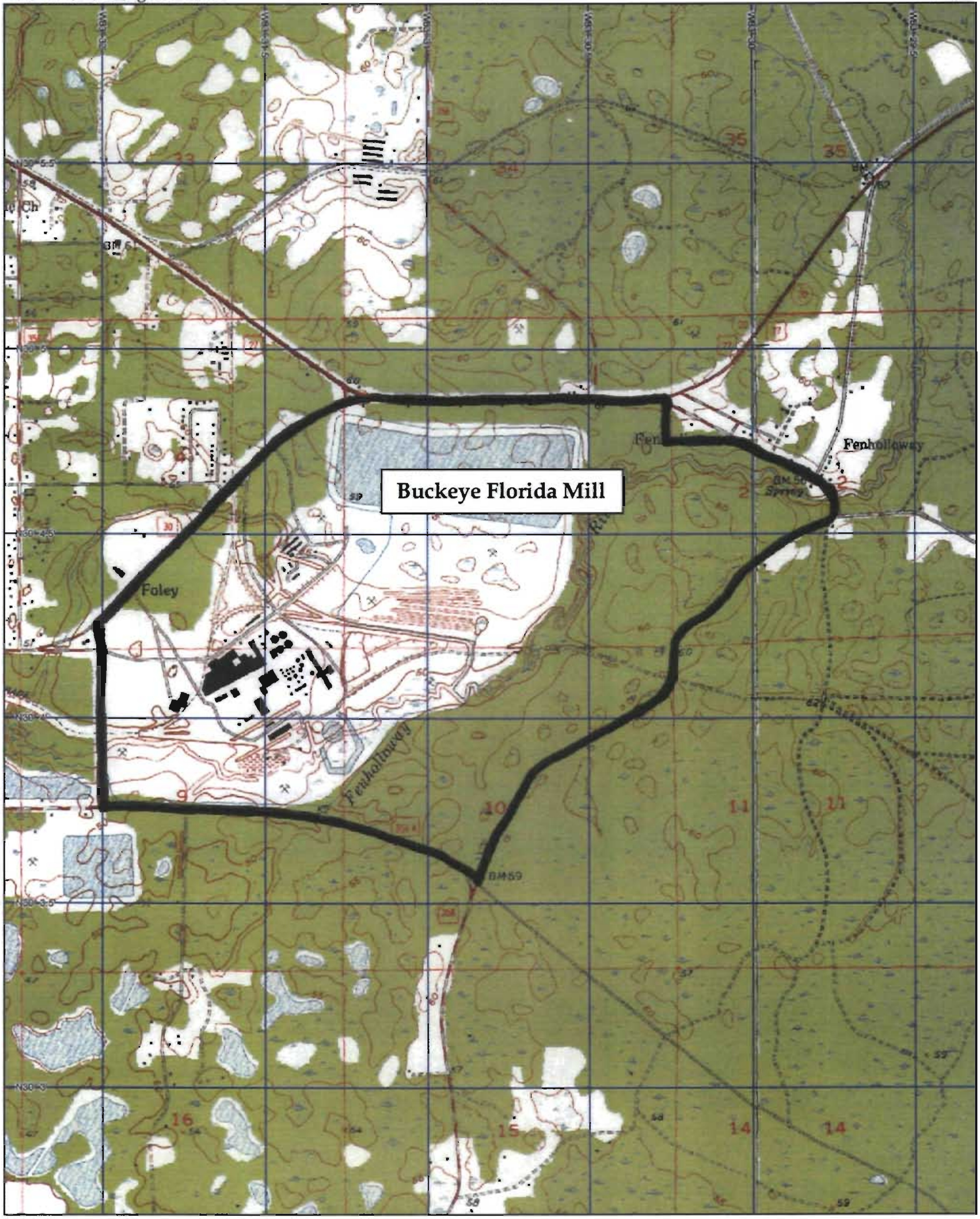
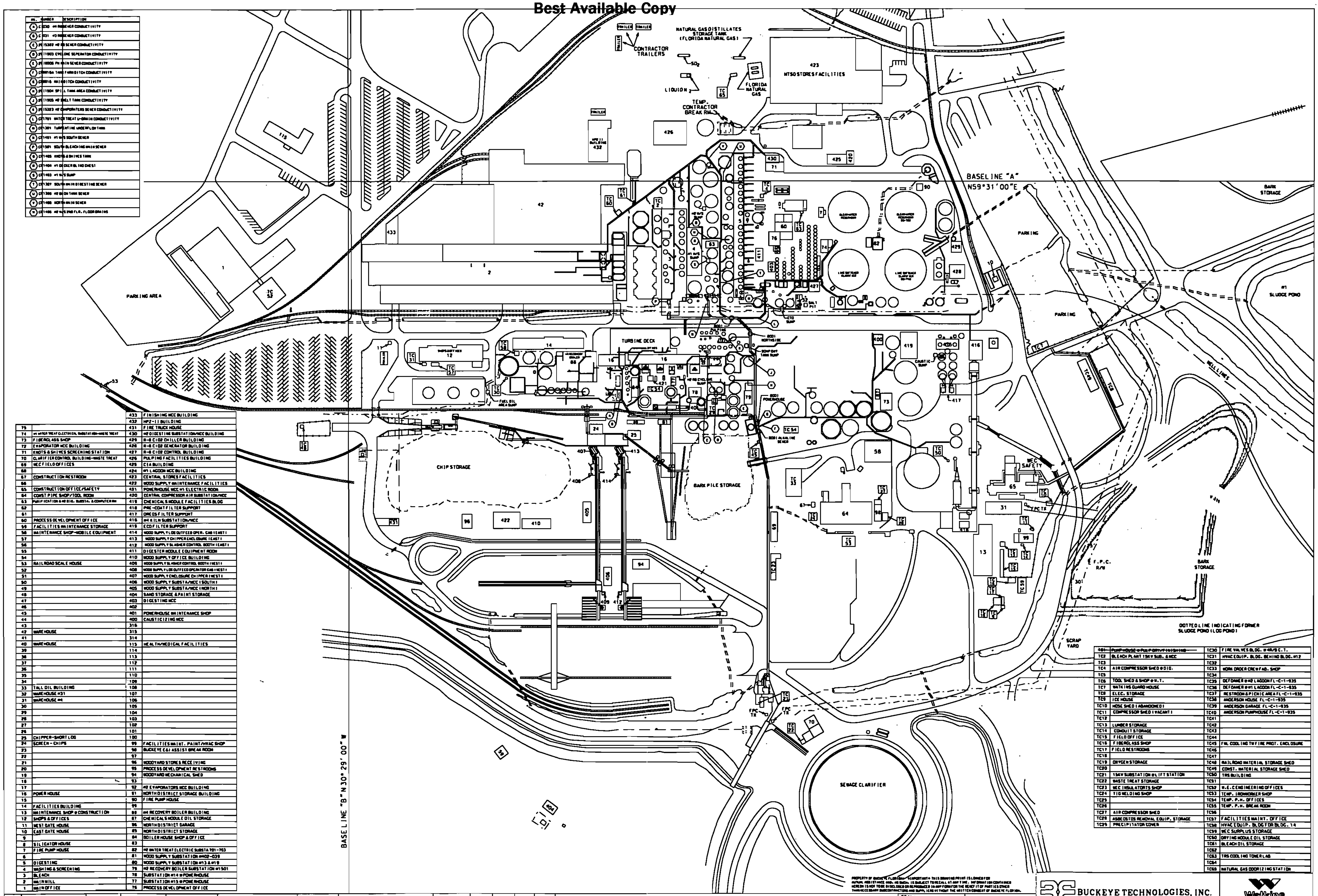


Figure 2-1
Location Map
Buckeye Foley Mill
Florida

Golder Associates

Best Available Copy



NO.	NUMBER	DESCRIPTION
A	C 1030	#4 RB SEWER CONDUCTIVITY
B	C 1031	#3 RB SEWER CONDUCTIVITY
C	2C 15302	#2 RB SEWER CONDUCTIVITY
D	2C 11903	CYCLONE SEPERATOR CONDUCTIVITY
E	2C 10006	PH MAIN SEWER CONDUCTIVITY
F	C 8016A	TANK FARM DITCH CONDUCTIVITY
G	C 8016	MAIN DITCH CONDUCTIVITY
H	2C 11904	SPILL TANK AREA CONDUCTIVITY
J	2C 11905	#2 SMELT TANK CONDUCTIVITY
K	2C 15303	#2 EVAPORATORS SEWER CONDUCTIVITY
L	C 1701	WATER TREAT U-DRAIN CONDUCTIVITY
M	C 1301	TURPENTINE UNDERFLOW TANK
N	C 1401	#1 W/S SOUTH SEWER
P	C 1501	SOUTH BLEACHING MAIN SEWER
Q	C 1405	KNOTS & SHIVES TANK
R	C 1404	#1 DECKER BLEND CHEST
S	C 1403	#1 W/S SUMP
T	C 1307	SOUTH MAIN DIGESTING SEWER
U	C 1306	#2 BLOW TANK SEWER
V	C 1406	NORTH MAIN SEWER
W	C 1405	#2 W/S 2ND FLR. FLOOR DRAINS

		433	FINISHING MCC BUILDING
		432	HPZ-II BUILDING
75		431	FIRE TRUCK HOUSE
74	#1 WATER TREAT ELECTRICAL SUBSTATION-WASTE TREAT	430	#2 DIGESTING SUBSTATION/MCC BUILDING
73	FIBERGLASS SHOP	429	R-8 ClO2 CHILLER BUILDING
72	EVAPORATOR MCC BUILDING	428	R-8 ClO2 GENERATOR BUILDING
71	KNOTS & SHIVES SCREENING STATION	427	R-8 ClO2 CONTROL BUILDING
70	CLARIFIER CONTROL BUILDING-WASTE TREAT	426	PULPING FACILITIES BUILDING
69	WEC FIELD OFFICES	425	CIA BUILDING
68		424	#1 LAGOON MCC BUILDING
67	CONSTRUCTION RESTROOM	423	CENTRAL STORES FACILITIES
66		422	WOOD SUPPLY MAINTENANCE FACILITIES
65	CONSTRUCTION OFFICE/SAFETY	421	POWERHOUSE MCC #1 ELECTRIC ROOM
64	CONST PIPE SHOP/TOOL ROOM	420	CENTRAL COMPRESSOR AIR SUBSTATION/MCC
63	PURIFICATION & #2 DIG. SUBSTA. & COMPUTER RM	419	CHEMICALS MODULE FACILITIES BLDG
62		418	PRE-COAT FILTER SUPPORT
61		417	DREGS FILTER SUPPORT
60	PROCESS DEVELOPMENT OFFICE	416	#4 KILN SUBSTATION/MCC
59	FACILITIES MAINTENANCE STORAGE	415	ECO FILTER SUPPORT
58	MAINTENANCE SHOP-MOBILE EQUIPMENT	414	WOOD SUPPLY LOG OUTFEED OPER. CAB (EAST)
57		413	WOOD SUPPLY CHIPPER ENCLOSURE (EAST)
56		412	WOOD SUPPLY SLASHER CONTROL BOOTH (EAST)
55		411	DIGESTER MODULE EQUIPMENT ROOM
54		410	WOOD SUPPLY OFFICE BUILDING
53	RAILROAD SCALE HOUSE	409	WOOD SUPPLY SLASHER CONTROL BOOTH (WEST)
52		408	WOOD SUPPLY LOG OUTFEED OPERATOR CAB (WEST)
51		407	WOOD SUPPLY ENCLOSURE CHIPPER (WEST)
50		406	WOOD SUPPLY SUBSTA/MCC (SOUTH)
49		405	WOOD SUPPLY SUBSTA/MCC (NORTH)
48		404	SAND STORAGE & PAINT STORAGE
47		403	DIGESTING MCC
46		402	
45		401	POWERHOUSE MAINTENANCE SHOP
44		400	CAUSTICIZING MCC
43		316	
42	WAREHOUSE	315	
41		314	
40	WAREHOUSE	115	HEALTH/MEDICAL FACILITIES
39		114	
38		113	
37		112	
36		111	
35		110	
34		109	
33	TALL OIL BUILDING	108	
32	WAREHOUSE #31	107	
31	WAREHOUSE #4	106	
30		105	
29		104	
28		103	
27		102	
26		101	
25	CHIPPER-SHORT LOG	100	
24	SCREEN - CHIPS	99	FACILITIES MAINT. PAINT/HVAC SHOP
23		98	BUCKEYE E&I ASSIST BREAK ROOM
22		97	
21		96	WOODYARD STORES RECEIVING
20		95	PROCESS DEVELOPMENT RESTROOMS
19		94	WOODYARD MECHANICAL SHED
18		93	
17		92	#2 EVAPORATORS MCC BUILDING
16	POWER HOUSE	91	NORTH DISTRICT STORAGE BUILDING
15		90	FIRE PUMP HOUSE
14	FACILITIES BUILDING	89	
13	MAINTENANCE SHOP @ CONSTRUCTION	88	#4 RECOVERY BOILER BUILDING
12	SHOPS & OFFICES	87	CHEMICALS MODULE OIL STORAGE
11	WEST GATE HOUSE	86	NORTH DISTRICT GARAGE
10	EAST GATE HOUSE	85	NORTH DISTRICT STORAGE
9		84	BOILER HOUSE SHOP & OFFICE
8	SILICATOR HOUSE	83	
7	FIRE PUMP HOUSE	82	#2 WATER TREAT ELECTRIC SUBSTA 701-703
6		81	WOOD SUPPLY SUBSTATION #402-039
5	DIGESTING	80	WOOD SUPPLY SUBSTATION #13 & #19
4	WASHING & SCREENING	79	#2 RECOVERY BOILER SUBSTATION #1501
3	BLEACH	78	SUBSTATION #14 @ POWERHOUSE
2	MAIN MILL	77	SUBSTATION #15 @ POWERHOUSE
1	MAIN OFFICE	76	PROCESS DEVELOPMENT OFFICE

~~TC1~~	~~PUMPHOUSE @ PULP DRY/FINISHING~~	TC30	FIRE VALVES BLDG. @ 4R/BC.T.
TC2	BLEACH PLANT 15KV SUB. & MCC	TC31	HVAC EQUIP. BLDG. BEHIND BLDG. #12
TC3		TC32	
TC4	AIR COMPRESSOR SHED @ DIG.	TC33	WORK ORDER CREW FAB. SHOP
TC5		TC34	
TC6	TOOL SHED & SHOP @ W.T.	TC35	DEFOAMER @ #2 LAGOON FL-C-1-935
TC7	WATKINS GUARD HOUSE	TC36	DEFOAMER @ #1 LAGOON FL-C-1-935
TC8	ELEC. STORAGE	TC37	RESTROOM & PICNIC AREA FL-C-1-935
TC9	ICE HOUSE	TC38	ANDERSON HOUSE FL-C-1-935
TC10	HOSE SHED (ABANDONED)	TC39	ANDERSON GARAGE FL-C-1-935
TC11	COMPRESSOR SHED (VACANT)	TC40	ANDERSON PUMPHOUSE FL-C-1-935
TC12		TC41	
TC13	LUMBER STORAGE	TC42	
TC14	CONDUIT STORAGE	TC43	
TC15	FIELD OFFICE	TC44	
TC16	FIBERGLASS SHOP	TC45	FAL COOLING TWR FIRE PROT. ENCLOSURE
TC17	FIELD RESTROOMS	TC46	
TC18		TC47	
TC19	OXYGEN STORAGE	TC48	RAILROAD MATERIAL STORAGE SHED
TC20		TC49	CONST. MATERIAL STORAGE SHED
TC21	15KV SUBSTATION @ LIFT STATION	TC50	TRS BUILDING
TC22	WASTE TREAT STORAGE	TC51	
TC23	WEC INSULATOR'S SHOP	TC52	W.E.C. ENGINEERING OFFICES
TC24	TIG WELDING SHOP	TC53	TEMP. IRONWORKER SHOP
TC25		TC54	TEMP. P.H. OFFICES
TC26		TC55	TEMP. P.H. BREAK ROOM
TC27	AIR COMPRESSOR SHED	TC56	
TC28	ASBESTOS REMOVAL EQUIP. STORAGE	TC57	FACILITIES MAINT. OFFICE
TC29	PRECIPITATOR COVER	TC58	HVAC EQUIP. BLDG FOR BLDG. 14
		TC59	WEC SURPLUS STORAGE
		TC60	DRYING MODULE OIL STORAGE
		TC61	BLEACH OIL STORAGE
		TC62	
		TC63	TRS COOLING TOWER LAB
		TC64	
		TC65	NATURAL GAS ODORIZING STATION

PROPERTY OF BUCKEYE FLORIDA. IMPORTANT: THIS DRAWING PRINT IS LOANED FOR MUTUAL ASSISTANCE AND, AS SUCH, IS SUBJECT TO RECALL AT ANY TIME. INFORMATION CONTAINED HEREIN IS NOT TO BE DISCLOSED OR REPRODUCED IN ANY FORM FOR THE BENEFIT OF PARTIES OTHER THAN NECESSARY SUBCONTRACTORS AND SUPPLIERS WITHOUT THE WRITTEN CONSENT OF BUCKEYE FLORIDA.

FILE

REVISIONS

F1-01-258 F1-01-264

WO19995 WO19992

0037580Y\F1\WP\Figure 2-2.dwg

FIGURE 2-2
FACILITY PLOT PLAN

SEAL:

DRAWN BY	MET	DEPT. 01
CHECKED BY		PLANT FOLEY
APPROVAL		BLDG. NO.
APPROVAL		DWG. LIST S
SCALE: 1" = 100'-0"		MAT'L

BUCKEYE TECHNOLOGIES, INC.
PERRY, FLORIDA

PLANT & PROPERTY
MAP
FOLEY PLANT

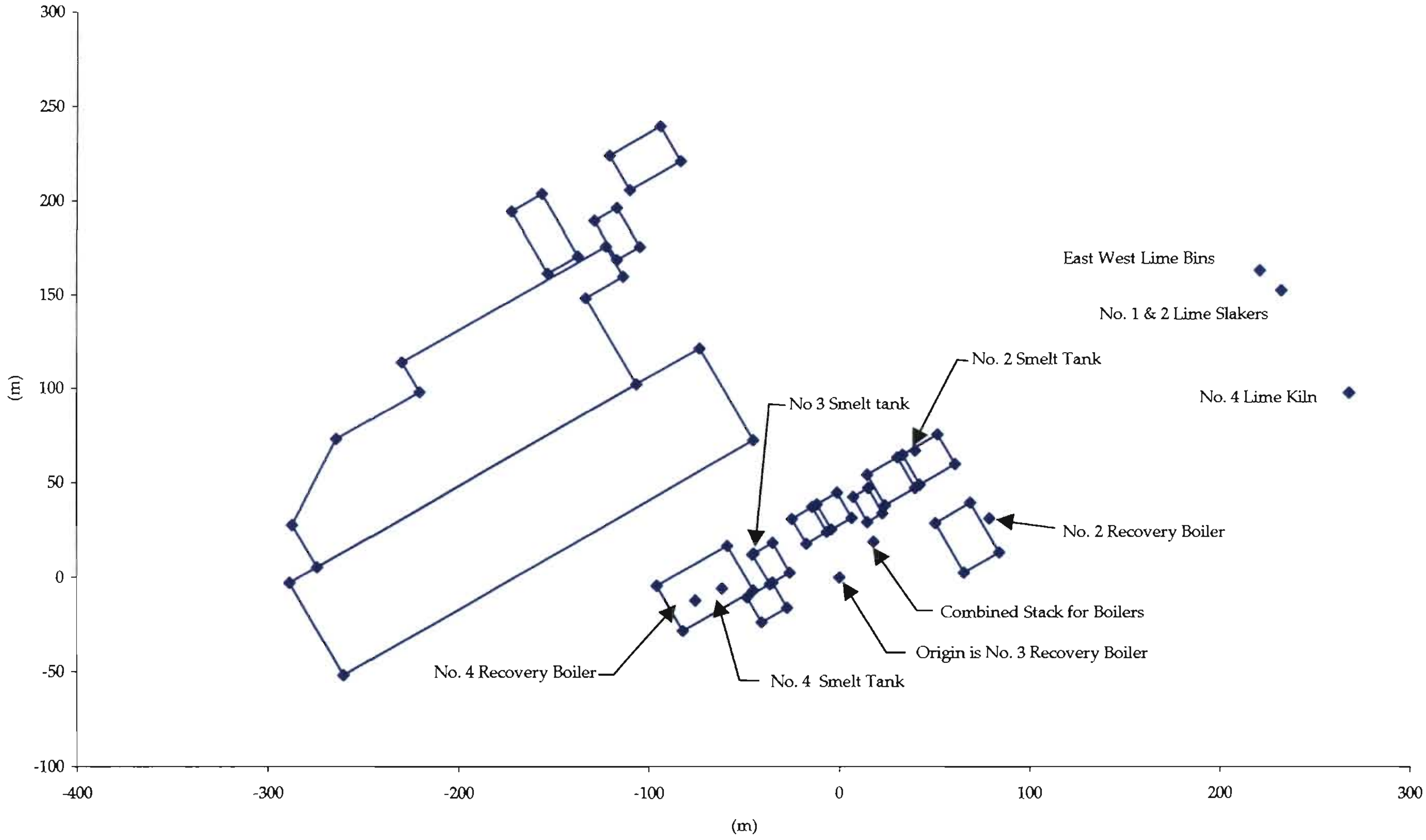
Watkins

DRAWING NUMBER
FL-C-01-510-29

SUPERSEDES

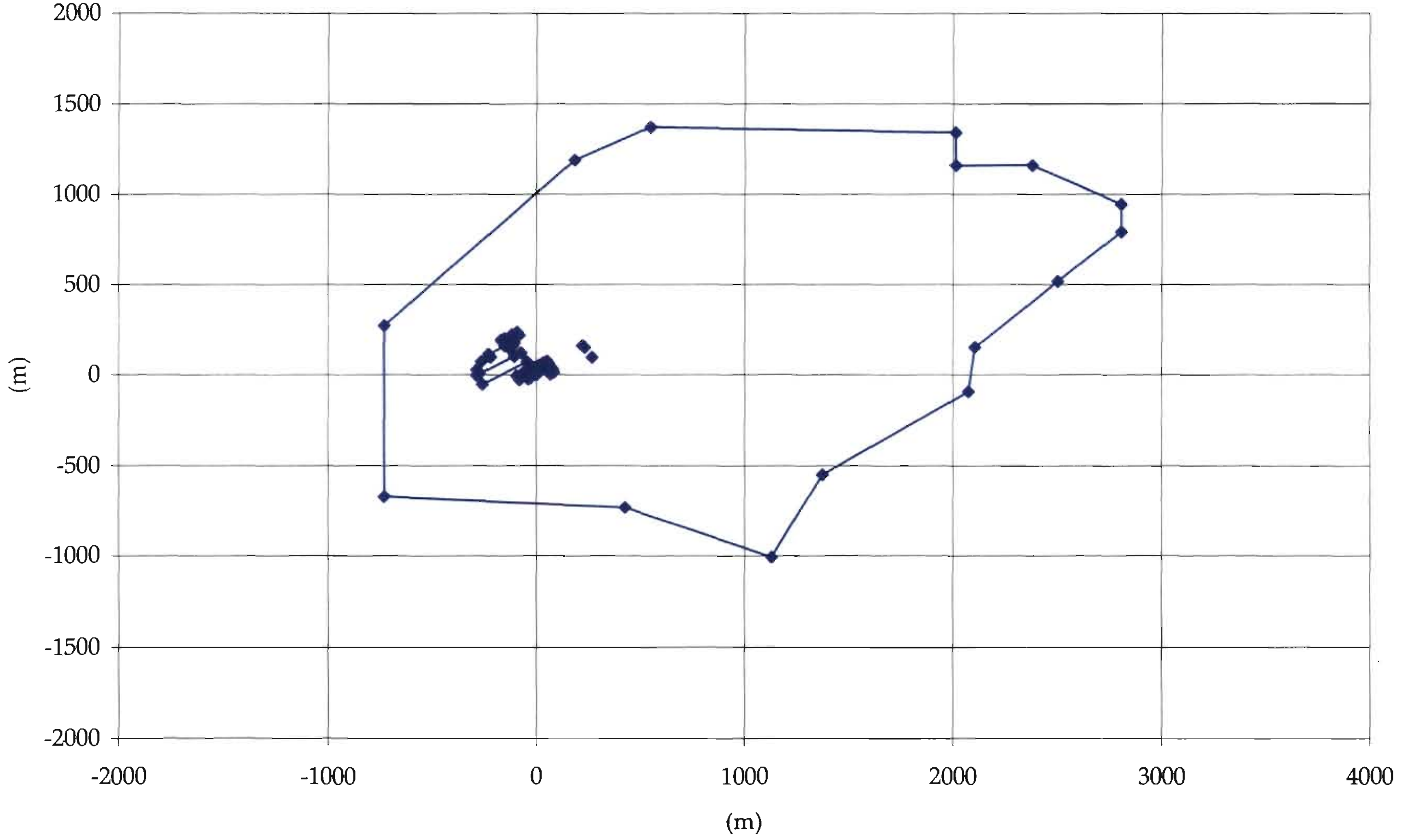
SUPERSEDED BY

Figure 2-3. Buckeye Florida, Foley Mill
Buildings with Stack Locations



0037580Y/F1/WP/Buckeye.xls
Fig 2-4 Chart 6 11/8/00

Figure 2-4. Buckeye Florida, Foley Mill
Boundary and Buildings



3.0 AMBIENT BACKGROUND CONCENTRATIONS

Background concentrations are necessary to determine total ambient air quality impacts to demonstrate compliance with the AAQS. Background concentrations are defined as concentrations due to sources other than those specifically included in the modeling analysis. For all pollutants, background would include other point sources not included in the modeling (i.e., distant sources or small sources), fugitive emission sources, and natural background sources.

3.1 AMBIENT BACKGROUND PM_{10} CONCENTRATIONS

A summary of ambient PM_{10} data for the ambient monitors located nearest to the Buckeye Foley Mill, is presented in Table 3-1. These monitors are located in Gainesville. Data are presented for the last year of record, 1999. The monitoring data show that ambient PM_{10} concentrations were well below the AAQS of 150 $\mu g/m^3$, 24-hour average; and 50 $\mu g/m^3$, annual average at the site. The highest, second-highest (H2H) 24-hour average concentration was 38 $\mu g/m^3$; the maximum annual average concentration was 21 $\mu g/m^3$. For purposes of the modeling analysis, these values were selected to represent ambient PM_{10} background concentration for the respective averaging times.

3.2 AMBIENT BACKGROUND SO_2 CONCENTRATIONS

A summary of ambient SO_2 data for monitors located in Jacksonville, the closest SO_2 monitors to Buckeye, is presented in Table 3-2. Data are presented for the last year of record, 1999. As shown, four SO_2 monitors were operational during this period.

The monitoring data show that ambient SO_2 concentrations were well below the AAQS of 1,300 $\mu g/m^3$, 3-hour average; 260 $\mu g/m^3$, 24-hour average; and 60 $\mu g/m^3$, annual average, at all sites. The H2H 3-hour average concentration at any of these stations was 181 $\mu g/m^3$; the H2H 24-hour average concentration was 52 $\mu g/m^3$; and the maximum annual average concentration was 10 $\mu g/m^3$. For purposes of the modeling analysis, these values were selected to represent ambient SO_2 background concentrations for the respective averaging times.

Table 3-1. Summary of PM_{10} Ambient Monitoring Data Used to Estimate Background Concentrations

Year	County	Station ID	Monitor Location	Measured Concentration [a] ($\mu g/m^3$) Maximum 24-Hour	2nd-Highest 24-Hour	3rd-Highest 24-Hour	Annual Average
1999	Alachua	12-001-0023	Gainesville - NW 53rd Avenue & NW 43rd Street	37	33	32	19
1999	Alachua	12-001-1003	Gainesville -721 NW Sixth Street	40	38	37	21

Note: $\mu g/m^3$ = micrograms per cubic meter.

[a] From EPA Aerometric Information Retrieval System (AIRS), 1999

Table 3-2. Summary of SO_2 Ambient Monitoring Data Used to Estimate Background Concentrations

Year	County	City	Station ID	Monitor Location	Measured Concentration [a] ($\mu g/m^3$) 2nd Highest 3-Hour	2nd Highest 24-Hour	Annual Average
1999	Duval	Jacksonville	12-031-0032	2900 Bennett Street	155	52 ok	10
1999	Duval	Jacksonville	12-031-0080	LaSalle St. Jacks	165	45	8
1999	Duval	Jacksonville	12-031-0081	1840 Cedar Bay Road	181 ok	39	8
1999	Duval	Jacksonville	12-031-0097	6241 Fort Carolin	139	42	10

Note: $\mu g/m^3$ = micrograms per cubic meter.

[a] From EPA Aerometric Information Retrieval System (AIRS), 1999

4.0 AIR QUALITY IMPACT ANALYSIS METHODOLOGY

4.1 SIGNIFICANT IMPACT ANALYSIS APPROACH

Air quality impact analyses were conducted for SO_2, PM_{10}, NO_2, and CO emission sources for the proposed projects at the Buckeye Foley Mill. These analyses were initially performed to determine whether each project's impacts are predicted to exceed the EPA Class II significant impact levels in any areas beyond the Mill's property boundaries. If the project's impacts are predicted to be above the significant impact levels, then a more detailed air modeling analysis that includes background sources is required. If the project's impacts are below the significant impact levels, no further air modeling analysis is required.

Air quality impacts were predicted using 5 years of meteorological data. The highest ground-level concentrations predicted for each project were then compared to the significant impact levels. The air quality modeling approach followed EPA and FDEP modeling guidelines for determining compliance with AAQS and PSD increments.

Generally, if a proposed project is located within 200 km of a PSD Class I area, then a significant impact analysis is also performed for the PSD Class I area. EPA has proposed PSD Class I significant impact levels but they have not been finalized as of this report. Nevertheless, the proposed project's impacts on the Class I areas were compared to the proposed significant impact levels.

Because the Mill site is approximately 42 km from the St. Marks NWA and 96 km from the Bradwell Bay NWA, both PSD Class I areas, significant impact modeling analyses were performed for each project. Air impact analyses were not performed for other PSD Class I areas since they are located more than 200 km from the Buckeye Foley Mill.

As shown in Section 5.0, the maximum SO_2, NO_2, and CO impacts for the Brown Stock Washer project are predicted to be less than the PSD Class II significant impact levels. The maximum SO_2 and NO_2 impacts are also predicted to be less than the PSD Class I significant impact levels. As a result, no further air modeling analyses for these pollutants is required for this project.

The maximum SO_2 impacts for the No. 1 Power Boiler project and the PM_{10} impacts for the Brown Stock Washer project are predicted to be greater than the PSD Class II and Class I significant impact levels. Therefore, more detailed air modeling analyses for these pollutants are required for these projects.

Descriptions of the methods and assumptions used in the air quality impact analyses, including selection of dispersion models, development of emission inventories, and processing of meteorological data, are presented in the following sections.

4.2 AAQS AND PSD CLASS II INCREMENT ANALYSES

In general, when 5 years of meteorological data are used, the highest annual and the H2H short-term concentrations are compared to the applicable AAQS and allowable PSD Class II increments. The H2H short-term 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 most air quality standards and all allowable PSD increments, which permit a short-term average concentration to be exceeded once per year at each receptor.

For the AAQS analysis, the future emissions of the mill are modeled together with background emission facilities. The total air quality concentration is estimated by adding the maximum concentrations from all modeled sources to a non-modeled background concentration. The maximum annual and short-term total air quality concentrations are then compared to the AAQS.

For the PSD Class II increment analysis, the PSD increment consuming and expanding sources at the Buckeye Foley Mill site were modeled with background PSD consuming or expanding sources. The maximum annual and short-term concentrations are compared to the allowable PSD Class II increments.

For addressing compliance with the AAQS and PSD Class II increments, these analyses used screening and refinement phases to determine the maximum pollutant impacts associated with the Buckeye Foley Mill. The difference between the two modeling phases is the density of the receptor grid spacing used when predicting concentrations.

For the screening phase, concentrations are predicted in a receptor grid that extends over a large area centered on the mill, using a 5-year meteorological data record. The receptor grid consisted of receptors located at varying distances from the mill with a denser grid spacing in areas near the property boundary.

For the refinement phase, concentrations are predicted in a receptor grid with receptor spacing of 100 meters (m) or less. The location of the refined receptor grid is determined from the location at which the maximum concentration is predicted from the screening phase. The area of a refined receptor grid extends to adjacent screening grid receptors, surrounding the receptor at which the maximum concentration is predicted. If the maximum concentration in the screening phase is predicted in an area in which the receptor spacing is 100 m or less, additional modeling for the refinement phase is not needed.

Concentrations are predicted for all receptors in the refined grid, for the entire year of meteorology during which the maximum concentration was predicted in the screening phase. If the maximum concentration predicted in another year is within 10 percent of the overall maximum concentration predicted for the 5-year period, the refinement phase analysis is also performed for the other year. This approach is used to ensure that a valid maximum concentration is obtained.

4.3 PSD CLASS I INCREMENT ANALYSIS

For addressing compliance with the PSD Class I increments, concentrations were predicted at the PSD Class I areas of the St. Marks NWA and Bradwell Bay NWA. These PSD Class I areas are the only Class I areas within 200 km of the Buckeye Foley Mill. Concentrations were predicted in a receptor grid that were used in previous air impact analyses and with the same 5-year meteorological data record used to address compliance with the AAQS and PSD Class II increments.

For the PSD Class I increment analysis, the PSD increment consuming and expanding sources at the Buckeye Foley Mill were modeled along with other background PSD consuming and expanding sources located within 150 km of the PSD Class I areas. The maximum annual and H2H short-term concentrations are compared to the allowable PSD Class I increments.

4.4 MODEL SELECTION

The selection of an air quality model to predict air quality impacts for the proposed projects was based on the ability of the model to simulate impacts in areas surrounding the projects as well as at the PSD Class I areas. Two air quality dispersion models were selected and used in these analyses to address air quality impacts for these projects. These models were:

- The Industrial Source Complex Short Term (ISCST3) dispersion model, and
- The California Puff model (CALPUFF).

The ISCST3 dispersion model (Version 00101) is available on the EPA's Internet web site, Support Center for Regulatory Air Models (SCRAM), within the Technical Transfer Network (TTN). A listing of ISCST3 model features is presented in Table 4-1. The EPA and FDEP recommend that the ISCST3 model be used to predict pollutant concentrations at receptors located within 50 km from a source. The ISCST3 model calculates hourly concentrations based on hourly meteorological data (i.e., wind direction, wind speed, atmospheric stability, ambient temperature, and mixing heights). The ISCST3 model is applicable to sources located in either flat or rolling terrain where terrain heights do not exceed stack heights. These areas are referred to as simple terrain. The model can also be applied in areas where the terrain exceeds the stack heights. These areas are referred to as complex terrain.

The ISCST3 model was used to predict the maximum pollutant concentrations for each project in nearby areas surrounding the Buckeye Foley Mill and at the PSD Class I area located within 50 km from the mill (i.e., St. Marks NWA). The predicted concentrations were then compared to applicable PSD Class II significant impact levels. The ISCST3 model was also used to predict the maximum pollutant concentrations due to each project's emissions together with appropriate background sources. The predicted concentrations were then compared to the applicable AAQS and PSD Class II increments.

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

In this analysis, the EPA regulatory default options were used to predict all maximum impacts. The ISCST3 model can be executed in the rural or urban land use mode, which affects stability dispersion coefficients, wind speed profiles, and mixing heights. Land use can be characterized based on a scheme recommended by EPA (Auer, 1978). If more than 50 percent of the land use within a 3-km radius circle around a project is classified as industrial or commercial, or high-density residential, then the urban option should be selected. Otherwise, the rural option is appropriate. Based on reviews of aerial and U.S. Geological Survey (USGS) topographical maps and a site visit, the land use within a 3-km (1.9-mile) radius of the Buckeye Foley Mill site is considered to be rural (i.e., very little heavy industrial, light-moderate industrial, commercial, or compact residential land use categories). Therefore, the rural mode was used in the air dispersion model to predict impacts from the Buckeye Foley Mill and other emission sources considered in the modeling analysis.

At distances beyond 50 km from a source, the CALPUFF model, Version 5.0 (EPA, 1998), is recommended for use by the EPA and FDEP. The CALPUFF model is a long-range transport model applicable for estimating the air quality impacts in areas that are more than 50 km from a source. The methods and assumptions used in the CALPUFF model were based on the latest recommendations for modeling analysis as presented in the Interagency Workgroup on Air Quality Models (IWAQM), Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts (EPA, 1998). This model is also maintained by the EPA on the SCRAM website.

The CALPUFF model was used to assess impacts from each project at the PSD Class I area located beyond 50 km from the mill (i.e., Bradwell Bay NWA). The predicted concentrations were then compared to applicable PSD Class I significant impact levels. The CALPUFF model was also used to predict the maximum pollutant concentrations due to each project's emissions together with appropriate background sources that were compared to the applicable PSD Class I increments. The CALPUFF model was used for these analyses since most of the background sources are located more than 50 km from the Class I areas. Based on discussions with the FDEP, the CALPUFF model can be used for modeling all sources at the Class I area, even though some sources are located within 50 km of the Class I area. For those sources located within 50 km of the Class I area, the CALPUFF model uses the ISCST3 model algorithms.

More detailed descriptions of the assumptions and methods used for the CALPUFF model are presented in Appendix C.

4.5 METEOROLOGICAL DATA

Meteorological data used in the ISCST3 model to determine air quality impacts consisted of a concurrent 5-year period of hourly surface weather observations and twice-daily upper air soundings from the National Weather Service (NWS) offices located at the Tallahassee Regional Airport and in Waycross, Georgia, respectively. Concentrations were predicted using 5 years of hourly meteorological data from 1987 through 1991. The NWS office at Tallahassee is located approximately 77 km (48 miles) west of the site and is the closest primary weather station to the study area considered to have surface meteorological data representative of the project site.

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

For the CALPUFF model, additional meteorological parameters are needed (e.g., precipitation, relative humidity) to predict air quality concentrations, compared to those required for the ISCST3 model. More detailed descriptions of the assumptions and methods used for processing the meteorological data and establishing the model domain are presented in Appendix C.

4.6 EMISSION INVENTORY

4.6.1 BUCKEYE FOLEY MILL

The current actual and future maximum SO_2, NO_x, CO, PM, and PM_{10} emissions for sources affected by the Brown Stock Washer Project are shown in Tables 2-1 and 2-2. The maximum PM_{10} and SO_2 emissions for all sources at the Buckeye Foley Mill for the future operating condition are shown in Tables 2-3 and 2-4. The Buckeye Foley Mill PSD increment consuming and expanding emissions for PM_{10} and SO_2 are presented in Tables 2-5 and 2-6. Future and baseline PSD stack parameters and sources locations are presented in Tables 2-7 and 2-8.

The emission increases for the Brown Stock Washer and No. 1 Power Boiler Projects were modeled separately to determine impacts for each project. The PM_{10}, SO_2, CO, and NO_2 emission increases due to the Brown Stock Washer Project were modeled. Based on the modeling results presented in Section 5.0, the project's maximum impacts were predicted to exceed the PSD Class II and Class I significant impact levels only for PM_{10} concentrations. Therefore, AAQS and PSD increment analyses were performed for PM_{10}.

The SO_2 emissions from the No. 1 Power Boiler Project were modeled and the maximum SO_2 impacts were predicted to be above the PSD Class II and Class I significant impact levels. Therefore, AAQS and PSD increment analyses were performed for SO_2 emissions. These analyses were performed with the No. 1 Power Boiler at the current permitted SO_2 emissions rate because this project will not result in an increase above current permitted SO_2 levels.

4.6.2 OTHER EMISSION SOURCES

The SO_2 and PM_{10} emission inventories for background facilities were developed from databases obtained from the FDEP, from previous air modeling studies performed by Golder Associates, and from air permit data. In addition, the Georgia Department of Natural Resources provided an emission inventory of sources located within 100 km of the mill. All background sources in these inventories and located within each project's modeling area (defined as the PSD Class II significant impact area for each project) were included in the modeling.

Based on the results presented in Section 5.0, the significant impact distance estimated PM_{10} for concentrations for the Brown Stock Washer project in the PSD Class II area is 6 km. The significant impact distance estimated SO_2 for concentrations for the No. 1 Power Boiler project is 26 km.

For sources located in the screening area (defined as 50 km beyond the modeling area), a technique was used for eliminating sources in the modeling analyses if the source's emissions are below a specified criterion. This technique, which is approved for use by the DEP and the USEPA, is the *Screening Threshold* method, developed by the North Carolina Department of Natural Resources and Community Development. The method is designed to objectively eliminate from the emission inventory those sources that are unlikely to have a significant interaction with the source undergoing evaluation. In general, sources that should be considered in the modeling analyses are those with emissions greater than a screening threshold value (in TPY) that is calculated by the following criteria:

$$Q = 20 \times D$$

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

D = the distance (km) from the source or project undergoing evaluation to the background source for short-term analysis, or
the distance (km) from the edge of the project's significant impact area to the background source for long-term (annual) analysis.

For this analysis, the long-term criterion was used since fewer facilities would be eliminated than with the short-term criterion. Also, the total emissions from a facility were used rather than emissions from individual sources for comparison to the screening threshold value. These methods result in a more conservative approach to produce higher-than-expected concentrations. Those facilities with maximum or allowable emissions that are below the calculated *screening threshold* were eliminated from further consideration in the AAQS and PSD increment modeling analyses.

A summary of all PM_{10} emitting facilities considered for inclusion in the AAQS and PSD Class II increment modeling analysis is provided in Table 4-2. This summary identifies those facilities located within the project's modeling area (6 km) and screening area (6 to 56 km). The facilities that were not included in the modeling analyses because their emissions were less than the *screening threshold* criteria are also identified.

The individual source emissions, stack, and operating parameters for the AAQS and PSD Class II modeling analyses were developed and are presented in Table 4-3. Each source listed in Table 4-3 includes a description of the source, the identification name of the source used in the air modeling analysis, and a determination of whether the source consumes or expands PSD increment. It should be noted that facilities with PSD-affecting sources may have baseline sources. Baseline sources may no longer operate but did operate during the PM_{10} PSD baseline period of 1974 to 1975. These sources expand PSD increment and are represented in the PSD increment air modeling analyses as negative emission sources.

A summary of all SO_2 emitting facilities considered for inclusion in the AAQS and PSD Class II increment modeling analysis is provided in Table 4-4. This summary identifies those facilities located within the project's modeling area (26 km) and screening area (26 to 76 km). The facilities that were not included in the modeling analyses because their emissions were less than the *screening threshold* criteria are also identified.

The individual source emissions, stack, and operating parameters for the AAQS and PSD Class II modeling analyses were developed and are presented in Table 4-5. Similar to the information provided for the PM_{10} sources, each source listed in Table 4-5 includes a description of the source, the identification name of the source used in the air modeling analysis, and a determination of whether the source consumes or expands PSD increment.

Modeling analyses were required to determine compliance with PSD Class I increments for PM_{10} and SO_2 concentrations. The PM_{10} and SO_2 emission sources that were included in the analysis are presented in Tables 4-3 and 4-5, respectively. All known PSD increment consuming or expanding sources within these facilities are included in the analysis.

4.7 BUILDING DOWNWASH EFFECTS FOR BUCKEYE FOLEY MILL

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

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

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

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

The building dimensions considered in the air modeling analysis for the Buckeye Foley Mill are presented in Table 4-6. The location of the buildings and stacks can be found on the site plot plan (Figure 2-3). At the Buckeye Foley Mill, one or more buildings can cause building downwash effects at several stacks. For the modeling analysis, direction-specific building dimensions are input for H_b and l_b for 36 radial directions, with each direction representing a 10-degree sector. All direction-specific building parameters were calculated with the Building

Profile Input Program (BPIP), Version 00101. The BPIP program was used to generate building data for the ISCST3 model input.

A detailed listing of direction-specific building data used in the air modeling analysis is provided in Appendix D.

4.8 RECEPTOR LOCATIONS

The property boundaries for the Buckeye Foley Mill are shown in Figures 2-1 through 2-4. Public access to the Buckeye Foley Mill property is restricted by a fence that surrounds the majority of the property boundary line. The areas that are not fenced are those heavily wooded areas located about 800 m to the northeast and 2000 m to the west of the mill. These areas are posted with "No Trespassing" signs. The access road and the railroad line to Buckeye Foley Mill are not fenced, but also are posted. This restricts public access to that section of Buckeye Foley property.

For predicting maximum concentrations in the vicinity of the Buckeye Foley Mill, an array of discrete Cartesian and polar receptors were used. The locations of these receptors are shown in Figure 4-1. The origin of the receptor grids was assumed to be at the stack location for the existing No. 3 Recovery Boiler. The origin was assigned X and Y coordinates of 0.0 m each. There were 98 discrete Cartesian receptors located at intervals of 100 m along the property line of the Buckeye Foley Mill. These boundary receptor locations are shown in Table 4-7. An additional 149 receptors were located off of the Mill's property along radials spaced at 10 degree increments. Along each radial, receptors were located at distances of 0.8, 0.9, 1.0, 1.5, 2.0, and 2.5 km from the origin. Receptors along the radials that were within the Buckeye Foley Mill property were excluded from the model.

Modeling refinements were performed, as needed, by using a polar receptor grid with a maximum spacing of 100 m along each radial and an angular spacing between radials of 1 to 2 degrees. At a distance of less than 575 m, the angular distance between receptors is 100 m or less and additional refinements were not be performed. At distances of 600 m and beyond, modeling refinements were performed by using a maximum spacing of 100 m along each radial and an angular spacing between radials of 1 to 2 degrees.

SO_2 and PM_{10} concentrations were also predicted at receptors located around the boundaries of the St. Marks NWA and Bradwell Bay NWA, both PSD Class I areas. A listing of the Class I receptors is presented in Table C-4, Appendix C. Due to the large distance from the Buckeye Foley Mill to these PSD Class I areas, additional receptor refinements were not performed for these areas.

4.9 BACKGROUND CONCENTRATIONS

Total air quality impacts were predicted for the AAQS analysis by adding the maximum annual and H2H short-term concentrations due to all modeled sources to estimated background concentrations. Background concentrations are concentrations due to sources not explicitly included in the modeling analysis. These concentrations consist of two components:

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

The non-modeled background concentrations were assumed to be as follows:

Pollutant	Averaging Period	Background Concentration ($\mu g/m^3$)
PM_{10}	24-hour	38
	Annual	21
SO_2	3-hour	181
	24-hour	52
	Annual	10

These background concentrations were obtained from air quality monitoring data, as described in Section 3.0.

Table 4-1. Features of the ISCST3 Model

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

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

Table 4-2. Summary of PM_{10} Facilities Considered for Inclusion in the Buckeye Foley AAQS and PSD Class II Air Modeling Analyses.

		UTM Coordinates [a]		Relative to Buckeye Foley Mill [b]				Maximum PM_{10}	Q, Emission	Include in
Facility ID Number	Facility	East (km)	North (km)	X (km)	Y (km)	Distance (km)	Direction [a] (deg)	Emissions (TPY)	Threshold [c] (Dist -6) x 20	Modeling Analysis ?
1230033	GILMAN PAPER PRODUCTS	250.70	3332.50	-6.00	3.80	7	302	40.5	22	YES
1230020	ROBERTS LUMBER CO, INC.	251.00	3333.00	-5.70	4.30	7	307	3.0	23	NO
1230028	TOM'S FOODS INC.	251.10	3333.40	-5.60	4.70	7	310	8.1	26	NO
1230034	FLORIDA GAS TRANSMISSION CO. TAYLOR CO.	249.00	3339.60	-7.70	10.90	13	325	3.4	147	NO
0670001	MAYO READY-MIX CONCRETE, INC - MAYO	291.00	3326.40	34.30	-2.30	34	94	6.4	568	NO
1230030	WHITE CONSTRUCTION COMPANY	218.30	3340.70	-38.40	12.00	40	287	57.4	685	NO
7774805	APAC OF FLORIDA, INC.-TAMPA DIVISION	249.88	3371.57	-6.82	42.87	43	351	11.9	748	NO
7774812	ANDERSON COLUMBIA, INC #11 PLANT	280.24	3367.55	23.54	38.85	45	31	10.3	789	NO
0730010	FLORIDA STATE UNIVERSITY	283.00	3367.00	26.30	38.30	46	34	7.5	809	NO
1210003	FLORIDA POWER CORPORATION, SUWANNEE RVR PLANT	290.50	3362.20	33.80	33.50	48	45	1127.9	832	YES
1210018	GOLD KIST INC. POULTRY PLANT- LIVE OAK	292.20	3361.40	35.50	32.70	48	47	7.1	845	NO
0790011	PERPETUAL ENERGY CORP OF FLORIDA	270.10	3376.50	13.40	47.80	50	16	155.4	873	NO
1210008	GOLD KIST INC. FEED MILL	307.50	3354.00	50.80	25.30	57	64	17.6	1,015	NO
1290001	TALLAHASSEE CITY PURDOM GENERATING STA.	189.50	3339.97	-67.20	11.27	68	280	688.9	1,243	YES
0730003	CITY OF TALLAHASSEE A.B.HOPKINS PLANT	169.53	3371.70	-87.17	43.00	97	296	1895.5	1,824	YES
	GEORGIA PACIFIC HOSFORD OSB FACILITY (PROPOSED)	133.63	3369.43	-123.07	40.73	130	288	0.2	2,473	YES

---

[a] UTM coordinates relative to Zone 17, in which Buckeye Foley Mill is located.

[b] Buckeye Foley Mill East and North UTM Coordinates (km) 256.7 3328.7

[c] Proposed project's emissions are significant to 6 kilometers.

Emission inventory is limited to facilities within 56 km of Buckeye's facility.

Table 4-3. Summary of PM_{10} Sources Included in the Air Modeling Analysis.

				Stack Parameters				Emission Rate		PSD source?	Modeled in		
Facility ID Number	Facility	Units	ISCST3 ID Name	Height (m)	Diameter (m)	Temper. (K)	Velocity (m/s)	Hourly (g/s)	Annual (g/s)	(EXP/CON)	AAQS	Class II	Class I
1230033	Gilman Paper Products												
	Wood Fired Boiler	1	GILMAN1	13.72	0.97	492.04	4.69	1.16	1.16	CON	Yes	Yes	Yes
1210003	Florida Power Corporation, Suwannee River Plant												
	#1 Power Unit	1	FPLSWR1	33.53	2.13	432.04	18.90	17.01	5.67	No	Yes	No	No
	#2 Power Unit	2	FPLSWR2	33.53	2.13	444.26	25.91	16.78	5.59	No	Yes	No	No
	#3 Unit	3	FPLSWR3	41.15	2.35	422.04	33.22	33.30	11.10	No	Yes	No	No
	#1, 2, 3 Peaking Unit	4,5,6	FPLSWR4	6.71	3.44	658.71	63.70	10.08	10.08	CON	Yes	Yes	Yes
1290001	City of Tallahassee S.O.Purdom Plant [a]												
	Unit No. 2		PURD2	26.0	1.95	478.0	5.89	-1.81	-1.81	EXP	No	No	Yes
	Unit No. 3		PURD3	26.0	1.95	478.0	5.89	-1.81	-1.81	EXP	No	No	Yes
	Unit No. 4		PURD4	26.0	1.95	478.0	5.89	-1.81	-1.81	EXP	No	No	Yes
	Unit No. 5		PURD5	38.1	3.96	447.0	7.23	-4.73	-4.73	EXP	No	No	Yes
	Unit No. 6		PURD6	38.1	3.96	447.0	7.23	-4.73	-4.73	EXP	No	No	Yes
	Unit No. 7		PURD7	61.0	5.00	353.0	15.38	2.14	2.14	CON	No	No	Yes
	Unit No. 8		PURD8	13.4	10.08	305.0	7.09	0.30	0.30	CON	No	No	Yes
	Gas Turbines		PURDGT	11.6	3.05	744.0	25.56	0.01	0.01	CON	No	No	Yes
0730003	City of Tallahassee A.B.Hopkins Plant [a]												
	Unit No. 2		HOPK2	76.2	4.27	400.0	21.00	29.32	29.32	CON	No	No	Yes
	Georgia Pacific Hosford OSB Facility (proposed) [a, b]												
	Combined Units 1, 2, 3		HOS123	10.7	0.23	294.3	0.01	0.0053	0.0053	CON	No	No	Yes

[a] Source within 150 km of Class I areas cosidered in PSD Class I increment analysis.

[b] Information provided by Georgia Pacific.

Table 4-4. Summary of SO_2 Facilities Considered for Inclusion in the Buckey Foley AAQS and PSD Class II Air Modeling Analyses.

		UTM Coordinates [a]		Relative to Buckeye Foley Mill [b]				Maximum SO2	Q, Emission	Include in
Facility ID Number	Facility	East (km)	North (km)	X (km)	Y (km)	Distance (km)	Direction [a] (deg)	Emissions (TPY)	Threshold [c] (Dist -26) x 20	Modeling Analysis ?
1230034	FLORIDA GAS TRANSMISSION CO. TAYLOR CO.	249.00	3339.60	-7.70	10.90	13	325	19	SIA	YES
7770254	LIMEROCK INDUSTRIES, INC.	219.00	3340.60	-37.70	11.90	40	288	2	271	NO
1230030	WHITE CONSTRUCTION COMPANY	218.30	3340.70	-38.40	12.00	40	287	99	285	NO
7774805	APAC OF FLORIDA, INC.-TAMPA DIVISION	249.88	3371.57	-6.82	42.87	43	351	14	348	NO
7774812	ANDERSON COLUMBIA, INC #11 PLANT	280.24	3367.55	23.54	38.85	45	31	23	389	NO
0730010	FLORIDA STATE UNIVERSITY	283.00	3367.00	26.30	38.30	46	34	8	409	NO
1210003	FLORIDA POWER CORP., SUWANNEE RIVER PLT	290.50	3362.20	33.80	33.50	48	45	22,213	432	YES
1210018	GOLD KIST INC. POULTRY PLANT- LIVE OAK	292.20	3361.40	35.50	32.70	48	47	179	445	NO
0290008	CROSS CITY VENEER COMPANY, INC.	295.20	3279.60	38.50	-49.10	62	142	46	728	NO
0290013	FL DEPT OF CORRECTIONS - CROSS CITY	296.08	3279.99	39.38	-48.71	63	141	3	733	NO
7774804	LANE CONSTRUCTION CORP.	301.50	3376.80	44.80	48.10	66	43	25	795	NO
1210011	ANDERSON COLUMBIA, INC. #4	322.20	3315.00	65.50	-13.70	67	102	20	818	NO
1290005	MCKENZIE SERVICE CO	189.30	3338.40	-67.40	9.70	68	278	66	842	NO
1290001	TALLAHASSEE CITY PURDOM GEN. STA.	189.50	3339.97	-67.20	11.27	68	280	9,264	843	YES
7770007	ANDERSON COLUMBIA, INC. #9	302.96	3275.86	46.26	-52.84	70	139	19	885	NO
1290003	ST. MARKS POWDER, INC.	187.60	3342.10	-69.10	13.40	70	281	245	888	NO
13 185 00001	PACKAGING CORP OF AM CLYATTVILLE GA	279.09	3397.89	22.39	69.19	73	18	5,499	934	YES
7770237	ANDERSON MINING CORPORATION	333.20	3324.50	76.50	-4.20	77	93	1	1,012	NO
0730003	CITY OF TALLAHASSEE A.B.HOPKINS GEN. STATION	169.53	3371.70	-87.17	43.00	97	296	18,311	1,424	YES
	GEORGIA PACIFIC HOSFORD OSB FACILITY (PROPO:	133.63	3369.43	-123.07	40.73	130	288	10	2,473	YES
	ST. JOSEPH PAPER	64.00	3348.90	-192.70	20.20	194	276	2960	3,755	YES
	STONE CONTAINER,PANAMA CITY	52.80	3335.10	-203.90	6.40	204	272	3685	3,960	YES

[a] UTM coordinates relative to Zone 17, in which Buckeye Foley Mill is located.

[b] Buckey Foley Mill East and North UTM Coordinates (km) 256.70 3328.70

[c] Proposed project's annual emissions are significant to 26 km.

Emission inventory is limited to facilities within 76 km of Buckeye's facility but includes major sources outside the proposed project's significant impact distance.

Table 4-5. Summary of SO_2 Sources Included in the Buckey Foley Air Modeling Analysis.

				Stack Parameters				Emission Rate		PSD source?	Modeled in		
Facility ID Number	Facility	Unit No.	ISCST3 ID Name	Height (m)	Diameter (m)	Temper. (K)	Velocity (m/s)	Hourly (g/s)	Annual (g/s)	(EXP/CON)	AAQS	Class II	Class I
1230034	FLORIDA GAS TRANSMISSION CO. TAYLOR CO.												
	#6 RECIPROCATING I.C. ENGINE	2	FGTRN2	20.12	0.76	560.9	31.09	0.09	0.09	CON	Yes	Yes	Yes
	NATURAL GAS FIRED TURBINE	3	FGTRN3	16.76	2.60	738.7	15.24	0.46	0.46	CON	Yes	Yes	Yes
1210003	Florida Power Suwannee River Plant												
	#1 POWER UNIT	1	FPLSWR1	33.53	2.13	432.0	18.90	155.93	155.93	No	Yes	No	No
	#2 POWER UNIT	2	FPLSWR2	33.53	2.13	444.3	25.91	153.85	153.85	No	Yes	No	No
	#3 UNIT	3	FPLSWR3	41.15	2.35	422.0	33.22	305.27	305.27	No	Yes	No	No
	#1, 2, 3 PEAKING UNIT	4, 5, 6	FPLSW456	6.71	3.44	658.7	63.60	47.75	8.18	CON	Yes	Yes	Yes
1290001	City of Tallahassee S.O.Purdom Plant												
	Boiler #2	2	TALPURD2	26.00	1.95	478	5.89	-39.88	-39.88	EXP	No	Yes	Yes
	Boiler #3	3	TALPURD3	26.00	1.95	478	5.89	-39.88	-39.88	EXP	No	Yes	Yes
	Boiler #4	4	TALPURD4	26.00	1.95	478	5.89	-39.88	-39.88	EXP	No	Yes	Yes
	Boiler #5	5	TALPURD5	38.10	3.96	447	7.23	-104.04	-104.04	EXP	No	Yes	Yes
	BOILER #6	6	TALPURD6	38.10	3.96	447	7.23	-104.04	-104.04	EXP	No	Yes	Yes
	Boiler No.7	7	TALPURD7	54.90	2.74	422	14.44	-68.92	-68.92	EXP	No	Yes	Yes
	UNIT #1 & 2 -CT PEAKING UNIT	8	TALPURDGT	11.60	3.05	744	25.56	-10.29	-10.29	EXP	No	Yes	Yes
	Combustion Turbine-Unit No. 8	14	TALPURD8	60.97	5.00	353	15.35	7.82	7.82	CON	Yes	Yes	Yes
13 185 00001	PACKAGING CORP OF AM., VALDOSTA GA												
	No. 1 Recovery Boiler		PCARB1	56.08	2.06	444.3	16.33	4.77	4.77	CON	Yes	Yes	Yes
	No. 2 Recovery Boiler		PCARB2	56.08	2.06	417.0	16.61	4.77	4.77	CON	Yes	Yes	Yes
	No. 3 Recovery Boiler		PCARB3	54.56	2.13	402.6	19.14	6.28	6.28	CON	Yes	Yes	Yes
	No. 1 Smelt Dissolving Tank		PCASDT1	34.14	1.07	330.4	7.22	0.04	0.04	CON	Yes	Yes	Yes
	No. 2 Smelt Dissolving Tank		PCASDT2	34.14	1.07	325.4	7.67	0.04	0.04	CON	Yes	Yes	Yes
	No. 3 Smelt Dissolving Tank		PCASDT3	44.20	1.22	325.9	9.14	0.06	0.06	CON	Yes	Yes	Yes
	No. 4 Lime Kiln		PCALK4	60.66	1.68	438.7	7.62	3.36	3.36	CON	Yes	Yes	Yes
	CE Power Boiler		PCACEPB	33.53	1.52	449.8	9.18	73.21	73.21	CON	Yes	Yes	Yes
	CE & Riley Bark Boilers Combined Stack		PCACMBO	60.66	3.05	337.6	14.10	238.57	238.57	CON	Yes	Yes	Yes
	TRS Thermal Oxidizer		PCAOX	45.42	0.91	353.2	9.49	1.15	1.15	CON	Yes	Yes	Yes
			Baseline										
	No. 3 Recovery Boiler		PCARB3B	54.56	2.13	422.0	12.94	-5.32	-5.05	EXP	No	Yes	Yes
	No. 3 Smelt Dissolving Tank		PCASDT3B	44.20	1.22	337.6	6.43	-0.15	-0.14	EXP	No	Yes	Yes
	No. 2 Lime Kiln		PCALK2B	24.08	1.22	334.3	4.77	-0.08	-0.06	EXP	No	Yes	Yes
	No. 3 Lime Kiln		PCALK3B	17.37	1.07	352.6	18.48	-0.24	-0.18	EXP	No	Yes	Yes
	CE Power Boiler		PCACPBB	33.53	1.52	449.8	9.18	-61.91	-16.87	EXP	No	Yes	Yes
	CE Bark Boiler		PCACEBB	34.14	1.52	422.0	10.87	-61.91	-3.28	EXP	No	Yes	Yes
	Riley Bark Boiler		PCARBB	40.54	2.29	422.0	13.24	-93.71	-12.42	EXP	No	Yes	Yes
	Georgia Pacific Hosford OSB Facility (proposed)												
			EP_1A	39.6	2.59	399.3	15.31	1.05E-01	1.05E-01	CON	No	No	Yes
			EP_1B	39.6	2.59	399.3	15.31	1.05E-01	1.05E-01	CON	No	No	Yes
			EP_10	36.6	1.68	644.3	6.35	8.40E-02	8.40E-02	CON	No	No	Yes

Table 4-5. Summary of SO_2 Sources Included in the Buckey Foley Air Modeling Analysis (continued).

				Stack Parameters				Emission Rate		PSD source?	Modeled in		
Facility ID Number	Facility	Unit No.	ISCST3 ID Name	Height (m)	Diameter (m)	Temper. (K)	Velocity (m/s)	Hourly (g/s)	Annual (g/s)	(EXP/CON)	AAQS	Class II	Class I
050009	STONE CONTAINER,PANAMA CITY •												
			SCRB1	71	1.97	414	28.6	16.35	16.35	CON	No	No	Yes
			SCRB2	71	1.97	428	28.5	16.35	16.35	CON	No	No	Yes
			SCSDT1	71	1.83	348	5.25	0.13	0.13	CON	No	No	Yes
			SCSDT2	71	1.83	348	4.56	0.13	0.13	CON	No	No	Yes
			SCLKILN	18.6	2.44	348	11.84	0.59	0.59	CON	No	No	Yes
			SCBB4	64.9	2.38	335	27.32	72.45	72.45	CON	No	No	Yes
			BASELINE SOURCES										
			SCRB1b	71	1.97	428	26.82	-15.3	-15.3	EXP	No	No	Yes
			SCRB2b	71	1.97	433	24.78	-15.3	-15.3	EXP	No	No	Yes
			SCSDT1b	71	1.83	339	5.15	-0.9	-0.9	EXP	No	No	Yes
			SCSDT2b	71	1.83	333	5.3	-0.9	-0.9	EXP	No	No	Yes
			SCLKILNb	18.6	2.03	344	10.24	-0.4	-0.4	EXP	No	No	Yes
			SCPB45b	90.2	3.66	478	7.56	-52.6	-52.6	EXP	No	No	Yes
			SCPB6b	73.5	2.44	494	10.85	-66	-66	EXP	No	No	Yes
			SCBB3b	45.7	2.59	500	14.69	-43.2	-43.2	EXP	No	No	Yes
			SCBB4b	45.7	2.24	516	18.47	-68.8	-68.8	EXP	No	No	Yes
											No	No	Yes
	St Joseph Paper •												
			BCEB12	38.1	1.37	477.6	17.5	9.02	9.02	CON	No	No	Yes
			FCPPB9	51.8	4.27	343.1	10.33	76.23	76.23	CON	No	No	Yes
0730003	City of Tallahassee A.B.Hopkins Plant •												
			TALHOPK1	61	3.35	400	12.11	-227.59	-227.59	EXP	No	No	Yes
			TALHOPK2	76.2	4.27	400	21	410.76	410.76	CON	No	No	Yes
	Proposed G-P Hosford OSB Facility		EP_1A	39.6	2.59	399.3	15.31	1.05E-01	1.05E-01	CON	No	No	Yes
			EP_1B	39.6	2.59	399.3	15.31	1.05E-01	1.05E-01	CON	No	No	Yes
			EP_10	36.6	1.68	644.3	6.35	8.40E-02	8.40E-02	CON	No	No	Yes

• Source within 150 km of Class I areas cosidered in PSD Class I increment analysis.

Table 4-6. Buildings and Structures Considered in the Building Downwash Analysis at the Buckeye Foley Mill

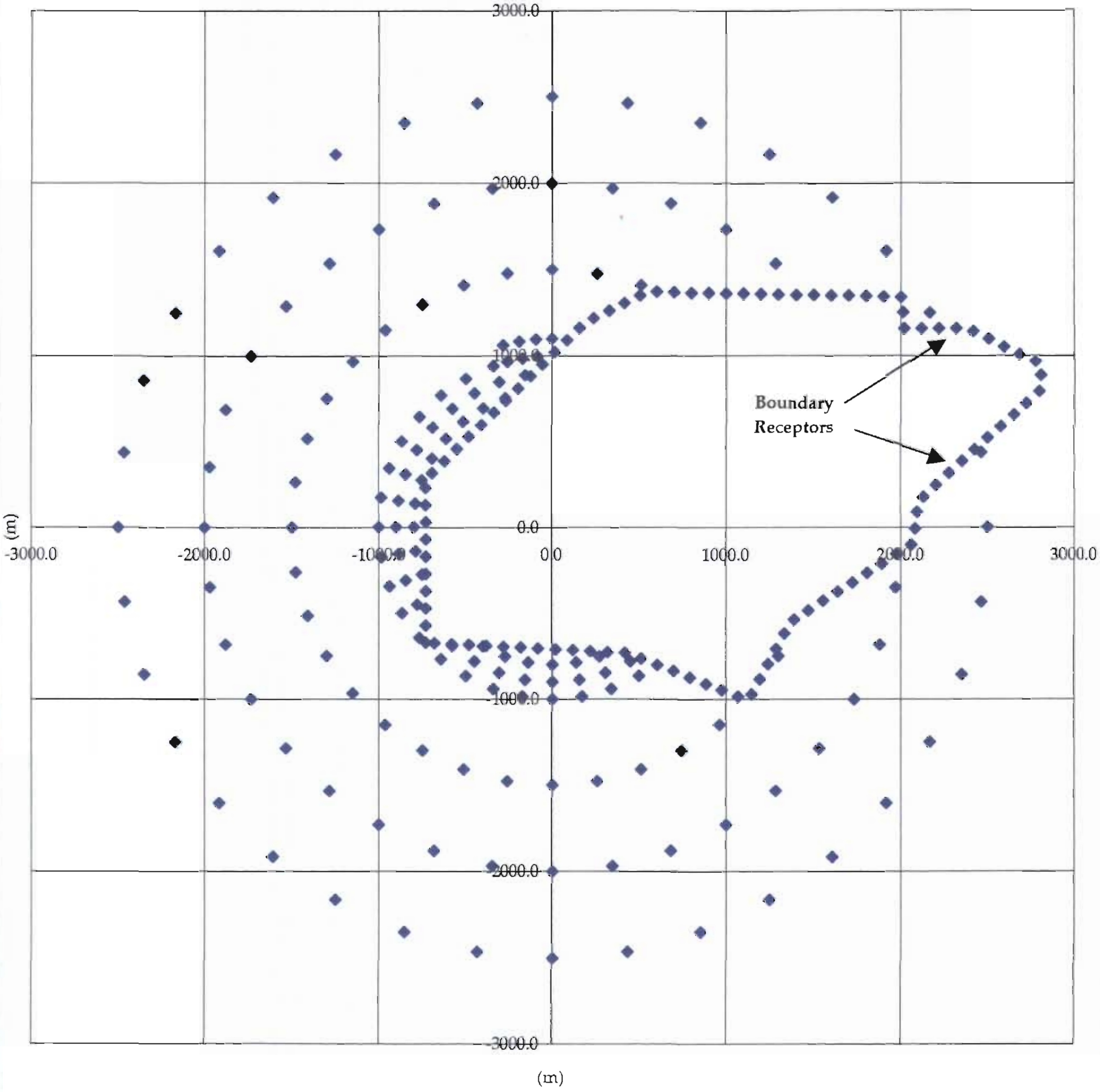
	Building Dimensions					
	Height		Length		Width	
Structure	ft	m	ft	m	ft	m
No. 4 Recovery Boiler	150	46	140	43	90	27
No. 3 Recovery Boiler ESP	125	38	50	15	50	15
No. 3 Recovery Boiler	120	37	40	12	60	18
No. 2 Power Boiler	70	21	40	12	50	15
No. 1 Power Boiler	70	21	40	12	50	15
No. 1 Bark Boiler	70	21	30	9	50	15
No. 2 Bark Boiler	115	35	60	18	60	18
No. 2 Recovery Boiler	120	37	70	21	60	18
No 2 Recovery Boiler ESP	100	30	70	21	100	30
Sidestream	60	18	125	38	43	13
Bleach Chest	45	14	80	24	37	11
Pulping Bldg	100	30	70	21	55	17
Pulp Machine	815	248	185	56	64	20
Buildings No. 40 and 42	710	216	235	72	25	8

Table 4-7. Summary of Boundary Receptor Locations with respect to No. 3 Recovery Boiler to Buckeye Foley Property Boundaries.

Direction (degrees)	Distance (m)	Direction (degrees)	Distance (m)	Direction (degrees)	Distance (m)
1	1021	74	2904	150	842
4	1094	75	2814	156	793
8	1172	76	2726	163	753
11	1240	77	2638	171	725
15	1303	78	2551	178	710
18	1371	80	2466	187	709
21	1442	81	2382	195	723
24	1497	82	2299	202	749
27	1538	84	2218	209	787
30	1584	85	2138	215	836
33	1635	88	2097	221	893
36	1691	90	2083	225	957
39	1750	93	2061	227	992
42	1813	94	1981	232	928
44	1879	96	1903	237	870
46	1949	98	1827	243	820
48	2020	100	1753	250	780
50	2094	103	1682	257	751
52	2170	105	1614	264	735
53	2248	108	1550	272	732
55	2328	111	1489	280	743
56	2409	115	1471	287	767
58	2369	119	1469	294	760
60	2327	123	1473	302	731
61	2414	127	1485	310	714
62	2503	130	1502	318	712
63	2592	133	1454	325	723
65	2670	134	1361	333	748
66	2733	136	1269	340	785
68	2798	138	1179	346	832
69	2865	140	1090	352	888
71	2934	143	1004	357	951
73	2939	146	920		

Note: Origin of modeling grid is the location of No. 3 Recovery Boiler. Distance between receptors is 100 meter along the property boundary line.

Figure 4-1. Buckeye Foley Mill Near Field Receptors



*Boundary Receptors at 100 m Spacing

5.0 AIR MODELING ANALYSIS RESULTS

5.1 SIGNIFICANT IMPACT ANALYSIS

The significant impact analysis results for the Brown Stock Washer and No. 1 Power Boiler projects for the PSD Class II area are presented in Tables 5-1 through 5-3. The modeling results for the screening and refinement analyses for the Brown Stock Washer project are presented in Tables 5-1 and 5-2, respectively. Based on the refined model results presented in Table 5-2, the Brown Stock Washer project was predicted to be significant for PM_{10} emissions only. The project's PM_{10} impacts were predicted to be significant out to a distance of 6 km. Therefore, AAQS and PSD increment analyses were performed for PM_{10}. As shown in Table 5-3, the modeling results for the screening analyses for the No. 1 Power Boiler project was predicted to be significant for SO_2, therefore no refinements were necessary. The project's SO_2 impacts were predicted to be significant out to a distance of 26 km. Therefore, AAQS and PSD increment analyses were performed for SO_2.

PSD Class I significant impact analyses were also performed for both the Brown Stock Washer and the No. 1 Power Boiler projects at the St. Marks NWA and Bradwell Bay NWA. The maximum PM_{10}, SO_2, and NO_2 impacts due to the Brown Stock Washer project are shown in Table 5-4. These results show that the maximum concentrations were predicted to be less than EPA's proposed PSD Class I significant impact levels at these Class I areas, except for the 24-hour average PM_{10} concentration at the St. Marks NWA. The maximum SO_2 impacts due to the No. 1 Power Boiler are shown in Table 5-5. These results show that the maximum concentrations are predicted to be less than the significant impact level for the annual averaging period, and greater than the significant impact levels for the 3-hour and 24-hour averaging period at the Class I areas. Therefore, PSD Class I increment analyses were performed for PM_{10} and SO_2 concentrations at the St. Marks NWA and for SO_2 concentrations at the Bradwell Bay NWA.

5.2 AAQS ANALYSES

The maximum PM_{10} and SO_2 concentrations predicted for all sources from the screening and refined analyses are presented in Tables 5-6 and 5-7, respectively. The refined modeling results are added to a non-modeled background concentration to produce a total air quality concentration that can be compared with the AAQS. All maximum impacts occurred at or near the Buckeye Foley Mill property boundary.

As shown in Table 5-7, the maximum total PM_{10} concentrations are predicted to be 43.9 and 127 $\mu g/m^3$ for the annual and 24-hour averaging periods, respectively. These concentrations are all below the respective AAQS of 50 and 150 $\mu g/m^3$ for these averaging periods.

The maximum total SO_2 concentrations are predicted to be 29, 164, and 456 $\mu g/m^3$, for the annual, 24-hour and 3-hour averaging periods, respectively. These concentrations are below the respective AAQS of 60, 260, and 1,300 $\mu g/m^3$ for these averaging periods.

5.3 PSD CLASS II ANALYSES

The maximum PM_{10} and SO_2 concentrations predicted for the PSD sources from the screening and refined analyses are presented in Tables 5-8 and 5-9, respectively. Based on the results of the screening analyses, refined modeling analyses were performed for PM_{10} and SO_2. The refined modeling results are compared to the allowable PSD Class II increments in Tables 5-9.

As presented in Table 5-9, the maximum PM_{10} Class II increment consumption concentrations are predicted to be 2.7 and 5.6 $\mu g/m^3$ for the annual and 24-hour averaging periods, respectively. These concentrations are below the respective allowable PSD Class II increments of 17 and 30 $\mu g/m^3$ for these averaging periods.

The maximum SO_2 Class II increment consumption concentrations are predicted to be 2.5, 7.1, and 31.7 $\mu g/m^3$ for the annual, 24-hour, and 3-hour averaging periods, respectively. These concentrations are below the respective allowable PSD Class II increments of 20, 91, and 512 $\mu g/m^3$ for these averaging periods.

5.4 PSD CLASS I ANALYSIS

The maximum PSD Class I increment consumption for PM_{10} and SO_2 concentrations for the PSD sources predicted at the St Marks NWA Class I area is presented in Table 5-10. The maximum 24-hour average PM_{10} concentration is 0.8 $\mu g/m^3$, which is below the allowable PSD Class I increment of 8 μg/m^3. The maximum 3-hour and 24-hour average SO_2 concentrations are predicted to be 12.3 and 3.5 μg/m^3, respectively, which are below the respective allowable PSD Class I increments of 25 and 5 μg/m^3.

The maximum PSD Class I SO_2 increment consumption for all PSD sources predicted at the Bradwell Bay NWA Class I area is presented in Table 5-11. The maximum 3-hour and 24-hour average SO_2 concentrations are predicted to be 26.5 and 4.1 μg/m^3. The maximum 3-hour average SO_2 concentration is predicted to be greater than the allowable PSD Class I increment of 25 μg/m^3, while the 24-hour average SO_2 concentration is predicted to be below the PSD Class I increment of 5 μg/m^3.

Upon further analysis, there were no other predicted exceedances of the allowable 3-hour average PSD Class I increment. The maximum 3-hour average SO_2 concentration of 26.5 μg/m^3 was predicted to be due entirely to a background PSD source (the City of Tallahassee's A.B. Hopkins Plant). The Buckeye Foley Mill's sources did not contribute any concentrations to this maximum 3-hour average concentration. The A.B. Hopkins Plant is located about 29 km from the receptor at which the PSD Class I increment was exceeded.

It should be noted that while the CALPUFF model would not be the appropriate model for predicting the maximum impacts from the A.B. Hopkins Plant at the Bradwell Bay NWA, this model was used because the Buckeye Foley Mill sources are located more than 50-km from the PSD Class I area.

Table 5-1. Maximum Predicted Pollutant Impacts Due to Brown Stock Washer Project Only, Significant Impact Screening Analyses

Pollutant /	Concentration[a]	Receptor Location [b]		Time Period
		Direction	Distance	
Averaging Time	(µg/m3)	(degree)	(m)	(YYMMDDHH)
SO$_2$				
Annual	0.2	194	723 [d]	87123124
	0.2	187	710 [d]	88123124
	0.1	187	710 [d]	89123124
	0.1	187	710 [d]	90123124
	0.2	187	710 [d]	91123124
High 24-Hour				
	0.4 [c]	176	1900	87062724
	0.4 [c]	178	3600	88101424
	0.4 [c]	60	3300	89061424
	0.3	180	5000	90120524
	0.3	170	1000	91050224
High 3-Hour				
	1.6 [c]	206	2400	87020412
	1.3 [c]	192	2700	88061018
	1.0	350	1000	89053112
	0.9	180	4000	90122515
	1.2	200	2000	91090212
PM$_{10}$				
Annual	6.6	187	710 [d]	87123124
	5.8	187	710 [d]	88123124
	3.6	187	710 [d]	89123124
	2.9	187	710 [d]	90123124
	4.8	187	710 [d]	91123124
High 24-Hour	31.5	187	710 [d]	87021824
	37.9	194	723 [d]	88010824
	23.6	187	710 [d]	89020824
	20.6	187	710 [d]	90101024
	33.3	187	710 [d]	91010124
NO$_x$				
Annual	0.4 [c]	182	1500	87123124
	0.3 [c]	182	1500	88123124
	0.2	187	710 [d]	89123124
	0.2	187	710 [d]	90123124
	0.2	187	710 [d]	91123124
CO				
H2H 8-Hour	6.4	212	731 [d]	87111708
	5.4	190	6000	88030516
	4.7	180	3000	89052816
	4.0	170	4000	90102416
	6.0	190	2000	91060516
H2H 1-Hour	24.9	187	710 [d]	87010509
	19.5	200	3000	88011410
	22.2	10	3000	89072008
	20.8	77	2638 [d]	90072209
	27.9	190	1500	91060511

---

[a] Based on the ISCST3 model using 5 year surface and upper air meteorological data from Tallahassee and Waycross, Georgia, respectively from 1987 to 1991.

[b] Relative to No. 3 Recovery Boiler Stack Location.

[c] Refined value with 100 meter receptors grid spacing.

[d] Property boundary receptor location converted to degree and distance from Cartesian coordinates.

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

Table 5-2. Maximum Pollutant Impacts Predicted for the Brown Stock Washer Project Only, for Comparison to EPA Significant Impact, Refined Analyses

Averaging Time	Concentration[a] ($\mu g/m^3$)	Receptor Location[b] Direction (degrees)	Receptor Location[b] Distance (m)	Time Period (YYMMDDHH)	EPA Significant Impact Levels ($\mu g/m^3$)
PM_{10}					
Annual	6.6 /	187	710	87123124	1
	5.8 ✓	187	710	88123124	
High 24-Hour	37.9	194	723	88010824	5
	33.3	187	710	91010124	
SO_2					
Annual	0.2	194	723	87123124	1
	0.2	187	710	88123124	
High 24-Hour	0.4	176	1,900	87062724	5
	0.4	178	3,600	88101424	
	0.4	60	3,300	89061424	
High 3-Hour	1.6	206	2,400	87020412	25
	1.3	192	2,700	88061018	
NO_x					
Annual	0.4	182	1,500	87123124	1
	0.3	182	1,500	88123124	
CO					
High 8-Hour	6.4 ✓	212	731	87111708	500
High 1-Hour	29.7 ✓	186	1,500	91060511	2,000

Note: The project's significant impact distance for PM_{10} is 6 km.

[a] Based on the ISCST3 model using 5 year surface and upper air meteorological data from Tallahassee and Waycross, Georgia, respectively from 1987 to 1991.

[b] Relative to No. 3 Recovery Boiler stack location.

Legend: YYMMDDHH = Year, Month, Day, Hour Ending
EPA = Environmental Protection Agency

Table 5-3. Maximum SO_2 Predicted for the No. 1 Power Boiler Project Only, Significant Impact Screening Analyses

Pollutant / Averaging Time	Concentration[a] ($\mu g/m^3$)	Receptor Location[b]		Time Period (YYMMDDHH)	EPA Significant Impact Levels ($\mu g/m^3$)
		Direction (degrees)	Distance (m)		
SO_2					
Annual	0.2	190	2,000	87123124	1
	0.1	190	2,000	88123124	
	0.1	180	2,000	89123124	
	0.1	180	2,000	90123124	
	0.1	180	2,000	91123124	
High 24-Hour	21.4 ✓	180	2,000	87071224	5
	15.6 ✓	190	2,000	88051124	
	19.6 ✓	58	2,369	89061424	
	13.5 ✓	220	2,000	90100624	
	15.1 ✓	180	1,500	91050224	
High 3-Hour	57.9 ✓	346	832	87062515	25
	59.7 ✓	270	800	88091503	
	49.7 ✓	346	832	89053112	
	52.7 ✓	325	723	90062812	
	54.7 ✓	200	2,000	91090212	

Note: The project's significant impact distance for SO_2 is 26 km.

[a] Based on the ISCST3 model using 5 year surface and upper air meteorological data from Tallahassee and Waycross, Georgia, respectively from 1987 to 1991.

[b] Relative to No. 3 Recovery Boiler stack location.

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

Table 5-4. Maximum Pollutant Impacts Predicted for the Brown Stock Washer Project Only at Bradwell Bay NWA and St. Marks NWA, PSD Class I Significant Impact Analyses

Pollutant / Averaging Time	Concentration ($\mu g/m^3$)	Receptor UTM Location (m) East	Receptor UTM Location (m) North	Time Period (YYMMDDHH)	Proposed EPA Class I Significant Impact Level ($\mu g/m^3$)
		St. Marks NWA [a]			
PM$_{10}$					
Annual	0.02 ✓	791,305	3,333,366	87123124	0.2
	0.01 ✓	791,300	3,331,469	88123124	
	0.01 ✓	794,368	3,328,455	89123124	
	0.02 ✓	794,368	3,328,455	90123124	
	0.01 ✓	794,368	3,328,455	91123124	
High 24-Hour	0.3	791,305	3,333,366	87120624	0.3
	0.4	791,305	3,333,366	88070324	
	0.4	791,098	3,330,375	89070224	
	0.3	791,646	3,336,585	90060924	
	0.2	794,368	3,328,455	91021824	
SO$_2$					
Annual	0.005	791,305	3,333,366	87123124	0.1
	0.005	791,300	3,331,469	88123124	
	0.004	791,439	3,338,244	89123124	<
	0.005	794,368	3,328,455	90123124	
	0.004	794,368	3,328,455	91123124	
High 24-Hour	0.04	791,305	3,333,366	87120624	0.2
	0.05	791,305	3,333,366	88070324	
	0.04	791,098	3,330,375	89070224	<
	0.04	791,258	3,335,786	90011724	
	0.02	791,439	3,338,244	91091924	
High 3-Hour	0.1	791,244	3,330,549	87010312	1.0
	0.2	791,439	3,338,244	88033109	
	0.1	791,305	3,333,366	89101509	<
	0.2	791,258	3,335,786	90011703	
	0.1	794,368	3,328,455	91021806	
NO$_2$					
Annual	0.006	791,305	3,333,366	87123124	
	0.006	791,300	3,331,469	88123124	< 0.1
	0.005	794,368	3,328,455	89123124	
	0.006	794,368	3,328,455	90123124	
	0.004	794,368	3,328,455	91123124	
		Bradwell Bay NWA [b]			
PM$_{10}$					
Annual	0.0073	733,000	3,333,000	90123123	< 0.2
High 24-Hour	0.106	733,000	3,333,000	90022823	< 0.3
SO$_2$					
Annual	0.003	733,000	3,333,000	90123123	< 0.1
High 24-Hour	0.046	736,000	3,336,000	9001623	< 0.2
High 3-Hour	0.122	736,000	3,338,000	90011608	< 1
NO$_2$					
Annual	0.001	733,000	3,333,000	90123123	< 0.1

---

[a] Based on the ISCST3 model using 5 year surface and upper air meteorological data from Tallahassee and Waycross, Georgia, respectively from 1987 to 1991.

[b] Based on the CALPUFF model using 1990 surface and upper air meteorological data developed with the CALMET program.

Note: YYMMDDHH = Year, Month, Day, Hour Ending
UTM = Universal Transverse Mercator: Zone 16.

Table 5-5. Maximum SO_2 Impacts Predicted for the No. 1 Power Boiler Project Only at Bradwell Bay NWA and St. Marks NWA, PSD Class I Significant Impact Analyses

Pollutant / Averaging Time	Concentration ($\mu g/m^3$)	Receptor UTM Location (m) East	Receptor UTM Location (m) North	Time Period (YYMMDDHH)	Proposed EPA Class I Significant Impact Level ($\mu g/m^3$)
		St. Marks NWA [a]			
$\underline{SO_2}$					
Annual	0.003	791,305	3,333,366	87123124	< 0.1
	0.003	794,368	3,328,455	88123124	
	0.003	791,439	3,338,244	89123124	
	0.003	794,368	3,328,455	90123124	
	0.002	794,368	3,328,455	91123124	
High 24-Hour	1.0	791,305	3,333,366	87032424	> 0.2
	1.5	791,305	3,333,366	88070324	
	1.3	792,098	3,329,606	89070224	
	1.1	791,258	3,335,786	90011724	
	0.9	791,342	3,337,159	91091924	
High 3-Hour	4.1	791,305	3,333,366	87032403	> 1.0
	6.9	794,368	3,328,455	88021903	
	6.1	791,305	3,333,366	89101509	
	6.0	791,258	3,335,786	90011703	
	3.9	790,915	3,335,000	91091909	
		Bradwell Bay NWA [b]			
$\underline{SO_2}$					
Annual	0.03	733,000	3,333,000	90123123	< 0.1
High 24-Hour	0.67	736,000	3,336,000	90011623	< 0.2
High 3-Hour	1.8	736,000	3,336,000	90011508	> 1

[a] Based on the ISCST3 model using 5 year surface and upper air meteorological data from Tallahassee and Waycross, Georgia, respectively from 1987 to 1991.

[b] Based on the CALPUFF model using 1990 surface and upper air meteorological data developed with the CALMET program.

Note: YYMMDDHH = Year, Month, Day, Hour Ending
UTM = Universal Transverse Mercator: Zone 16.

Table 5-6. Maximum PM_{10} and SO_2 Impacts Predicted for All Sources, AAQS Screening Analyses

Pollutant / Averaging Time	Concentration [a] ($\mu g/m^3$)	Receptor Location [b] Direction (degrees)	Receptor Location [b] Distance (m)	Time Period (YYMMDDHH)
PM_{10}				
Annual	22.9 ✓	187	710	87123124
	20.0 ✓	187	710	88123124
	12.0 ✓	178	710	89123124
	9.7 ✓	178	710	90123124
	15.4 ✓	187	710	91123124
H2H 24-Hour	76.8 ✓	180	800	87081624
	89.1 ✓	194	723	88011024
	64.4 ✓	178	710	89032424
	54.7 ✓	178	710	90122524
	78.7 ✓	187	710	91010224
SO_2				
Annual	19.2	190	2,000	87123124
	15.9	190	2,000	88123124
	9.3	180	2,000	89123124
	8.5	180	2,000	90123124
	12.6	180	2,000	91123124
H2H 24-Hour	106.0	180	200	87062724
	88.4	190	1,500	88051124
	96.9	61	2,415	89061324
	77.3	220	2,000	90100824
	76.9	180	1,500	91062824
H2H 3-Hour	267.5	166	832	87070215
	250.7	190	1,500	88050512
	252.8	190	1,500	89082515
	226.7	330	900	90070815
	266.0	202	1,600	91090815

[a] Based on the ISCST3 model using 5 year surface and upper air meteorological data from Tallahassee and Waycross, Georgia, respectively from 1987 to 1991.

[b] Relative to No. 3 Recovery Boiler stack location.

Note: YYMMDDHH = Year, Month, Day, Hour Ending
H2H = Highest, 2nd-Highest Concentration in 5 years.

Table 5-7. Maximum PM_{10} and SO_2 Impacts Predicted for All Sources, AAQS Refined Analyses

Pollutant /	Concentration ($\mu g/m^3$)			Receptor Location [b]		Time Period	Florida
Averaging Time	Total	Modeled	Background	Direction (degrees)	Distance (m)	(YYMMDDHH)	AAQS ($\mu g/m3$)
PM_{10}							
Annual	43.9	22.9	21	187	710	87123124	50
H2H 24-Hour	127	89.1	38	194	723	88011024	150
SO_2							
Annual	29	19.3	10	188	2,100	87123124	60
H2H 24-Hour	164	112.5	52	182	1,900	87062724	260
H2H 3-Hour	456	275	181	202	1,600	91090815	1,300

[a] Based on the ISCST3 model using 5 year surface and upper air meteorological data from Tallahassee and Waycross, Georgia, respectively from 1987 to 1991.

[b] Relative to No. 3 Recovery Boiler stack location.

Note: YYMMDDHH = Year, Month, Day, Hour Ending
H2H = Highest, 2nd-Highest concentration in 5 years.

Table 5-8. Maximum PM_{10} and SO_2 Due to PSD sources, PSD Class II Increment Screening Analyses

Pollutant / Averaging Time	Concentration [a] ($\mu g/m^3$)	Receptor Location [b] Direction (degrees)	Distance (m)	Time Period (YYMMDDHH)
PM_{10}				
Annual	2.70 ✓	194	723	87123124
	2.73 ✓	194	723	88123124
	1.71 ✓	187	710	89123124
	1.45 ✓	187	710	90123124
	2.16 ✓	187	710	91123124
H2H 24-Hour	4.69 ✓	250	781	87062124
	5.53 ✓	290	6000	88110124
	5.08 ✓	290	6000	89012024
	3.50 ✓	290	6000	90112924
	4.57 ✓	290	6000	91020824
SO_2				
Annual	2.4	30	26,000	87123124
	1.2	50	26,000	88123124
	1.2	50	26,000	89123124
	0.9	50	26,000	90123124
	1.7	50	26,000	91123124
H2H 24-Hour	5.8 ✓	190	2,000	87071624
	5.9 ✓	200	2,000	88051424
	4.9 ✓	242	2503	89061424
	3.5 ✓	250	1,500	90090524
	5.8 ✓	200	2,000	91061424
H2H 3-Hour	23.5 ✓	200	250	87050515
	20.6 ✓	200	2,500	88100809
	18.8 ✓	190	2,000	89080518
	15.5 ✓	220	2,500	90100609
	26.0 ✓	210	1,500	91090212

---

[a] Based on the ISCST3 model using 5 year surface and upper air meteorological data from Tallahassee and Waycross, Georgia, respectively from 1987 to 1991.

[b] Relative to No. 3 Recovery Boiler stack location.

Note: YYMMDDHH = Year, Month, Day, Hour Ending
H2H = Highest, 2nd-Highest Concentration in 5 years.

Table 5-9. Maximum PM_{10} and SO_2 Due to PSD sources, PSD Class II Increment Refined Analyses

Pollutant / Averaging Time	Concentration ($\mu g/m^3$)	Receptor Location[b] Direction (degrees)	Receptor Location[b] Distance (m)	Time Period (YYMMDDHH)	Allowable PSD Class II Increment ($\mu g/m^3$)
PM_{10}					
Annual	2.7	194	723	87123124	17
	2.7	194	723	88123124	
H2H 24-Hour	5.6	289	6000	88110124	30
	5.6	297	6000	89101924	
SO_2					
Annual	2.5	26.8	26,000	87123124	20
H2H 24-Hour	6.8	202	2,200	87102624	91
	6.3	198	1,800	88051424	
	7.1	206	2,000	91090224	
H2H 3-Hour	31.7	204	2,300	87050515	512
	27.7	206	1,300	91090212	

---

[a] Based on the ISCST3 model using 5 year surface and upper air meteorological data from Tallahassee and Waycross, Georgia, respectively from 1987 to 1991.

[b] Relative to No. 3 Recovery Boiler stack location.

Legend: YYMMDDHH = Year, Month, Day, Hour Ending
H2H = Highest, 2nd-Highest Concentration in 5 years.
PSD = Prevention of Significant Deterioration
EPA = Environmental Protection Agency

Table 5-10. Maximum PSD Class I Increment Consumption for PM_{10} and SO_2 Concentrations at St. Marks NWA

Pollutant / Averaging Time	Concentration [a] ($\mu g/m^3$)	Receptor UTM Location (m) East	Receptor UTM Location (m) North	Time Period (YYMMDDHH)	Allowable PSD Class I Increment ($\mu g/m^3$)
PM_{10}					
H2H 24-Hour	0.6	744,700	3,322,400	87010524	8
	0.8	747,100	3,320,500	88031424	
	0.5	747,100	3,320,500	89010224	
	0.7	747,100	3,320,500	90120524	
	0.6	746,000	3,321,200	91010924	
SO_2					
H2H 24-Hour	2.8	744,100	3,321,500	87030224	5
	3.2	746,500	3,321,400	88101424	
	2.0	747,100	3,320,500	89012324	
	3.5	747,100	3,320,500	90101124	
	2.9	747,100	3,320,500	91012524	
H2H 3-Hour	12.3	746,500	3,321,400	87012206	25
	8.9	744,100	3,321,500	88010209	
	8.2	747,100	3,320,500	89010212	
	8.5	745,400	3,322,000	90101024	
	9.1	745,400	3,321,000	91012909	

[a] Based on the ISCST3 model using 5 year surface and upper air meteorological data from Tallahassee and Waycross, Georgia, respectively from 1987 to 1991.

Note: YYMMDDHH = Year, Month, Day, Hour Ending
UTM = Universal Transverse Mercator; Zone 16.
H2H = Highest, 2nd-Highest

Table 5-11. Maximum PSD Class I Increment Consumption for SO_2 Concentrations at Bradwell Bay NWA

Pollutant / Averaging Time	Concentration [a] ($\mu g/m^3$)	Receptor UTM Location (m)		Time Period (YYMMDDHH)	Allowable PSD Class I Increment ($\mu g/m^3$)
		East	North		
H2H 24-Hour	4.1	736,000	3,346,000	90072823	5
H2H 3-Hour	26.5 [b]	736,000	3,346,000	90112011	25

---

[a] Based on the CALPUFF model using 1990 surface and upper air meteorological data developed with the CALMET program.

[b] Concentration is predicted to be due to emissions from The City of Tallahassee's A.B. Hopkins Plant.
The Buckeye Foley Mill's sources did not contribute any concentrations to this maximum 3-hour average concentration.
The A.B. Hopkin's Plant is located about 29 km from Bradwell Bay NWA Class I area.
There were no other predicted exceedances of the 3-hour average PSD Class I increment.

Note: YYMMDDHH = Year, Month, Day, Hour Ending
UTM = Universal Transverse Mercator; Zone 16.
H2H = Highest, 2nd-Highest

APPENDIX A
SUPPORTING TABLES FOR BROWN STOCK WASHING PROJECT

Table 3A. Summary of Net Short-term Emissions Changes Based on Future Maximum Operations, Brown Stock Washing Project, Buckeye Florida, Foley Mill

Source Description	Pollutant Emission Rates (lb/hr)				
	SO2	NOx	CO	PM	PM_{10}
	Future Maximum Short-term Emissions				
I. Brown Stock Washers	0	0	0	0	0
II. No. 4 Recovery Boiler	176.66	104.39	2,676.50	113.40	88.00
III. No. 4 Smelt Dissolving Tank	1.07	2.21	0	30.19	27.02
IV. No. 4 Lime Kiln	31.25	68.44	12.81	20.00	20.00
V. Lime Slakers/Causticizer	0	0	0	4.16	4.16
VI. Lime Storage Bins	0	0	0	0.34	0.34
VII. White Liquor Pressure Filter	0	0	0	0	0
VIII. Lime Mud Pressure Filter	0	0	0	0	0
Grand Total Future Maximum	208.98	175.04	2,689.31	168.09	139.52
	Current Actual Short-term Emissions				
I. Pulping Area General	0	0	0	0	0
II. Brown Stock Washing System	0	0	0	0	0
III. No. 4 Recovery Boiler	162.66	96.12	2,464.52	29.80	23.12
IV. No. 4 Smelt Dissolving Tank	0.99	2.03	0	6.10	5.46
V. No. 4 Lime Kiln	25.90	56.72	10.62	3.40	3.40
VI. Lime Slakers/Causticizer	0	0	0	4.16	4.16
VII. Lime Storage Bins	0	0	0	0.34	0.34
VIII. White Liquor Pressure Filter	0	0	0	0	0
IX. Lime Mud Filter	0	0	0	0	0
Grand Total Current Actual	189.54	154.87	2,475.14	43.80	36.48
Project Short-term Increase	19.44	20.17	214.17	124.29	103.03

Table 3B. Summary of Net Annual Emissions Changes Based on Future Maximum Operations, Brown Stock Washing Project, Buckeye Florida, Foley Mill

	Pollutant Emission Rates (TPY)				
Source Description	SO2	NOx	CO	PM	PM_{10}
	Future Maximum Annual Emissions				
I. Brown Stock Washers	0	0	0	0	0
II. No. 4 Recovery Boiler	773.77	457.23	3,106.61	496.69	385.43
III. No. 4 Smelt Dissolving Tank	4.69	9.67	0	132.23	118.35
IV. No. 4 Lime Kiln	136.88	299.76	56.12	87.60	87.60
V. Lime Slakers/Causticizer	0	0	0	18.22	18.22
VI. Lime Storage Bins	0	0	0	1.49	1.49
VII. White Liquor Pressure Filter	0	0	0	0	0
VIII. Lime Mud Pressure Filter	0	0	0	0	0
Grand Total Future Maximum	915.33	766.66	3,162.73	736.23	611.09
	Current Actual Annual Emissions				
I. Pulping Area General	0	0	0	0	0
II. Brown Stock Washing System	0	0	0	0	0
III. No. 4 Recovery Boiler	623.36	368.35	2,502.90	114.95	89.20
IV. No. 4 Smelt Dissolving Tank	3.78	7.79	0	23.53	21.06
V. No. 4 Lime Kiln	87.65	191.94	35.93	12.46	12.46
VI. Lime Slakers/Causticizer	0	0	0	16.71	16.71 17
VII. Lime Storage Bins	0	0	0	1.25	1.25
VIII. White Liquor Pressure Filter	0	0	0	0	0
IX. Lime Mud Filter	0	0	0	0	0
Grand Total Current Actual	714.79	568.09	2,538.83	168.89	140.67
Project Annual Increase	200.55	198.57	623.90	567.34	470.42

Table 3-3. Current Actual Emissions from No. 4 Recovery Boiler Burning Black Liquor Solids, Buckeye Florida, Foley Mill

Regulated Pollutant	Emission Factor		Reference	Hourly Activity Factor [a]		Short-term Emissions (lb/hr)	Annual Activity Factor [a]	Annual Emissions (TPY)
Particulate (PM)	29.8	lb/hr	1	--		29.80	7,715 hr/yr	114.95 115.0 ✓
Particulate (PM_{10})	77.6	% of PM	2	--		23.12	--	89.2 ✓
Sulfur dioxide	0.22	lb/MMBtu	3	739.36	MMBTU/hr	162.66	5,666,935 MMBtu/yr	623.4 ✓
Nitrogen oxides	0.13	lb/MMBtu	3	739.36	MMBTU/hr	96.12	5,666,935 MMBtu/yr	368.4 ✓
Carbon monoxide (hourly)	20.0	lb/1,000 lb BLS	4	123.23	1,000 lb BLS/hr	2,464.52	--	
Carbon monoxide (annual)	5.3	lb/1,000 lb BLS	4	--		--	944,489 1,000 lb BLS/yr	2,502.9 ✓

Notes:

[a] Based on the average BLS burned in 1998-1999:
1998: 933,943,416 lbs. BLS
1999: 955,034,904 lbs. BLS
1998-1999 Maximum: 123,226 lb BLS/hr
Annual operation based on the 1998-1999 average hours of operation:
1998: 7,643 hr/yr
1999: 7,787 hr/yr
Based on 12 MMBtu/ton BLS.

References:

1. Average PM emissions from averages of 1998 and 1999 stack tests, 29.1 lb/hr and 30.6 lb/hr, respectively.
2. Based on AP-42 Tables 10.2-1, 10.2-2, and Figure 10.2-2 for Kraft pulping sources.
3. Emission factor based on NCASI Bulletin No. 646, Tables 8-11, non-direct contact evaporator with ESP, average factor used.
4. Based on NCASI Bulletin No. 416, Table 5 and Figure 17.

Table 3-5. Current Actual Emissions from No. 4 Smelt Dissolving Tank, Buckeye Florida, Foley Mill

Regulated Pollutant	Emission Factor	Reference	Short-term Activity Factor [a]	Short-term Emissions (lb/hr)	Annual Activity Factor [a] [b]	Annual Emissions (TPY)
Particulate (PM)	6.1 lb/hr	1	--	6.10	7,715 hr/yr	23.5 ✓
Particulate (PM_{10})	89.5 % of PM	2	--	5.46	--	21.1 ✓
Sulfur dioxide	0.016 lb/ton BLS	3	61.61 ton BLS/hr	0.99	472,245 tons BLS/yr	3.78 ✓
Nitrogen oxides	0.033 lb/ton BLS	3	61.61 ton BLS/hr	2.03	472,245 tons BLS/yr	7.79 ✓
Carbon monoxide	--		--	--	--	--

Notes:

[a] Fuel input rate based on the average burned in 1998-1999.
1998: 933,943,416 lbs. BLS
1999: 955,034,904 lbs. BLS
1998-1999 Maximum: 123,226 lb BLS/hr

[b] Annual operation based on the 1997-1998 average hours of operation.
1998: 7,643 hr/yr
1999: 7,787 hr/yr

References:
1. Average of average PM emissions from 1998 and 1999 stack tests, 6.6 lb/hr and 5.6 lb/hr, respectively.
2. AP-42, Table 10.2-7.
3. Data is averages from NCASI Bulletin No. 646, Tables 16-18, for smelt dissolving tanks with scrubbers.

Table 3-7. Current Actual Emissions from No. 4 Lime Kiln, Buckeye Florida, Foley Mill

Regulated Pollutant	Emission Factor	Reference	Short-term Activity Factor [a]		Short-term Emissions (lb/hr)	Annual Activity Factor [a,b]	Annual Emissions (TPY)
Particulate (PM)	3.4 lb/hr	1	--		2.86 3.40 ✓	7,328 hr/yr	12.46 ✓
Particulate (PM_{10})	100 % of PM	2	--		3.40 2.86 ✓	--	12.46 ✓
Sulfur dioxide	1 lb/ton CaO	3	25.90	ton CaO/hr	25.90	175,290 ton CaO/yr	87.65 ✓
Nitrogen oxides	2.19 lb/ton CaO	3	25.90	ton CaO/hr	56.72	175,290 ton CaO/yr	191.94 ✓ ✓
Carbon monoxide	0.41 lb/ton CaO	4	25.90	ton CaO/hr	10.62	175,290 ton CaO/yr	35.93 ✓

Notes:

[a] Lime product based on the average product from 1998-1999.
1998: 160,145 tons CaO
1999: 190,435 tons CaO
1998-1999 Maximum: 25.9 tons CaO/hr

[b] Annual operation based on the 1998-1999 average hours of operation.
1998: 6,795.9 hr/yr
1999: 7,860.2 hr/yr

References:

1. Average of average PM emissions from 1998 and 1999 stack tests, 2.8 lb/hr and 3.9 lb/hr, respectively. These values include a 15% factor to account for startup, shutdown and malfunctions.
2. Assumes PM_{10} makes up 100% of PM emissions.
3. Based on maximum permitted emission rate.
4. Factor is from NCASI Technical Bulletin No. 416, Table 6, Kiln C.

Table 3-9. Current Actual Emissions from the Lime Slakers/Causticizer, Buckeye Florida, Foley Mill

Regulated Pollutant	Emission Factor	Reference	Short-term Emissions [c] (lb/hr)	Annual Activity Factor [a, b]	Annual Emissions [c] (TPY)	
Particulate (PM)	2.08 lb/hr	1	4.16 ✓	8,032 hr/yr ✓ ✓	16.71 ✓	17
Particulate (PM_{10})	100 % of PM	2	4.16 ✓	100 % of PM ✓	16.71 ✓	17
Sulfur dioxide	--	--	--	--	--	
Nitrogen oxides	--	--	--	--	--	
Carbon monoxide	--	--	--	--	--	

Notes:

[a] Lime product based on the average lime product that went to the slakers from 1998-1999.
1998: 154,054 tons CaO
1999: 158,155 tons CaO

[b] Annual operation based on the 1998-1999 average hours of operation.
1998: 7,942.3 hr/yr
1999: 8,122 hr/yr

[c] A factor of 2 is included in calculations to account for both the lime slakers and the causticizers.

References:

1. Allowable emission rate from current permit.
2. Assumes PM_{10} makes up 100% of PM emissions.

Table 3-11. Current Actual Emissions from the Lime Storage Bins, Buckeye Florida, Foley Mill

Regulated Pollutant	Emission Factor	Reference	Short-term Emission (lb/hr)	Annual Activity Factor [a b]	Annual Emissions (TPY)
Particulate (PM)	0.34 lb/hr	1	0.34 ✓	7,328 hr/yr	1.25 ✓
Particulate (PM_{10})	100 % PM	2	0.34 ✓	100 % of PM	1.25 ✓
Sulfur dioxide	--	--	--	--	--
Nitrogen oxides	--	--	--	--	--
Carbon monoxide	--	--	--	--	--

Notes:

[a] Annual operation based on the 1998-1999 average hours of operation for the No. 4 Lime Kiln.
1998: 6,795.9 hr/yr
1999: 7,860.2 hr/yr

[b] A factor of 2 is included in calculations to account for both the lime slakers and the causticizers.

References:
1. Based on maximum permitted emission rate.
2. Assumes PM_{10} makes up 100% of PM emissions.

Table 3-17. Future Maximum Emissions from No. 4 Recovery Boiler Burning Black Liquor Solids, Buckeye Florida, Foley Mill

Regulated Pollutant	Emission Factor		Reference	Short-term Activity Factor[a]		Short-term Emissions (lb/hr)	Maximum Annual Emissions[b] (TPY)
Particulate (PM)	113.4	lb BLS/hr	1	--	--	113.4	496.7
Particulate (PM_{10})	77.6	% of PM	2	--		88.00	385.4
Sulfur dioxide	0.22	lb/MMBtu	3	803	MMBtu/hr	176.66	773.8
Nitrogen oxides	0.13	lb/MMBtu	3	803	MMBtu/hr	104.39	457.2
Carbon monoxide (hourly)	20.0	lb/1,000 lb BLS	4	133.825	1,000 lb BLS/hr	2,676.5	
Carbon monoxide (annual)	5.3	lb/1,000 lb BLS	7	133.825	1,000 lb BLS/hr		3,106.6

Notes:

[a] Based on proposed future maximum operating rate of 133,825 lb BLS/hr; 12 MMBtu/ton BLS; and 8,760 hr/yr.

[b] Based on 100% black liquor solids firing.

References:

1. Based on Rule 62-296.404(2)(a), F.A.C.
2. Based on AP-42 Tables 10.2-1, 10.2-2, and Figure 10.2-2 for Kraft pulping sources.
3. Emission factor based on NCASI Bulletin No. 646, Tables 8-11, non-direct contact evaporator with ESP, average factor used.
4. Based on NCASI Bulletin No. 416, Table 5 and Figure 17 (20 lb/1,000 lb BLS for hourly emissions and 5.3 lb/1,000 lb BLS for annual average).

Table 3-19. Future Maximum Potential Emissions from No. 4 Smelt Dissolving Tank at Buckeye Florida, Foley Mill

Regulated Pollutant	Emission Factor	Reference	Activity Factor [a]	Short-term Emissions (lb/hr)	Annual Emissions (TPY)
Particulate (PM)	30.19 lb/hr	1	8,760 hr/yr	30.2	132.2
Particulate (PM_{10})	89.5 % of PM	2	--	27.0	118.3
Sulfur dioxide	0.016 lb/ton BLS	3	66.9 tons BLS/hr	1.07	4.69
Nitrogen oxides	0.033 lb/ton BLS	3	66.9 tons BLS/hr	2.21	9.67
Carbon monoxide	--		--	--	--

Note:

[a] Based on the proposed future maximum operating rate of 133,825 lb BLS/hr and 8,760 hr/yr.

References:

1. Based on current permitted rate.
2. AP-42, Table 10.2-7.
3. Data is averages from NCASI Bulletin No. 646, Tables 16-18, for smelt dissolving tanks with scrubbers.

Table 3-23. Future Maximum Emissions from No. 4 Lime Kiln, Buckeye Florida, Foley Mill

Regulated Pollutant	Emission Factor	Reference	Hourly Activity Factor [a]	Short-term Emissions (lb/hr)	Annual Activity Factor [a]	Annual Emissions (TPY)
Particulate (PM)	20 lb/hr	1		20.0	8,760 hr/yr	87.60
Particulate (PM_{10})	100 % of PM	2		20.0	--	87.60
Sulfur dioxide	1 lb/ton CaO	1	31.25 ton CaO/hr	31.25	273,750 ton CaO/yr	136.88
Nitrogen oxides	2.19 lb/ton CaO	1	31.25 ton CaO/hr	68.44	273,750 ton CaO/yr	299.76
Carbon monoxide	0.41 lb/ton CaO	3	31.25 ton CaO/hr	12.81	273,750 ton CaO/yr	56.12

References:

1. Based on maximum permitted emission rate.
2. Assumes PM_{10} makes up 100% of PM emissions.
3. Factor is from NCASI Technical Bulletin No. 416, Table 6, Kiln C.

Note:

[a] Based on maximum permitted production rate of 62,500 lb lime produced at 90% CaO and maximum allowed hours of operation.

Table 3-26. Future Maximum Emissions from the Lime Slakers/Causticizers, Buckeye Florida, Foley Mill

Regulated Pollutant	Emission Factor	Reference	Short-term Emissions [b] (lb/hr)	Activity Factor [a]	Annual Emissions [b] (TPY)
Particulate (PM)	2.08 lb/hr	1	4.16	8,760 hr/yr	18.2
Particulate (PM_{10})	100 % PM	2	4.16	100 % PM	18.2
Sulfur dioxide	--	--		--	--
Nitrogen oxides	--	--		--	--
Carbon monoxide	--	--		--	--

References:

1. Allowable emission rate from current permit.
2. Assumes PM_{10} makes up 100% of PM emissions.

Notes:

[a] Based on proposed maximum permitted production rate and maximum possible operating hours per year.

[b] A factor of 2 is included in calculations to account for both the lime slakers and the causticizers.

Table 3-28. Future Maximum Emissions from Lime Storage Bins, Buckeye Florida, Foley Mill

Regulated Pollutant	Emission Factor	Reference	Short-term Emissions (lb/hr)	Activity Factor [a]	Annual Emissions (TPY)
Particulate (PM)	0.34 lb/hr	1	0.34	8,760 hr/yr	1.49
Particulate (PM_{10})	100 % PM	2	0.34	100 % PM	1.49
Sulfur dioxide	--	--		--	--
Nitrogen oxides	--	--		--	--
Carbon monoxide	--	--		--	--

References:
1. Based on maximum permitted emission rate.
2. Assumes PM_{10} makes up 100% of PM emissions.

Note:
[a] Based on maximum annual operation of 8,760 hours.

APPENDIX B
BASELINE EMISSIONS TABLES

Table B-1. Baseline (1974) Long-term PM10 Emissions for Buckeye Florida, Foley Mill

	Plant Source ID	Model ID	PM Emission Factors			Activity Factors[f]			Percentage as PM10 %	Ref.	PM10 Emissions TPY	g/s	
No. 3 Recovery Boiler	007	RB3B	4.80E-03	lb/lb BLS	[a]	548	MM lb/yr BLS		75.0%	1	986.1	28.37	✓
No. 4 Recovery Boiler	011	RB4B	1.25E-03	lb/lb BLS	[b]	670	MM lb/yr BLS		75.0%	1	314.3	9.04	✓
No. 2 Smelt Dissolving Tank	021	SDT2B	3.33E-04	lb/lb BLS	[c]	512	MM lb/yr BLS		89.5%	2	76.4	2.20	✓
No. 3 Smelt Dissolving Tank	027	SDT3B	3.31E-04	lb/lb BLS	[d]	548	MM lb/yr BLS		89.5%	2	81.1	2.33	✓
No. 4 Smelt Dissolving Tank	023	SDT4B	9.62E-05	lb/lb BLS	[e]	670	MM lb/yr BLS		89.5%	2	28.8	0.83	✓
Combined stack													
No. 1 Bark Boiler	004		8,900	lb/day	[g]	355	day/yr		32%	3	505.5	14.54	✓
No. 3 Power Boiler	019		8.57	lb/1000 gal	[h]	10,045.6	1000 gal/yr	[l]	86%	4	37.03	1.07	✓
Totals:	004, 019	COMBOB									542.5	15.61	
No. 1 Lime Kiln		LK1B	6.19E-01	lb/ton lime mud	[i]	83,690	ton/yr lime mud		98.3%	5	25.46	0.73	✓
No. 2 Lime Kiln		LK2B	7.25E-01	lb/ton lime mud	[j]	92,526	ton/yr lime mud		98.3%	5	32.98	0.95	✓
No. 3 Lime Kiln		LK3B	4.67E-01	lb/ton lime mud	[k]	106,928	ton/yr lime mud		98.3%	5	24.53	0.71	✓

Notes:

[a] Air construction application 5/15/74, stack test 6/20/76.

[b] Air construction application 3/14/73, stack test 6/20/76.

[c] Air construction application 3/15/74, stack test 11/9/75.

[d] Air construction application 5/9/74, stack test 6/19/75.

[e] Air construction application 6/22/76, stack test 7/24/75.

[f] KBN report "Sulfur Dioxide Air Quality Impact Evaluation of TRS Burning", 2/86.

[g] Air operating permit application 1/6/1971

[h] Air operating permit application 6/24/75

[i] Test data 10/28/80

[j] Test data 12/9/75

[k] Test data 11/4/80

[l] 1977 actual operating data for No. 2 Bark Boiler, converted bark usage to equivalent oil usage.

References:

1. Based on AP-42, Figure 10.2-2, for DCE recovery boilers with ESP.
2. Based on AP-42, Table 10.2-7, for SDT with a venturi scrubber.
3. AP-42, Table 1.6-7 for bark/wood boiler with mechanical collector.
4. Based on AP-42, Table 1.3-5, for industrial boilers (SCC code 1-02-004-01) with no control.
5. Based on AP-42, Table 10.2-4 for lime kiln with venturi scrubber

Table B-2. Baseline (1974) Short-term PM10 Emissions for Buckeye Florida, Foley Mill

	Plant Source ID	Model ID	PM (lb/hr)	PM10 Emission Factor	Ref.	PM10 Emissions lb/hr	PM10 Emissions g/s	PM emissions based on:
No. 3 Recovery Boiler	007	RB3B	393	75.0%	1	294.75	37.14	✓ Air construction application 5/15/74.
No. 4 Recovery Boiler	011	RB4B	113.17	75.0%	1	84.88	10.69	✓ Air construction application 3/14/73.
No. 2 Smelt Dissolving Tank	021	SDT2B	30.83333	89.5%	2	27.60	3.48	✓ Test data 3/15/74, AP-42, Table 10.2-1.
No. 3 Smelt Dissolving Tank	027	SDT3B	27.3	89.5%	2	24.43	3.08	✓ Test data 5/9/74, AP-42, Table 10.2-1.
No. 4 Smelt Dissolving Tank	023	SDT4B	30.16	88.5%	3	26.69	3.36	✓ Test data 7/27/75.
Combined stack								
No. 1 Bark Boiler	004		370.83	32%	4	118.7	14.95	Operating permit, application date 1/6/1971.
No. 3 Power Boiler	019		12.50	86%	5	10.8	1.35	Air operating permit application date 6/24/75.
Totals:	004, 019	COMBOB				129.4	16.31	✓
No. 1 Lime Kiln		LK1B	8.77	98.3%	6	8.62	1.09	✓ Test data 10/28/80.
No. 2 Lime Kiln		LK2B	11.30	98.3%	6	11.11	1.40	✓ Test data 12/9/75 .
No. 3 Lime Kiln		LK3B	7.36	98.3%	6	7.23	0.91	✓ Test data 11/4/80.

References:

1. AP-42, Figure 10.2-2, for DCE recovery boilers with ESP.
2. Conservative assumption for mesh pad.
3. AP-42, Table 10.2-7 for smelt desolving tanks with a venturi scubber.
4. AP-42, Table 1.6-7 for bark/wood boiler with mechanical collector.
5. Based on AP-42, Table 1.3-5, for industrial boilers (SCC code 1-02-004-01) with no control.
6. Based on AP-42, Table 10.2-4 for lime kiln with venturi scrubber

Table B-3. Baseline (1974) SO2 Emissions for Buckeye Florida, Foley Mill

	Plant Source ID	Model ID	SO2 Emission Factor	Ref.	Activity Factor	Short-term SO2 Emissions lb/hr	Short-term SO2 Emissions g/s	Long-term SO2 Emissions TPY	Long-term SO2 Emissions g/s
No. 4 Recovery Boiler	011	RB4B	0.22 lb/MMBtu	1	536.25 MMBtu/hr [a]	118.0	14.86	442.2 [c]	12.72
No. 4 Smelt Dissolving Tank	023	SDT4B	0.016 lb/ton BLS	2	51.56 ton BLS/hr [a]	0.825	0.10	2.68 [c]	0.08
No. 3 Power Boiler	019	COMBOB	356.4 lb/1000gal	3	35 1000 gal/day [b]	519.7	65.49	–	
					10,045.6 1000 gal/yr [c]	--		1,790.1	51.50
No. 1 Lime Kiln		LK1B			--	4.33 [b]	0.55	✓ 12.78 [c]	0.37
No. 2 Lime Kiln		LK2B	--		--	4.78 [b]	0.60	✓ 14.11 [c]	0.41
No. 3 Lime Kiln		LK3B	--		--	5.53 [b]	0.70	✓ 16.31 [c]	0.47

---

[a] Air application, 3/14/73.

[b] Air application, 6/24/75

[c] KBN report "Sulfur Dioxide Air Quality Impact Evaluation of TRS Burning", 2/86 and 1977 actual operating data for No. 2 Bark Boiler, converted bark usage to equivalent oil usage.

APPENDIX C

CALPUFF/CALMET MODELING INFORMATION

APPENDIX C

1.0 Model Selection

The California Puff (CALPUFF, Version 5.2) air model was used to model pollutant impacts from sources at the Buckeye Foley Mill and other facilities at the St. Marks National Wilderness Area (NWA) and the Bradwell Bay NWA, both PSD Class I areas. CALPUFF is a non-steady state Lagrangian Gaussian puff long-range transport (LRT) model that includes algorithms for building downwash effects as well as chemical transformations (important for visibility controlling pollutants), and wet/dry deposition. The California Puff meteorological and geophysical data processor (CALMET, Version 5), a preprocessor to the CALPUFF model, is a diagnostic meteorological model that produces a three-dimensional field of wind and temperature and a two-dimensional field of other meteorological parameters. The CALMET model was designed to process raw meteorological, terrain, and land-use databases to be used in the air modeling analysis. The CALPUFF modeling system uses a number of preprocessor programs that extract data from large databases and converts the data into formats suitable for input to the CALMET model. The processed data produced from the CALMET model were input to the CALPUFF model to assess the pollutant specific impact. Both the CALMET and the CALPUFF models were used in a manner that is recommended by the IWAQM Phase 2 Report (see Table C-1).

1.1 CALPUFF MODEL SETTINGS

The CALPUFF model general settings contained in Table C-2 were used for the Level II refined modeling analysis. A listing of detailed settings used in the modeling analysis is presented in Table C-3.

1.2 BUILDING WAKE EFFECTS

The CALPUFF model analysis included the direction-specific building heights and projected widths to account for the effects of building-induced downwash on the Buckeye Foley Mill sources. The building dimensions used in the CALPUFF model are identical to those processed for the Industrial Source Complex Short-Term (ISCST) model using the Building Profile Input Program (BPIP), Version 95086. The building data from the ISCST model were converted to CALPUFF model input format using the utility program ISC2PUF.

1.3 RECEPTOR LOCATIONS

The CALPUFF model analysis used receptor grids with an array of receptors of sufficient density and extent to adequately predict the pollutant impacts at the St. Marks NWA and the Bradwell Bay NWA. Specifically, at the St. Marks NWA, the grid consisted of 125 receptors. Because the NWA is located at two separate areas, 108 receptors were used along the boundary at the larger eastern area, while 18 receptors were used at the western area, which consists entirely of Thoms Island. At the Bradwell Bay NWA, the grid consisted of 18 receptors. At both NWA, receptors were generally located at a 1-km spacing from one another.

The receptors used for the analysis are presented in Table C-4. Because the St. Marks NWA and the Bradwell Bay NWA are flat and at sea level, all receptors were assigned an elevation of zero.

1.4 SIGNIFICANT IMPACT ANALYSIS

Because the Bradwell Bay NWA is beyond 50 km from the Buckeye Foley Mill site, the impacts for each project were predicted with the CALPUFF model to determine if the impacts are greater than the proposed EPA Class I significant impact levels. If the impacts are predicted to be greater than the significant impact levels, then PSD Class I increment analysis would be required.

1.5 PSD CLASS I INCREMENT ANALYSIS

If the project's impacts are predicted to be greater than the significant impact levels at the NWA, concentrations would be predicted with the CALPUFF model to determine the PSD increment consumption. The maximum PSD increment consumption would be compared to EPA and DEP allowable PSD Class I increments.

2.0 METEOROLOGICAL DATA PROCESSING

The California Puff meteorological and geophysical data preprocessor (CALMET, Version 5) was used to develop the gridded parameter fields required for the refined modeling analysis. The follow sections discuss the specific data used and processed in the CALMET model.

2.1 CALMET SETTINGS

The CALMET model general settings contained in Table C-5 were used for the refined modeling analysis. A summary of the detailed settings used is presented in Table C-6.

2.2 MODELING DOMAIN

The modeling domain defines the boundary of plume simulation area. The modeling domain used for the analysis is in the shape of a rectangle extending approximately 475 km in the east-west (x) direction and 300 km in the north-south (y) direction. The southwest corner of the rectangle is the origin of the modeling domain and is located at 29.25 N degrees latitude and 81.5 W degrees longitude.

For the processing of meteorological and geophysical data, 95 grid cells were used in the x-direction and 60 grid cells were used in the y-direction. A grid resolution of 5 km was used. The air modeling analysis was performed with the UTM coordinate system.

2.3 MESOSCALE MODEL – GENERATION 4 (MM4) DATA

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

To apply the MM4 dataset to a regional modeling domain, such as the area that will incorporate the Buckeye Foley Mill and the NWA, a sub-set domain was developed based on the MM4 data local coordinate system. In this coordinate system, the subset domain consisted of a 8 x 6- cell rectangle, spaced at 80 km, extending from MM4 coordinates (45,13) to (52,18). These data were processed to create a MM4.Dat file, which was input to the CALMET model.

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

2.4 SURFACE DATA STATIONS AND PROCESSING

The processed surface data includes the following eight primary weather stations that are located either within or just beyond the modeling domain. The seven surface stations include Jacksonville, Gainesville, Tallahassee, and Tampa in Florida; Columbus and Macon in Georgia; and Mobile and Montgomery in Alabama. The parameters included for these stations are wind speed, wind direction, cloud ceiling height, opaque cloud cover, dry bulb temperature, relative humidity, station pressure and a precipitation code that is based on current weather conditions. The weather station data for all stations but Gainesville were extracted for the year 1990 from the National Climatic Data Center's (NCDC) Solar and Meteorological Surface Observational Network (SAMSON) CD. The surface data from Gainesville were processed from NCDC CD-144 format. All data were processed with the CALMET preprocessor utility program, SMERGE, to create the SURF.DAT file for input to CALMET. Because the air modeling domain extends into the Gulf of Mexico, surface observations from the Cape San Blas C-MAN station were included in the analysis. The data from Cape San Blas were converted into an overwater surface station format (i.e., SEA) for input to CALMET.

2.5 UPPER AIR DATA STATIONS AND PROCESSING

Upper air data was processed from three weather stations including Apalachicola and Tampa Bay/Ruskin, in Florida and Waycross in Georgia. The upper air data were extracted from the NCDC Radiosonde Data CD and processed into the NCDC Tape Deck (TD) 6201 format by the CALMET preprocessor utility program, READ62, to create an upper air file for each station.

A summary of the surface, over-water, and upper air stations used in the air modeling analysis is presented in Table C-7.

2.6 PRECIPITATION DATA STATIONS AND PROCESSING

Hourly precipitation data were developed for 57 primary and secondary NWS precipitation stations located in southern Alabama, southern Georgia and northern Florida. The stations were selected to provide detailed coverage in all areas within and around the CALMET modeling domain. The hourly precipitation data were extracted from data obtained by the NCDC and organized by EarthInfo on CD. These CD data were extracted into Tape Deck (TD) 3240 format. Once in TD3240 format, the hourly precipitation data for each of the 57 stations were extracted and then re-merged into CALMET input format (PRECIP.DAT) using the utility programs PXTRACT and PMERGE, respectively.

A listing of the precipitation stations used for air modeling analysis is presented in Table C-8.

2.7 GEOPHYSICAL DATA PROCESSING

Terrain elevations for each grid cell of the modeling domain were obtained from 1-degree Digital Elevation Model (DEM) files obtained from US Geographical Survey (USGS) internet website. The DEM data for the modeling domain grid was processed using the utility program TERREL. One-degree land-use data were also obtained from the USGS website. The land-use parameters that were used for the modeling domain were developed using the CALMET preprocessor utility programs CTGCOMP and

GTGPROC. Other processed parameters extracted with the land use data are surface roughness, surface albedo, Bowen ratio, soil heat flux, and leaf index field. The processed land-use parameters were combined with the processed terrain elevation data to create the GEO.DAT file that was input to CALMET.

Table C-1. Outline of IWAQM Level II Refined Modeling Analyses Recommendations*

Meteorology	Use CALMET (minimum 6 to 10 layers in the vertical; top layer must extend above the maximum mixing depth expected); horizontal domain extends 50 to 80 km beyond outer receptors and sources being modeled; terrain elevation and land-use data is resolved for the situation.
Receptors	Within Class I area(s) of concern; obtain regulatory concurrence on coverage.
Dispersion	CALPUFF with default dispersion settings. Use MESOPUFF II chemistry with wet and dry deposition. Define background values for ozone and ammonia for area.
Processing	Use highest predicted 24-hr SO_4, PM_{10} and NO_3 values; compute a day-average relative humidity factor (f(RH)) for the worst day for each predicted species, calculate extinction coefficients and compute percent change in extinction using the FLM supplied background extinction.

---

* *IWAQM Phase II Summary Report and Recommendations for Modeling Long Range Transport Impacts* (EPA, 12/98)

Table C-2. CALPUFF Model General Settings

Parameter	Setting
Pollutant Species	SO_2, SO_4, NO_x, HNO_3, and NO_3, and PM_{10}
Chemical Transformation	MESOPUFF II scheme
Deposition	Include both dry and wet deposition, plume depletion
Meteorological/Land Use Input	CALMET
Plume Rise	Transitional, Stack-tip downwash, Partial plume penetration
Dispersion	Puff plume element, PG /MP coefficients, rural mode, ISC building downwash scheme
Terrain Effects	Partial plume path adjustment
Output	Create binary concentration file including output species for SO_4, NO_3 and PM_{10}
Model Processing	Highest predicted 24-hour SO_4, NO_3 and PM_{10} concentrations for year
Background Values	Ozone: 80 ppb; Ammonia: 10 ppb

Table C-3. CALPUFF Model Detailed Settings

Number	Input Group Description	Variable	Seq	Description	Default Value	Modeled Value
1	Run Control	NMETDAT	1	Number of CALMET data files for run	1	4
1		METRUN	2	Do we run all periods (1) or a subset (0)?	0	0
1		IBYR	3	Beginning year	User Defined	90
1		IBMO	4	Beginning month	User Defined	1
1		IBDY	5	Beginning day	User Defined	6
1		IBHR	6	Beginning hour	User Defined	0
1		IRLG	6	Length of run (hours)	User Defined	Quarterly
1		NSPEC	7	Number of species modeled (for MESOPUFF II chemistry)	5	6
1		NSE	8	Number of species emitted	3	3
1		ITEST	9		2	2
1		MRESTART	10	Restart options (0 = no restart) allows splitting runs into smaller segments	0	0
1		NRESPD	11		0	0
1		METFM	12	Format of input meteorology (1 = CALMET, 2 = ISC)	1	1
1		AVET	13	Averaging time lateral dispersion parameters (minutes)	60	60
1		PGTIME	14	PG Averaging Time (minutes)	60	60
2	Tech Options	MGAUSS	1	Near-field vertical distribution (1 = Gaussian)	1	1
2		MCTADJ	2	Terrain adjustments to plume path (3 = Plume path)	3	3
2		MCTSG	3	Do we have subgrid hills? (0 = No) allows CTDM-like treatment for subgrid scale hills	0	0
2		MSLUG	4	Near-field puff treatment (0 = No slugs)	0	0
2		MTRANS	5	Model transitional plume rise? (1 = Yes)	1	1
2		MTIP	6	Treat stack tip downwash? (1 = Yes)	1	1
2		MSHEAR	7	Treat vertical wind shear? (0 = No)	0	0
2		MSPLIT	8	Allow puffs to split? (0 = No)	0	0
2		MCHEM	9	MESOPUFF-II Chemistry? (1 = Yes)	1	1
2		MWET	10	Model wet deposition? (1 = Yes)	1	1
2		MDRY	11	Model dry deposition? (1 = Yes)	1	1
2		MDISP	12	Method for dispersion coefficients (3 = PG & MP)	3	4
2		MTURBVW	13	Turbulence characterization? (Only if MDISP = 1 or 5)	3	0
2		MDISP2	14	Backup coefficients (Only if MDISP = 1 or 5)	3	4
2		MROUGH	15	Adjust PG for surface roughness? (0 = No)	0	0
2		MPARTL	16	Model partial plume penetration? (0 = No)	1	1
2		MTINV	17	Elevated inversion strength (0 = compute from data)	0	0
2		MPDF	18	Use PDF for convective dispersion? (0 = No)	0	0
2		MSGTIBL	19	Use TIBL module? (0 = No) allows treatment of subgrid scale coastal areas	0	0
2		MREG	20	Regulatory default checks? (1 = Yes)	1	0
3	Species List	CSPECn		Names of species modeled (for MESOPUFF II must be SO2-SO4-NOX-HNO3-NO3, PM10	User Defined	ALL 6
3		Specie Groups		Grouping of species if any	User Defined	NA
3		Specie Names		Manner species will be modeled	User Defined	
4	Grid Control	NX	1	Number of east-west grids of input meteorology	User Defined	95
4		NY	2	Number of north-south grids of input meteorology	User Defined	60
4		NZ	3	Number of vertical layers of input meteorology	User Defined	9
4		DGRIDKM	4	Meteorology grid spacing (km)	User Defined	5
4		ZFACE	5	Vertical cell face heights of input meteorology	User Defined	9 values
4		XORIGKM	6	Southwest corner (east-west) of input User	efined meteorolog	452
4		YORIGIM	7	Southwest corner (north-south) of input User	efined meteorolog	3236
4		IUTMZN	8	UTM zone	User Defined	17
4		XLAT	9	Latitude of center of meteorology domain	User Defined	30.5
4		XLONG	10	Longitude of center of meteorology domain	User Defined	85
4		XTZ	11	Base time zone of input meteorology	User Defined	5
4		IBCOMP	12	Southwest X-index of computational domain	User Defined	1
4		JBCOMP	13	Southwest Y-index of computational domain	User Defined	1
4		IECOMP	14	Northeast X-index of computational domain	User Defined	95
4		JECOMP	15	Northeast Y-index of computational domain	User Defined	60
4		LSAMP	16	Use gridded receptors? (T = Yes)	F	F
4		IBSAMP	17	Southwest X-index of receptor grid	User Defined	0
4		JBSAMP	18	Southwest Y-index of receptor grid	User Defined	0
4		IESAMP	19	Northeast X-index of receptor grid	User Defined	95
4		JESAMP	20	Northeast Y-index of receptor grid	User Defined	60
4		MESHDN	21	Gridded recpetor spacing = DGRIDKM/MESHDN	1	1
5	Output Options	ICON	1	Output concentrations? (1 = Yes)	1	1
5		IDRY	2	Output dry deposition flux? (1 = Yes)	1	0
5		IWET	3	Output west deposition flux? (1 = Yes)	1	0
5		IVIS	4	Output RH for visibility calculations (1 = Yes)	1	0
5		LCOMPRS	5	Use compression option in output? (T = Yes)	T	T
5		ICPRT	6	Print concentrations? (0 = No)	0	0
5		IDPRT	7	Print dry deposition fluxes (0 = No)	0	0
5		IWPRT	8	Print wet deposition fluxes (0 = No)	0	0
5		ICFRQ	9	Concentration print interval (1 = hourly)	1	24
5		IDFRQ	10	Dry deposition flux print interval (1 = hourly)	1	1
5		IWFRQ	11	West deposition flux print interval (1 = hourly)	1	1
5		IPRTU	12	Print output units (1 = g/m**3; g/m**2/s; 3 = ug/m3, ug/m2/s)	1	3
5		IMESG	13	Status messages to screen? (1 = Yes)	1	1
5		LDEBUG	14	Turn on debug tracking? (F = No)	F	F
5		NPFDEB	15	(Number of puffs to track)	(1)	1
5		NN1	16	(Met. Period to start output)	(1)	1
5		NN2	17	(Met. Period to end output)	(10)	10
7	Dry Dep Chem	Dry Gas Dep		Chemical parameters of gaseous deposition species	User Defined	NOX,HNO3

Table C-3. CALPUFF Model Detailed Settings

Number	Input Group Description	Variable	Seq	Description	Default Value	Modeled Value
8	Dry Dep Size	Dry Part. Dep		Chemical parameters of particulate deposition species	User Defined	SO2 SO4,NO3 PM10
9	Dry Dep Misc	RCUTR	1	Reference cuticle resistance (s/cm)	30	30
9		RGR	2	Reference ground resistance (s/cm)	10	10
9		REACTR	3	Reference reactivity	8	8
9		NINT	4	Number of particle-size intervals	9	9
9		IVEG	5	*Vegetative state (1 = active and unstressed)*	1	1
10	Wet Dep	Wet Dep		Wet deposition parameters	User Defined	Var
11	Chemistry	MOZ	1	Ozone background? (0 = constant background value; 1 = read from ozone.dat)	1	0
11		BCKO3	2	Ozone default (ppb) (Use only for missing data)	80	80
11		BCKNH3	3	Ammonia background (ppb)	10	10
11		RNITE1	4	Nighttime SO2 loss rate (%/hr)	0.2	0.2
11		RNITE2	5	Nighttime NOx loss rate (%/hr)	2	2
11		RNITE3	6	Nighttime HNO3 loss rate (%/hr)	2	2
12	Dispersion	SYTDEP	1	Horizontal size (m) to switch to time dependence	550	550
12		MHFTSZ	2	Use Heffter for vertical dispersion? (0 = No)	0	0
12		JSUP	3	PG Stability class above mixed layer	5	5
12		CONK1	4	Stable dispersion constant (Eq 2.7-3)	0.01	0.01
12		CONK2	5	Neutral dispersion constant (Eq 2.7-4)	0.1	0.1
12		TBD	6	Transition for downwash algorithms (0.5 = ISC)	0.5	0.5
12		IURB1	7	Beginning urban landuse type	10	10
12		IURB2	8	Ending urban landuse type	19	19
12		ILANDUIN	9	Land use type (20 = Unirrigated agricultural land)	(20)	20
12		ZOIN	10	Roughness length (m)	(0.25)	0.25
12		XLAIIN	11	Leaf area index	(3)	3
12		ELEVIN	12	Met. Station elevation (m above MSL)	(0)	0
12		XLATIN	13	Met. Station North latitude (degrees)	(-999)	-999
12		XLONIN	14	Met. Station West longitude (degrees)	(-999)	-999
12		ANEMHT	15	Anemometer height of ISC meteorological data (m)	(10)	NA
12		ISIGMAV	16	Lateral turbulence (Not used with ISC meteorology)	(1)	NA
12		IMIXCTDM	17	Mixing heights (Not used with ISC meteorology)	(1)	NA
12		XMXLEN	18	Maximum slug length in units of DGRIDKM	1	1
12		XSAMLEN	19	Maximum puff travel distance per sampling step (units of DGRIDKM)	1	1
12		MXNEW	20	Maximum number of puffs per hour	99	99
12		MXSAM	21	Maximum sampling steps per hour	99	99
12		NCOUNT	22	Iterations when computing Transport Wind (Calmet & Profile Winds)	(2)	2
12		SYMIN	23	Minimum lateral dispersion of new puff (m)	1	1
12		SZMIN	24	Minimum vertical dispersion of new puff (m)	1	1
12		SVMIN	25	Array of minimum lateral turbulence (m/s)	6 * 0.50	6*0.50
12		SWMIN	26	Array of minimum vertical turbulence (m/s)	,0.12,0.08,0.06,0.03,0	SAME
12		CDIV (1), (2)	27	Divergence criterion for dw/dz (1/s)	0.01 (0.0,0.0)	0.0,0.0
12		WSCALM	28	Minimum non-calm wind speed (m/s)	0.5	0.5
12		XMAXZI	29	Maximum mixing height (m)	3000	3000
12		XMINZI	30	Minimum mixing height (m)	50	50
12		WSCAT	31	Upper bounds 1st 5 wind speed classes (m/s)	.54,3.09,5.14,8. 23,10	SAME
12		PLX0	32	Wind speed power-law exponents	,0.07,0.10,0.15,0.35,	SAME
12		PTGO	33	Potential temperature gradients PG E and F (deg/km)	0.020,0.035	SAME
12		PPC	34	Plume path coefficients (only if MCTADJ = 3)	.5,0.5,0.5,0.5,0.35,0.3	SAME
12		SL2PF	35	Maximum Sy/puff length	10	10
12		NSPLIT	36	Number of puffs when puffs split	3	3
12		IRESPLIT	37	Hours when puff are eligible to split	User Defined	HR 17=1
12		ZISPLIT	38	Previous hour's mixing height(minimum)(m)	100	100
12		ROLDMAX	39	Previous Max mix ht/current mix ht ratio must be less then this value for puff to split	0.25	0.25
12		EPSSLUG	40	Convergence criterion for slug sampling integration	1.00E-04	1.0E-04
12		EPSAREA	41	Convergence criterion for area source integration	1.00E-06	1.0E-06
13	Point Source	NPT1	1	Number of point sources	User Defined	17
13		IPTU	2	Units of emission rates (1 = g/s)	1	1
13		NSPT1	3	Number of point source-species combinations	0	0
13		NPT2	4	Number of point sources with fully variable emission rates	0	0
13		Point Sources		Point sources characteristics	User Defined	VAR
14	Area Source	Area Sources		Area sources characteristics	User Defined	NA
15	Line Source	Line Sources		Buoyant lines source characteristics	User Defined	NA
16	Volume Source	NVL1		Number of volume sources	User Defined	5
		IVLU		Units for volume source (1= g/s)	User Defined	1
		NSVL1		Number of volume sources with emission scaling factors	0	1
17	Receptors	NREC		Number of user defined receptors	User Defined	125
17		Receptor Data		Location and elevation (MSL) of receptors	User Defined	VAR

Note:		
	DEPOS.	With Deposition
	DEFAULT	Uses defaults
	VAR	Variable Input
	NA	Not Applicable
	SAME	Same as recommended

Table C-4. Summary of Receptors Used for the CALPUFF Modeling Analysis

Receptor	UTM Coordinate (m)		Receptor	UTM Coordinate (m)	
Number	Easting	Northing	Number	Easting	Northing
Bradwell Bay National Wilderness Area (NWA)					
1	728000	3343000	10	733000	3333000
2	728000	3341000	11	736000	3346000
3	731000	3343000	12	736000	3343000
4	731000	3341000	13	736000	3341000
5	731000	3338000	14	736000	3338000
6	733000	3343000	15	736000	3336000
7	733000	3341000	16	738000	3343000
8	733000	3338000	17	738000	3341000
9	733000	3336000	18	741000	3341000
St. Marks NWA (eastern area)			64	794368	3328454.5
1	769660	3334380	65	778372	3332268.5
2	770000	3333480	66	778882.5	3332190.7
3	770420	3332920	67	779661.2	3332675.2
4	771060	3332350	68	780388.1	3332580.1
5	771850	3332110	69	780742.8	3332363.7
6	772100	3332710	70	781219.2	3332424.5
7	772380	3332160	71	781868.1	3332952.4
8	772230	3331440	72	782335.4	3332987
9	771570	3331050	73	782984.3	3333471.6
10	771450	3330530	74	783192	3333359.1
11	771700	3330220	75	783936.1	3333488.9
12	772420	3329810	76	784585	3333627.3
13	773350	3329870	77	785173.4	3333203.3
14	774000	3330230	78	785597	3333748.3
15	774270	3331020	79	786159.4	3333644.4
16	774100	3330040	80	787000	3333750
17	774740	3330480	81	788000	3333218.75
18	775370	3330910	82	782000	3335390.24
19	776140	3331240	83	781000	3335268.29
20	776220	3331880	84	780000	3333939
21	776490	3332400	85	789500	3331512
22	776440	3333010	86	791098	3330375
23	777370	3332250	87	790098	3330847
24	770000	3338000	88	794098	3329274
25	770000	3336000	89	793098	3329183
26	772000	3336000	90	792098	3329606
27	772000	3333000	91	791244	3330549
28	772000	3331000	92	791305	3333366
29	775000	3333000	93	790915	3335000
30	775000	3331000	94	791342	3337159
31	777000	3333000	95	789000	3337914
32	770200	3339000	96	788000	3337182
33	770200	3338000	97	787000	3336476
34	770200	3337200	98	786000	3336415
35	774400	3336100	99	785000	3336244
36	770400	3333000	100	784000	3336183
37	768900	3337600	101	783000	3336171
38	769100	3336800	102	791646	3336585
39	768800	3338400	103	791439	3338244
40	769300	3338800	104	789431	3338305
41	769800	3339100	105	791300	3332259.3
42	768755	3338411	106	791300	3331468.6
43	769098	3338713	107	790443	3338299.2
44	769399	3338902	108	791257.6	3335786.3
45	769717	3339105	**St. Marks NWA (Thoms Island)**		
46	770257	3339219	109	744700	3322400
47	769200	3336000	110	745400	3321399.9
48	769700	3335000	111	746500	3321399.9
49	770000	3334000	112	747100	3320500
50	771000	3332000	113	746400	3319899.9
51	773000	3330500	114	746200	3318800
52	774000	3330500	115	745600	3318000
53	771000	3336000	116	745200	3319200
54	773000	3336000	117	745200	3320399.9
55	774000	3336000	118	744100	3321500
56	775000	3335000	119	744700	3321000
57	775000	3334000	120	744700	3321700
58	775000	3333000	121	745400	3321000
59	776000	3333000	122	745400	3322000
60	776000	3331000	123	746000	3319500
61	778000	3333500	124	746000	3320500
62	779000	3334000	125	746000	3321200
63	789000	3333000			

Table C-5. CALMET Model General Settings

Parameter	Setting
Horizontal Grid Dimensions	475 by 300 km, 5 km grid resolution
Vertical Grid	8 layers
Weather Station Data Inputs	9 surface, 3 upper air, 57 precipitation stations
Wind model options	Diagnostic wind model, no kinematic effects
Prognostic wind field model	MM4 data, 80 km resolution, 8 x 6 grid, used for wind field initialization
Output	Binary hourly gridded meteorological data file for CALPUFF input

Table C-6. CALMET Model Detailed Settings

Variable	Description	Default Value	Modeled Value
GEO.DAT	Name of Geophysical data file	GEO.DAT	GEO.DAT
SURF.DAT	Name of Surface data file	SURF.DAT	SURF.DAT
PRECIP.DAT	Name of Precipitation data file	PRECIP.DAT	PRECIP.DAT
NUSTA	Number of upper air data sites	User Defined	3
Upn.DAT	Names of NUSTA upper air data files	Upn.DAT	UP1.UP5.DAT
NOWSTA	Number of Overwater met stations	User Defines	0
IBYR	Beginning year	User Defines	90
IBMO	Beginning month	User Defines	1
IBDY	Beginning day	User Defines	6
IBHR	Beginning hour	User Defines	0
IBTZ	Base time zone	User Defines	5
IRLG	Number of hours to simulate	User Defines	quarterly
IRTYPE	Output file type to create (must be 1 for CALPUFF)	1	1
LCALGRD	Are w-components and temperature needed?	T	T
NX	Number of east-west grid cells	User Defines	95
NY	Number of north-south grid cells	User Defines	60
DGRIDKM	Grid spacing	User Defines	5
XORIGKM	Southwest grid cell X coordinate	User Defines	452
YORIGKM	Southwest grid cell Y coordinate	User Defines	3236
XLAT0	Southwest grid cell latitude	User Defines	29.25
YLON0	Southwest grid cell longitude	User Defines	87.50
IUTMZN	UTM Zone	User Defines	16
LLCONF	When using Lambert Conformal map coordinates, roate winds from true north to map north?	F	F
XLAT1	Latitude of 1st standard parallel	30	30
XLAT2	Latitude of 2nd standard parallel	60	60
RLON0	Longitude used if LLCONF = T	90	NA
RLAT0	Latitude used in LLCONF = T	40	NA
NZ	Number of vertical layers	User Defines	8
ZFACE	Vertical cell face heights (NZ+1 values)	User Defines	9
LSAVE	Save met.data fields in an unformatted file?	T	T
INFORMO	Format of unformatted file (1-for CALPUFF)	1	1
NSSTA	Number of stations in SURF.DAT file	User Defines	8
NPSTA	Number of stations in PRECIP.DAT	User Defines	57
ICLOUD	Is cloud data to be input as gridded fields? (0 = No)	0	0
IFORMS	Format of surface data (2 = formatted)	2	2
IFORMP	Format of precipitation data (2 = formatted)	2	2
IFORMC	Format of cloud data (2 = formatted)	2	0
IWFCOD	Generate winds by diagnostic wind module? (1 = Yes)	1	1
IFRADJ	Adjust winds using Froude number effects? (1 = Yes)	1	1

Table C-6. CALMET Model Detailed Settings

Variable	Description	Default Value	Modeled Value
IKINE	Adjust winds using kinematic effects? (1 = Yes)	0	0
IOBR	Use O'Brien procedure for vertical winds? (0 = No)	0	0
ISLOPE	Compute slope flows? (1 = Yes)	1	1
IEXTRP	Extrapolate surface winds to upper layers? (-4 = use similarity theory and ignore layer 1 of upper air station data)	-4	-4
ICALM	Extrapolate surface calms to upper layers? (0 = No)	0	0
BIAS	Surface/upper-air weighting factors (NZ values)	NZ*0	8*0
IPROG	Using prognostic or MM-FDDA data? (0 = No)	4	4
LVARY	Use varying radius to develop surface winds?	F	F
RMAX1	Max surface over-land extrapoolation radius (km)	User Defines	40
RMAX2	Max aloft over-land extrapolation radius (km)	User Defines	100
RMAX3	Maximum over-water extrapolation radius (km)	User Defines	100
RMIN	Minimum extrapolation radius (km)	0.1	0.1
RMIN2	Distance (km) around an upper air site where veritcal extrapolation is excluded (Set to -1 if IEXTRP = +/-4)	4	4
TERRAD	Radius of influence of terrain features (km)	User Defines	10
R1	Relative weight at surface of Step 1 field and obs	User Defines	60
R2	Relative weight aloft of Step 1 field and obs	User Defines	100
DIVLIM	Maximum acceptable divergence	5.00E-06	5.00E-06
NITER	Max number of passes in divergence minimization	50	50
NSMTH	Number of passes in smoothing (NZ values)	2,4*(NZ-1)	2,4*(NZ-1)
NINTR2	Max number of stations for interpolations (NZ values)	99	99
CRITFN	Critical Froude number	1	1
ALPHA	Empirical factor triggering kinematic effects	0.1	0.1
IDIOPT1	Compute temperatures from observations (0 = True)	0	0
ISURFT	Surface station to use for surface temperature (between 1 and NSSTA)	User Defines	2
IDIOPT2	Compute domain-average lapse rates? (0 = True)	0	0
IUPT	Station for lapse rates (between 1 and NUSTA)	User Defines	3
ZUPT	Depth of domain-average lapse rate (m)	200	200
IDIOPT3	Compute internally initial guess winds? (0 = True)	0	0
IUPWND	Upper air station for domain winds (-1 = 1/ r**2 interpolation of all stations)	-1	-1
ZUPWND	Bottom and top of layer for 1st guess winds (m)	1, 1000	1, 5000
IDIOPT4	Read surface winds from SURF.DAT? (0 = True)	0	0
IDIOPT5	Read aloft winds from UPn.DAT? (0 = True)	0	0
CONSTB	Neutral mixing height B constant	1.41	1.41
CONSTE	Convective mixing height E constant	0.15	0.15

Table C-6. CALMET Model Detailed Settings

Variable	Description	Default Value	Modeled Value
CONSTN	Stable mixing height N constant	2400	2400
CONSTW	Over-water mixing height W constant	0.16	0.16
FCORIOL	Absolute value of Coriolis parameter	1.00E-04	1.00E-04
IAVEXZI	Spatial averaging of mixing heights? (1 = True)	1	1
MNMDAV	Max averaging radius (number of grid cells)	1	3
HAFANG	Half-angle for looking upwind (degrees)	30	30
ILEVZI	Layer to use in upwind averaging (between 1 and NZ)	1	1
DPTMIN	Minimum capping potential temperature lapse rate	0.001	0.001
DZZI	Depth for comuting capping lapse rate (m)	200	200
ZIMIN	Minimum over-land mixing height (m)	50	50
ZIMAX	Maximum over-land mixing height (m)	3000	3000
ZIMINW	Minimum over-water mixing height (m)	50	50
ZIMAXW	Maximum over-water mixing height (m)	3000	3000
IRAD	Form of temperature interpolation (1 = 1/r)	1	1
TRADKM	Radius of temperature interpolation (km)	500	500
NUMTS	max number of station in temperature interpolations	5	5
IAVET	Conduct spatial averaging of temperature? (1 = True)	1	1
TGDEFB	Default over-water mixed layer lapse rate (K/m)	-0.0098	-0.0098
TGDEFA	Default over-water capping lapse rate (K/m)	-0.0045	-0.0045
JWAT1	Beginning landuse type defining water	999	50
JWAT2	Ending landuse type defining water	999	50
NFLAGP	Method for precipitation interpolation (2 = 1/r**2)	2	2
SIGMAP	Precip radius for interpolations (km)	100	100
CUTP	Minimum cut off precip rate (mm/hr)	0.01	0.01
SSn	NSSTA input records for surface stations	User Defines	8
USn	NUSTA input records for upper-air stations	User Defines	3
PSn	NPSTA input records for precipation stations	User Defines	57

Note:

DEFAULT	Uses defaults
VAR	Variable Input
NA	Not Applicable
SAME	Same as recommended

Table C-7. Surface, Overwater, and Upper Air Stations Used in the Refined Modeling Analysis

Station Name	Station Symbol	WBAN Number	UTM Coordinate			Anemometer Height (m)	Time Zone[b]
			Easting (km)	Northing (km)	Zone		
Surface Stations							
Jacksonville, FL	JAX	13889	1012.82[a]	3374.19	17	6.1	5
Tallahassee, FL	TLH	93805	753.04[a]	3363.99	16	7.6	5
Tampa, FL	TPA	12842	929.17[a]	3094.25	17	6.7	5
Columbus, GA	CSG	93842	692.57[a]	3599.35	16	9.1	5
Macon, GA	MCN	3813	831.58[a]	3620.93	17	7.0	5
Mobile, AL	MOB	13894	380.26	3394.97	16	10.1	6
Montgomery, AL	MGM	13895	556.50	3573.65	16	7.0	6
Gainesville, FL	GNV	12816	957.43[a]	3284.16	17	6.7	5
Overwater Stations							
Cape San Blas, FL	CSBF1	-	659.04	3283.32	16	9.8	6
Upper Air Stations							
Ruskin, FL	TBW	12842	941.95[a]	3064.55	17	NA	5
Waycross, GA	AYS	13861	946.68[a]	3457.95	17	NA	5
Apalachicola, FL	AQQ	12832	690.22[a]	3290.65	17	NA	5

[a] Equivalent UTM Coordinate for Zone 16

[b] Eastern = 5, Central = 6

Table C-8. Hourly Precipitation Stations Used in the Refined Modeling Analysis

Station Name	Station Number	UTM Coordinate Easting (km)	UTM Coordinate Northing (km)	UTM Coordinate Zone
Florida				
Apalachicola WSO Arpt	80211	691.061	3289.921	16
Blackman	80765	533.424	3427.601	16
Branford	80975	895.606[a]	3315.955	17
Bristol	81020	693.715	3366.473	16
Cross City 2 WNW	82008	870.268[a]	3281.754	17
Dowling Park 1 W	82391	863.505[a]	3348.418	17
Gainesville 11 WNW	83322	935.411[a]	3284.205	17
Graceville 1 SW	83538	641.703	3424.797	16
Inglis 3 E	84273	922.631[a]	3211.652	17
Jacksonville WSO AP	84358	1013.427[a]	3373.634	17
Lynne	85237	989.255[a]	3230.295	17
Monticello 3 W	85879	800.168[a]	3381.291	17
Niceville	86240	548.745	3377.572	16
Panacea 3 S	86828	752.453	3319.607	16
Panama City 5 NE	86842	634.754	3343.414	16
Raiford State Prison	87440	965.02[a]	3326.686	17
Tallahassee WSO AP	88758	754.292	3365.100	16
Wausau	89415	635.756	3391.462	16
Woodruff Dam	89795	704.292	3399.935	16
Georgia				
Abbeville 4 S	90010	861.839[a]	3535.687	17
Americus Exp Stn Nurser	90258	757.935	3554.581	16
Bainbridge Intl Paper Co	90586	724.846	3409.588	16
Brunswick	91340	1032.132[a]	3448.130	17
Claxton	91973	995.054[a]	3559.185	17
Columbus Metro Ap	92166	693.300	3599.307	16
Coolidge	92238	806.336	3434.765	17
Doles	92728	806.73[a]	3510.587	17
Dublin 2	92844	901.605[a]	3603.714	17
Edison	93028	715.132	3494.426	16
Fargo	93312	930.278[a]	3396.112	17
Folkston 3 SW	93460	982.591[a]	3407.519	17
Hamilton 4 W	94033	693.630	3625.258	16
Hazlehurst	94204	930.478[a]	3528.882	17
Jesup	94671	996.541[a]	3497.124	17
Lizella	95249	815.936[a]	3633.385	17
Lumpkin 2 SE	95394	710.020	3545.778	16
Macon Middle GA Regional	95443	831.127[a]	3619.583	17
Pearson	96879	904.643[a]	3463.307	17
Sylvania 2 SSE	98517	1022.108[a]	3621.570	17
The Rock	98657	757.814	3650.455	16
Valdosta 4 NW	98974	856.902[a]	3416.946	17
West Point	99291	669.434	3638.065	16
Alabama				
Abbeville 1 NNW	10008	662.902	3495.325	16
Alberta	10140	459.798	3566.793	16
Andalusia 3 W	10252	545.472	3463.482	16
Atmore State Nursery	10402	458.171	3448.658	16
Auburn Agronomy Farm	10430	640.773	3607.735	16
Dadeville 2	12124	617.060	3633.087	16
Dothan	12377	652.449	3452.663	16
Enterprise 5 NNW	12675	604.606	3472.403	16
Greenville	13519	533.119	3523.197	16
Marion 7 NE	15112	474.872	3618.169	16
Midway	15397	639.828	3549.782	16
Montgomery Dannelly Field	15550	555.790	3573.610	16
Peterman	16370	474.564	3494.634	16
Thorsby Exp Station	18209	530.782	3642.236	16
Troy	18323	597.296	3519.354	16

[a] Equivalent UTM Easting Coordinate for Zone 16

APPENDIX D

DIRECTION-SPECIFIC BUILDING INFORMATION USED FOR THE AIR MODELING ANALYSIS

```
                                  BPIP (Dated: 95086)
 DATE : 10/12/00
 TIME : 17:42:18
 BPIP-BUCKEYE FOLEY MILL 10/11/2000

============================
BPIP PROCESSING INFORMATION:
============================

   The ST flag has been set for processing for an ISCST2 run.

   Inputs entered in FEET       will be converted to meters using
    a conversion factor of    0.3048.  Output will be in meters.

   UTMP is set to UTMN.  The input is assumed to be in a local
    X-Y coordinate system as opposed to a UTM coordinate system.
    True North is in the positive Y direction.

   Plant north is set to -30.00 degrees with respect to True North.



 BPIP-BUCKEYE FOLEY MILL 10/11/2000


                PRELIMINARY* GEP STACK HEIGHT RESULTS TABLE
                         (Output Units: meters)

                         Stack-Building            Preliminary*
         Stack    Stack  Base Elevation   GEP**    GEP Stack
         Name     Height Differences      EQN1     Height Value


        LK4       38.10         N/A        0.00        65.00
        RB2       68.58        0.00      109.35       109.35
        RB3       68.58        0.00      114.30       114.30
        RB4       68.58        0.00      114.30       114.30
        SDT2      43.28        0.00       98.08        98.08
        SDT3      42.67        0.00      114.30       114.30
        SDT4      49.38        0.00      114.30       114.30
        EWLB      37.80         N/A        0.00        65.00
        12LS      40.54         N/A        0.00        65.00
        COMBO     68.58        0.00      112.26       112.26

   * Results are based on Determinants 1 & 2 on pages 1 & 2 of the GEP
     Technical Support Document.  Determinant 3 may be investigated for
     additional stack height credit.  Final values result after
     Determinant 3 has been taken into consideration.
  ** Results were derived from Equation 1 on page 6 of GEP Technical
     Support Document.  Values have been adjusted for any stack-building
     base elevation differences.

     Note:  Criteria for determining stack heights for modeling emission
     limitations for a source can be found in Table 3.1 of the
     GEP Technical Support Document.




                                  BPIP (Dated: 95086)
 DATE : 10/12/00
 TIME : 17:42:18


 BPIP-BUCKEYE FOLEY MILL 10/11/2000

 BPIP output is in meters


     SO BUILDHGT LK4          0.00     0.00     0.00     0.00     0.00     0.00
     SO BUILDHGT LK4          0.00     0.00     0.00     0.00     0.00     0.00
     SO BUILDHGT LK4          0.00     0.00     0.00     0.00     0.00     0.00
     SO BUILDHGT LK4          0.00     0.00     0.00     0.00     0.00     0.00
     SO BUILDHGT LK4          0.00     0.00     0.00     0.00     0.00     0.00
```

```
     SO BUILDWID LK4        0.00    0.00    0.00    0.00    0.00    0.00
     SO BUILDWID LK4        0.00    0.00    0.00    0.00    0.00    0.00
     SO BUILDWID LK4        0.00    0.00    0.00    0.00    0.00    0.00
     SO BUILDWID LK4        0.00    0.00    0.00    0.00    0.00    0.00
     SO BUILDWID LK4        0.00    0.00    0.00    0.00    0.00    0.00
     SO BUILDWID LK4        0.00    0.00    0.00    0.00    0.00    0.00
     SO BUILDWID LK4        0.00    0.00    0.00    0.00    0.00    0.00

     SO BUILDHGT RB2       30.48   30.48   30.48   30.48   30.48   38.10
     SO BUILDHGT RB2       45.72   45.72   45.72   35.05   35.05   35.05
     SO BUILDHGT RB2       35.05   35.05   35.05   35.05   35.05   30.48
     SO BUILDHGT RB2       30.48   30.48   30.48   30.48   30.48   30.48
     SO BUILDHGT RB2       30.48   30.48   35.05   35.05   35.05   35.05
     SO BUILDHGT RB2       35.05   35.05   35.05   35.05   35.05   30.48
     SO BUILDWID RB2       35.94   37.06   37.06   35.94   33.72   44.20
     SO BUILDWID RB2       34.43   40.37   42.42   41.44   44.44   46.10
     SO BUILDWID RB2       46.35   45.20   42.67   45.20   46.35   33.72
     SO BUILDWID RB2       35.94   37.06   37.06   35.94   33.72   30.48
     SO BUILDWID RB2       33.72   35.94   37.17   41.44   44.44   46.10
     SO BUILDWID RB2       46.35   45.20   42.67   45.20   46.35   33.72

     SO BUILDHGT RB3       35.05   35.05   38.10   38.10   38.10   38.10
     SO BUILDHGT RB3       45.72   45.72   45.72   45.72   45.72   45.72
     SO BUILDHGT RB3       36.58   36.58   21.34   21.34   21.34   35.05
     SO BUILDHGT RB3       35.05   35.05   38.10   38.10   38.10   38.10
     SO BUILDHGT RB3       45.72   45.72   45.72   45.72   45.72   45.72
     SO BUILDHGT RB3       36.58   36.58   21.34   21.34   21.34   35.05
     SO BUILDWID RB3       44.44   41.44   64.94   59.77   52.79   44.20
     SO BUILDWID RB3       34.43   40.37   45.09   48.44   50.32   50.67
     SO BUILDWID RB3       65.88   65.95   27.43   29.66   52.08   46.10
     SO BUILDWID RB3       44.44   41.44   64.94   59.77   52.79   44.20
     SO BUILDWID RB3       34.43   40.37   45.09   48.44   50.32   50.67
     SO BUILDWID RB3       65.88   65.95   27.43   29.66   52.08   46.10

     SO BUILDHGT RB4       45.72   45.72   45.72   45.72   45.72   38.10
     SO BUILDHGT RB4       45.72   45.72   45.72   45.72   45.72   45.72
     SO BUILDHGT RB4       45.72   45.72   45.72   45.72   45.72   45.72
     SO BUILDHGT RB4       45.72   45.72   45.72   45.72   45.72   38.10
     SO BUILDHGT RB4       45.72   45.72   45.72   45.72   45.72   45.72
     SO BUILDHGT RB4       45.72   45.72   45.72   45.72   45.72   45.72
     SO BUILDWID RB4       50.32   48.44   45.09   40.37   34.43   44.20
     SO BUILDWID RB4       34.43   40.37   45.09   48.44   50.32   50.67
     SO BUILDWID RB4       49.48   46.79   42.67   46.79   49.48   50.67
     SO BUILDWID RB4       50.32   48.44   45.09   40.37   34.43   44.20
     SO BUILDWID RB4       34.43   40.37   45.09   48.44   50.32   50.67
     SO BUILDWID RB4       49.48   46.79   42.67   46.79   49.48   50.67

     SO BUILDHGT SDT2      35.05   35.05   38.10   45.72   45.72   38.10
     SO BUILDHGT SDT2      45.72   35.05   35.05   35.05   35.05   35.05
     SO BUILDHGT SDT2      35.05   35.05   35.05   35.05   35.05   35.05
     SO BUILDHGT SDT2      35.05   35.05   35.05   35.05   30.48   30.48
     SO BUILDHGT SDT2      30.48   35.05   35.05   35.05   35.05   35.05
     SO BUILDHGT SDT2      35.05   35.05   35.05   35.05   35.05   35.05
     SO BUILDWID SDT2      44.44   41.44   64.94   34.91   34.43   44.20
     SO BUILDWID SDT2      34.43   31.78   37.17   41.44   44.44   46.10
     SO BUILDWID SDT2      46.35   45.20   42.67   45.20   46.35   46.10
     SO BUILDWID SDT2      44.44   41.44   37.17   31.78   75.92   70.10
     SO BUILDWID SDT2      73.27   31.78   37.17   41.44   44.44   46.10
     SO BUILDWID SDT2      46.35   45.20   42.67   45.20   46.35   46.10

     SO BUILDHGT SDT3      45.72   45.72   45.72   45.72   45.72   38.10
     SO BUILDHGT SDT3      45.72   45.72   45.72   45.72   45.72   45.72
     SO BUILDHGT SDT3      45.72   45.72   45.72   45.72   45.72   45.72
     SO BUILDHGT SDT3      45.72   45.72   45.72   45.72   45.72   38.10
     SO BUILDHGT SDT3      45.72   45.72   45.72   45.72   45.72   45.72
     SO BUILDHGT SDT3      45.72   45.72   45.72   45.72   45.72   45.72
     SO BUILDWID SDT3      50.32   48.44   45.09   40.37   34.43   44.20
     SO BUILDWID SDT3      34.43   40.37   45.09   48.44   50.32   50.67
     SO BUILDWID SDT3      49.48   46.79   42.67   46.79   49.48   50.67
     SO BUILDWID SDT3      50.32   48.44   45.09   40.37   34.43   44.20
     SO BUILDWID SDT3      34.43   40.37   45.09   48.44   50.32   50.67
     SO BUILDWID SDT3      49.48   46.79   42.67   46.79   49.48   50.67
```

```
SO BUILDHGT SDT4       45.72   45.72   45.72   45.72   45.72   38.10
SO BUILDHGT SDT4       45.72   45.72   45.72   45.72   45.72   45.72
SO BUILDHGT SDT4       45.72   45.72   45.72   45.72   45.72   45.72
SO BUILDHGT SDT4       45.72   45.72   45.72   45.72   45.72   38.10
SO BUILDHGT SDT4       45.72   45.72   45.72   45.72   45.72   45.72
SO BUILDHGT SDT4       45.72   45.72   45.72   45.72   45.72   45.72
SO BUILDWID SDT4       50.32   48.44   45.09   40.37   34.43   44.20
SO BUILDWID SDT4       34.43   40.37   45.09   48.44   50.32   50.67
SO BUILDWID SDT4       49.48   46.79   42.67   46.79   49.48   50.67
SO BUILDWID SDT4       50.32   48.44   45.09   40.37   34.43   44.20
SO BUILDWID SDT4       34.43   40.37   45.09   48.44   50.32   50.67
SO BUILDWID SDT4       49.48   46.79   42.67   46.79   49.48   50.67

SO BUILDHGT EWLB        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDHGT EWLB        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDHGT EWLB        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDHGT EWLB        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDHGT EWLB        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDHGT EWLB        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDWID EWLB        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDWID EWLB        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDWID EWLB        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDWID EWLB        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDWID EWLB        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDWID EWLB        0.00    0.00    0.00    0.00    0.00    0.00

SO BUILDHGT 12LS        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDHGT 12LS        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDHGT 12LS        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDHGT 12LS        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDHGT 12LS        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDHGT 12LS        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDWID 12LS        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDWID 12LS        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDWID 12LS        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDWID 12LS        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDWID 12LS        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDWID 12LS        0.00    0.00    0.00    0.00    0.00    0.00

SO BUILDHGT COMBO      35.05   35.05   35.05   38.10   38.10   38.10
SO BUILDHGT COMBO      45.72   45.72   45.72   45.72   30.48   30.48
SO BUILDHGT COMBO      21.34   35.05   35.05   35.05   35.05   35.05
SO BUILDHGT COMBO      35.05   35.05   35.05   38.10   38.10   38.10
SO BUILDHGT COMBO      45.72   45.72   45.72   45.72   30.48   30.48
SO BUILDHGT COMBO      21.34   35.05   35.05   35.05   35.05   35.05
SO BUILDWID COMBO      44.44   41.44   37.17   59.77   52.79   44.20
SO BUILDWID COMBO      34.43   40.37   44.36   44.36   35.94   33.72
SO BUILDWID COMBO      51.04   45.20   42.67   45.20   46.35   46.10
SO BUILDWID COMBO      44.44   41.44   37.17   59.77   52.79   44.20
SO BUILDWID COMBO      34.43   40.37   44.36   44.36   35.94   33.72
SO BUILDWID COMBO      51.04   45.20   42.67   45.20   46.35   46.10
```