AIR QUALITY ANALYSIS IN SUPPORT OF AN APPLICATION FOR A PSD CONSTRUCTION PERMIT REVIEW

PREPARED FOR:

FLORIDA ROCK INDUSTRIES, INC.
ALACHUA COUNTY, FLORIDA

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1.0 SYNOPSIS OF APPLICATION

This is the air quality analysis in support of the Application to Construct for the Florida Rock Industries, Inc. cement plant near Newberry, Florida.

1.1 APPLICANT

FLORIDA ROCK INDUSTRIES, INC.
155 EAST 21st STREET
JACKSONVILLE, FLORIDA 32201

1.2 FACILITY LOCATION

Florida Rock Industries, Inc. plans to construct a new cement plant at their existing Newberry Quarry. The quarry is located on Alachua County Road 235, 2.5 miles northeast of Newberry, Alachua County, Florida. The UTM coordinates of the Florida Rock facility are Zone 17, 346.8 km East and 3287.0 km North.

1.3 PROJECT OVERVIEW

The cement plant will be a dry process preheater/precalciner kiln. The plant will produce 2300 tons per day of clinker, and 772,400 tons per year of cement. The produced cement will be stored in silos, and will be shipped in bulk by railcars or trucks; or will be bagged and palletized before shipping by railcars or trucks.

Florida Rock Industries is submitting this air quality analysis in support of their application to the Florida Department of Environmental Protection for an Air Construction Permit. The air quality analysis includes a description of the proposed cement plant, a rule applicability analysis, ambient air quality analyses and evaluations of the impacts of the proposed construction on soils, vegetation and visibility.

2.0 PROPOSED PROJECT

The operation of this plant will result in significant levels of emissions (as defined by FAC Rule 62-212.400) of particulate matter (PM), particulate matter smaller than 10 microns in diameter (PM10), nitrogen oxides (NOx), sulfur dioxide (SO2), carbon monoxide (CO), volatile organic compounds (VOC), and beryllium (Be). The proposed construction will therefore be subject to a Prevention of Significant Deterioration (PSD) review.

2.1 RULE REVIEW

The following are the state and federal air regulatory requirements that apply to new or modified sources subject to a Prevention of Significant Deterioration (PSD) review.

In accordance with EPA and State of Florida PSD review requirements, all major new or modified sources of air pollutants regulated under the Clean Air Act (CAA) are subject to preconstruction review. Florida's State Implementation Plan (SIP), approved by the EPA, authorizes the Florida Department of Environmental Protection (FDEP) to manage the air pollution program in Florida.

The PSD review determines whether or not significant air quality deterioration will result from a new or modified facility. Federal PSD regulations are contained in 40CFR52.21, Prevention of Significant Deterioration of Air Quality. The state of Florida has adopted PSD regulations which are essentially identical to the federal regulations and are contained in Chapter 62-212 of the

Florida Administration Code (FAC). All new major facilities and major modifications to existing facilities are subject to control technology review, source impact analysis, air quality analysis and additional impact analyses for each pollutant subject to a PSD review. A facility must also comply with the Good Engineering Practice (GEP) stack height rule.

A major facility is defined in the PSD rules as any one of the 28 specific source categories (see Table 2-3) which has the potential to emit 100 tons per year (tpy) or more, or any other stationary facility which has the potential to emit 250 tpy or more, of any pollutant regulated under the CAA.

2.1.1 AMBIENT AIR QUALITY STANDARDS

The EPA and the State of Florida have developed/adopted ambient air quality standards (AAQS, see Table 2-5). Primary AAQS protect the public health while the secondary AAQS protect the public welfare from adverse effects of air pollution. Areas of the country have been designated as attainment or nonattainment for specific pollutants. Areas not meeting the AAQS for a given pollutant are designated as nonattainment areas for that pollutant. Any new source or expansion of existing sources in or near these nonattainment areas are usually subject to more stringent air permitting requirements. Projects proposed in attainment areas are subject to air permit requirements which would ensure continued attainment status.

2.1.2 PSD INCREMENTS

In promulgating the 1977 CAA Amendments, Congress quantified concentration increases above an air quality baseline concentration level for sulfur dioxide and particulate matter which would each of the regulated air pollutants. The operation of the proposed plant will result in significant levels of emissions of particulate matter (PM), particulate matter smaller than 10 microns in diameter (PM10), nitrogen oxides (NOx), sulfur dioxide (SO2), carbon monoxide (CO), volatile organic compounds (VOC), and beryllium (Be) as defined by Rule 62-212.400 FAC, and will therefore be subject to PSD review requirements in accordance with FAC Rule 62-212.400 FAC. This will include a determination of Best Available Control Technology, an air quality review, Good Engineering Practice stack height analysis and an evaluation of impacts on soils, vegetation and visibility.

TABLE 2-1

FLORIDA ROCK INDUSTRIES, INC.

NEWBERRY CEMENT PLANT

PROPOSED AIR EMISSION RATES

POLLUTANT	LB/HR	TPY
LB/YEAR		
Particulate Matter (PM)	98.15	368.0
Particulate Matter (PM10)	86.82	327.9
Sulfur Dioxide (SO2)	53.74	201.2
Nitrogen Oxides (NOx)	446.42	1663.7
Volatile Organic Compounds (VOC)	11.56	43.0
Carbon Monoxide (CO)	355.97	1324.3
Beryllium (Be)	0.0002	0.001
1.35		
Lead (Pb)	0.07	0.3
509.12		
Hydrogen Chloride (HCl)	4.7	17.5
Benzene	0.3	1.1

TABLE 2-2

MAJOR FACILITY CATEGORIES

FLORIDA ROCK INDUSTRIES, INC.

ALACHUA COUNTY, FLORIDA

Fossil fuel fired steam electric plants of more than 250 MMBTU/hr heat input
Coal cleaning plants (with thermal dryers)
Kraft pulp mills
Portland cement plants
Primary zinc smelters
Iron and steel mill plants
Primary aluminum ore reduction plants
Primary copper smelters
Municipal incinerators capable of charging more than 250 tons of refuse per day
Hydrofluoric acid plants
Sulfuric acid plants
Nitric acid plants
Petroleum refineries
Lime plants
Phosphate rock processing plants
Coke oven batteries
Sulfur recovery plants
Carbon black plants (furnace process)
Primary lead smelters
Fuel conversion plants
Sintering plants
Secondary metal production plants
Chemical process plants
Fossil fuel boilers (or combinations thereof) totaling more than 250 million
BTU/hr heat input
Petroleum storage and transfer units with total storage capacity exceeding 300,000 barrels
Taconite ore processing plants
Glass fiber processing plants
Charcoal production plants

TABLE 2-3

REGULATED AIR POLLUTANTS - SIGNIFICANT EMISSION RATES

62-212.400 FAC, Tables 212.400-2 and 212.400-3

Pollutant	Significant Emission Rate (tons/yr)	De minimis Ambient Impacts ($\mu g/m3$), averaging period
CO	100	575 (8-hour)
NOx	40	14 (NO2, Annual)
SO2	40	13 (24-hour)
Ozone	40 (VOC)	---
PM (TSP)	25	---
PM10	15	10 (24-hour)
TRS (including H2S)	10	0.2 (1-hour)
H2SO4 mist	7	---
Fluorides	3	0.25 (24-hour)
Vinyl Chloride	1	15 (24-hour)
	pounds/yr	
Lead	1200	0.1 (Quarterly avg)
Mercury	200	0.25 (24-hour)
Asbestos	14	---
Beryllium	0.8	0.001 (24-hour)

TABLE 2-4

AMBIENT AIR QUALITY STANDARDS

POLLUTANT	NAAQS[1] $\mu g/m^3$	NAAQS[2] $\mu g/m^3$	FAAQS[3] $\mu g/m^3$
SO2:			
3-hour	---	1300	1300
24-hour	365	---	260
Annual	80	---	60
PM10:			
24-hour	---	---	150
Annual	---	---	50
CO:			
1-hour	---	---	40,000
8-hour	---	---	10,000
Ozone:			
1-hour	235	235	235
NO_2:			
Annual	100	100	100
Lead:			
Quarterly	---	---	1.5

Note 1: National Ambient Air Quality Standards (Primary)

Note 2: National Ambient Air Quality Standards (Secondary)

Note 3: Florida Ambient Air Quality Standards

TABLE 2-5

ALLOWABLE PSD INCREMENTS

FLORIDA ROCK INDUSTRIES, INC.
ALACHUA COUNTY, FLORIDA

Pollutant	Class I μg/m3	Class II μg/m3	Class III μg/m3
PM10:			
Annual	4	17	34
24-hour	8	30	60
SO2:			
Annual	2	20	40
24-hour	5	91	182
3-hour	25	512	700
NO2:			
Annual	2.5	25	50

3.0 AIR QUALITY REVIEW

The air quality review required of a PSD construction permit application potentially requires both air quality modeling and air quality monitoring. The air quality monitoring is required when the impact of air pollutant emission increases and decreases associated with a proposed project exceed the de minimis impact levels defined by Rule 62-212, FAC or in cases where an applicant wishes to define existing ambient air quality by monitoring rather than by air quality modeling. The air quality modeling is required to provide assurance that the emissions from the proposed project, together with the emissions of all other air pollutants in the project area, will not cause or contribute to a violation of any ambient air quality standard.

3.1 AIR QUALITY MODELING: PM10

Air quality modeling was performed for PM10 emissions to demonstrate compliance with all applicable standards, including Florida Ambient Air Quality Standards (FAAQS), PSD Class II increments, and PSD Class I increments.

3.1.1 FLORIDA AMBIENT AIR QUALITY STANDARDS

The source-alone emissions were modeled using the ISC model to determine the Area of Significant Impact (ASI) for the 24-hour and annual averaging periods. The ambient air concentrations for the 24-hour period fell below the Class II significance level (5 υg/m^3) within the 10-kilometer receptor ring; and the ambient air concentrations for the annual period fell below the Class II significance level (1 υg/m^3) within the 4-kilometer receptor ring.

An inventory of all permitted air emission sources within a 75-kilometer radius from the source was obtained from the FDEP Bureau of Information Systems. The sources at the two Occidental Chemical Complexes are located just beyond this 75-kilometer radius, so these sources were included with the base inventory. A 20-D analysis was conducted on this base inventory. The 20-D analysis calculates two things: The total emissions of a given pollutant from a given facility are calculated in tons per year (tpy); and the distance between the proposed cement plant and the existing facility is calculated in kilometers (D). The distance is multiplied by 20, and this value is compared to the facility's emissions in tons per year. Any facility where the 20-D value is greater than the emission value is assumed to have a negligible effect on the ambient air concentrations of the given pollutant at the proposed cement plant. This inventory (the 20-D inventory) was modeled with the source to determine compliance with the FAAQS.

Additionally, background concentrations of PM10 were provided by Cleve Holladay (FDEP). These background concentrations account for unpermitted sources, mobile sources, and other background concentrations. The background concentrations are added to the modeled concentrations (high-1st high) to evaluate compliance with the FAAQS.

The proposed cement plant, plus the 20-D inventory, plus the background concentrations, resulted in the following ambient air concentrations of PM10:

Averaging Period	**Modeled Concentration**	**Background Concentration**	**Total Concentration**	**FAAQS**
24-hour	29.09 υg/m^3	26 υg/m^3	**55.09 υg/m^3**	**150 υg/m^3**
Annual	4.98 υg/m^3	26 υg/m^3	**30.98 υg/m^3**	**50 υg/m^3**

This air quality modeling showed that the FAAQS were not violated for PM10 for either the 24-

hour or the annual averaging periods.

3.1.2 PSD CLASS II INCREMENTS

The ISC model was used for the PSD Class II increment analysis. The ambient air impacts of the proposed cement plant were evaluated with respect to the allowable PSD Class II increments. Generally, a different inventory is created which includes those facilities that have consumed or expanded the available PSD Class II increments. However, in this case, the ambient air concentrations resulting from the proposed cement plant plus the 20-D inventory were below the allowable increment. The use of the 20-D inventory results in a conservative evaluation of compliance with the PSD Class II increments, as all permitted allowable emissions are assumed as increment-consuming.

The emissions from the proposed cement plant and the 20-D inventory resulted in the following ambient air concentrations (high-1st high) of PM10:

Averaging Period	**Modeled Concentration**	**Allowable PSD Class II Increment**
24-hour	**29.09 υg/m^3**	**30 υg/m^3**
Annual	**4.98 υg/m^3**	**17 υg/m^3**

This air quality modeling showed that the PSD Class II increments were not violated for PM10 for either the 24-hour or the annual averaging periods.

3.1.3 PSD CLASS I INCREMENTS

Ambient air impact modeling for the Chassahowitzka and Okefenokee Class I areas was performed using the MESOPUFF II model, because the source is approximately 100 kilometers from either Class I area. The MESOPUFF II model is appropriate for long-range transport, i.e. transport distances in excess of 50 kilometers. As this model is quite complex, meteorological data for one year was used (1986). The modeling for was performed separately for each Class I area. The modeling for Chassahowitzka utilized upper-air meteorological data from the Ruskin, Florida station, and surface meteorological data from the Gainesville and Tampa, Florida stations. The modeling for Okefenokee utilized upper-air meteorological data from the Waycross, Georgia station, and surface meteorological data from the Gainesville and Jacksonville, Florida stations. The MESOPUFF II model outputs air concentrations in grams per cubic meter (g/m^3) with the input emission rate in grams per second (g/s). Because reference air concentrations are described using units of micrograms per cubic meter ($\upsilon g/m^3$), the modeling was performed using a generic emission rate of $1.0X10^6$ grams per second. This resulted in output concentrations in units of grams per cubic meter (g/m^3). These concentrations, when multiplied by the proposed pollutant-specific emission rates in micrograms per second ($\upsilon g/s$), were used to determine whether the proposed emissions would have a significant impact on either Class I area. Significance was determined with respect to guideline air concentrations proposed by the National Park Service. An example of the emission rate and concentration computations follow:

Generic Emission = $1.0X10^6$ grams per second (g/s)
Generic Concentration = 0.0003138 grams per cubic meter (g/m^3)
PM10 Emission = 10.94 grams/second (g/s)
Ratio of Emission = Ratio of Concentration = $(10.94\ g/s) / (1.0X10^6\ g/s) = 10.94 X 10^{-6}$
Effective Concentration = Ratio X Generic Concentration X $1.0 X 10^6\ \upsilon g/g$
$= 10.94 X 10^{-6} X 0.0003138\ g/m^3 X 1.0 X 10^6\ \upsilon g/g =$ **$0.00343\ \upsilon g/m^3$**

These computations show that (with the generic emission rate of $1.0X10^6$ g/s) the proposed emission rate in grams per second (g/s) multiplied by the generic concentration in grams per cubic meter (g/m^3) yields the actual concentration in micrograms per cubic meter.

The modeled emissions from the source resulted in the following ambient air impacts at Chassahowitzka and Okefenokee:

Averaging Period	Modeled Concentration	Class I Area	Proposed NPS PSD Class I Significance
24-hour	**0.07 $\upsilon g/m^3$**	**Chassahowitzka**	**0.27 $\upsilon g/m^3$**
	0.07 $\upsilon g/m^3$	**Okefenokee**	
Annual	**0.004 $\upsilon g/m^3$**	**Chassahowitzka**	**0.08 $\upsilon g/m^3$**
	0.003 $\upsilon g/m^3$	**Okefenokee**	

This air quality modeling showed that the PM10 impacts at both Class I areas, for the 24-hour and the annual averaging periods, were well below the NPS significance levels. As the impacts from the source are less than significant, no further Class I impact modeling is necessitated.

3.2 AIR QUALITY MODELING: SO2

Air quality modeling was performed for SO2 emissions to demonstrate compliance with all applicable standards, including Florida Ambient Air Quality Standards (FAAQS), PSD Class II increments, and PSD Class I increments.

3.2.1 FLORIDA AMBIENT AIR QUALITY STANDARDS

The source-alone emissions were modeled using the ISC model to determine the Area of Significant Impact (ASI) for the 3-hour, 24-hour and annual averaging periods. The ambient air concentrations for the 3-hour period fell below the Class II significance level (25 $\upsilon g/m^3$) within the 2.5-kilometer receptor ring, the ambient air concentrations for the 24-hour period fell below the Class II significance level (5 $\upsilon g/m^3$) within the 2.5-kilometer receptor ring; and the ambient air concentrations for the annual period fell below the Class II significance level (1 $\upsilon g/m^3$) within the 2.5-kilometer receptor ring.

An inventory of all permitted air emission sources within a 75-kilometer radius from the source was obtained from the FDEP Bureau of Information Systems. The sources at the two Occidental Chemical Complexes are located just beyond this 75-kilometer radius, so these sources were included with the base inventory. A 20-D analysis was conducted on this base inventory. The 20-D analysis calculates two things: The total emissions of a given pollutant from a given facility are calculated in tons per year (tpy); and the distance between the proposed cement plant and the existing facility is calculated in kilometers (D). The distance is multiplied by 20, and this value is compared to the facility's emissions in tons per year. Any facility where the 20-D value is greater than the emission value is assumed to have a negligible effect on the ambient air concentrations of the given pollutant at the proposed cement plant. This inventory (the 20-D inventory) was modeled with the source to determine compliance with the FAAQS.

Additionally, background concentrations of SO2 were provided by Cleve Holladay (FDEP). These background concentrations account for unpermitted sources, mobile sources, and other background concentrations. The background concentrations are added to the modeled concentrations (high-1st high) to evaluate compliance with the FAAQS.

The proposed cement plant, plus the 20-D inventory, plus the background concentrations, resulted in the following ambient air concentrations of SO2:

Averaging Period	Modeled Concentration	Background Concentration	Total Concentration	FAAQS
3-hour	196.75 υg/m³	8 υg/m³	**204.75 υg/m³**	**1300 υg/m³**
24-hour	57.06 υg/m³	8 υg/m³	**65.06 υg/m³**	**260 υg/m³**
Annual	7.11 υg/m³	8 υg/m³	**15.11 υg/m³**	**60 υg/m³**

This air quality modeling showed that the FAAQS were not violated for SO2 for either the 3-hour, the 24-hour or the annual averaging periods.

3.2.2 PSD CLASS II INCREMENTS

The ISC model was used for the PSD Class II increment analysis. The ambient air impacts of the proposed cement plant were evaluated with respect to the allowable PSD Class II increments. Generally, a different inventory is created which includes those facilities that have consumed or expanded the available PSD Class II increments. However, in this case, the ambient air concentrations resulting from the proposed cement plant plus the 20-D inventory were below the allowable increment. The use of the 20-D inventory results in a conservative evaluation of compliance with the PSD Class II increments, as all permitted allowable emissions are assumed as increment-consuming.

The emissions from the proposed cement plant and the 20-D inventory resulted in the following ambient air concentrations (high-1st high) of SO2:

Averaging Period	Modeled Concentration	Allowable PSD Class II Increment
3-hour	**196.75 υg/m³**	**512 υg/m³**
24-hour	**57.06 υg/m³**	**91 υg/m³**
Annual	**7.11 υg/m³**	**20 υg/m³**

This air quality modeling showed that the PSD Class II increments were not violated for SO2 for either the 3-hour, the 24-hour or the annual averaging periods.

3.2.3 PSD CLASS I INCREMENTS

Ambient air impact modeling for the Chassahowitzka and Okefenokee Class I areas was performed using the MESOPUFF II model, because the source is approximately 100 kilometers from either Class I area. The MESOPUFF II model is appropriate for long-range transport, i.e. transport distances in excess of 50 kilometers. As this model is quite complex, meteorological data for one year was used (1986). The modeling for was performed separately for each Class I area. The modeling for Chassahowitzka utilized upper-air meteorological data from the Ruskin, Florida station, and surface meteorological data from the Gainesville and Tampa, Florida stations. The modeling for Okefenokee utilized upper-air meteorological data from the Waycross, Georgia station, and surface meteorological data from the Gainesville and Jacksonville, Florida stations. The MESOPUFF II model outputs air concentrations in grams per cubic meter (g/m^3) with the input emission rate in grams per second (g/s). Because reference air concentrations are described using units of micrograms per cubic meter ($\upsilon g/m^3$), the modeling was performed using a generic emission rate of $1.0X10^6$ grams per second. This resulted in output concentrations in units of grams per cubic meter (g/m^3). These concentrations, when multiplied by the proposed pollutant-specific emission rates in micrograms per second ($\upsilon g/s$), were used to determine whether the proposed emissions would have a significant impact on either Class I area. Significance was determined with respect to guideline air concentrations proposed by the National Park Service. An example of the emission rate and concentration computations follow:

Generic Emission = $1.0X10^6$ grams per second (g/s)
Generic Concentration = 0.0003138 grams per cubic meter (g/m^3)
SO2 Emission = 6.77 grams/second (g/s)
Ratio of Emission = Ratio of Concentration = $(6.77\ g/s) / (1.0X10^6\ g/s) = 6.77 X 10^{-6}$
Effective Concentration = Ratio X Generic Concentration $X\ 1.0\ X\ 10^6\ \upsilon g/g$
$= 6.77\ X\ 10^{-6}\ X\ 0.0003138\ g/m^3\ X\ 1.0\ X\ 10^6\ \upsilon g/g =$ **$0.0021\ \upsilon g/m^3$**

These computations show that (with the generic emission rate of $1.0X10^6$ g/s) the proposed emission rate in grams per second (g/s) multiplied by the generic concentration in grams per cubic meter (g/m^3) yields the actual concentration in micrograms per cubic meter.

The modeled emissions from the source resulted in the following ambient air impacts at Chassahowitzka and Okefenokee:

Averaging Period	**Modeled Concentration**	**Class I Area**	**Proposed NPS PSD Class I Significance**
3-hour	**0.24 υg/m^3**	**Chassahowitzka**	**0.48 υg/m^3**
	0.15 υg/m^3	**Okefenokee**	
24-hour	**0.05 υg/m^3**	**Chassahowitzka**	**0.07 υg/m^3**
	0.04 υg/m^3	**Okefenokee**	
Annual	**0.002 υg/m^3**	**Chassahowitzka**	**0.025 υg/m^3**
	0.002 υg/m^3	**Okefenokee**	

This air quality modeling showed that the SO2 impacts at both Class I areas, for the 3-hour, the 24-hour and the annual averaging periods, were well below the NPS significance levels. As the impacts from the source are less than significant, no further Class I impact modeling is necessitated.

3.3 AIR QUALITY MODELING: NOx

Air quality modeling was performed for NOx emissions to demonstrate compliance with all applicable standards, including Florida Ambient Air Quality Standards (FAAQS), PSD Class II increments, and PSD Class I increments.

3.3.1 FLORIDA AMBIENT AIR QUALITY STANDARDS

The source-alone emissions were modeled using the ISC model to determine the Area of Significant Impact (ASI) for the annual averaging period. The ambient air concentrations for the annual period fell below the Class II significance level (1 $\upsilon g/m^3$) within the 11-kilometer receptor ring.

An inventory of all permitted air emission sources within a 75-kilometer radius from the source was obtained from the FDEP Bureau of Information Systems. The sources at the two Occidental Chemical Complexes are located just beyond this 75-kilometer radius, so these sources were included with the base inventory. A 20-D analysis was conducted on this base inventory. The 20-D analysis calculates two things: The total emissions of a given pollutant from a given facility are calculated in tons per year (tpy); and the distance between the proposed cement plant and the existing facility is calculated in kilometers (D). The distance is multiplied by 20, and this value is compared to the facility's emissions in tons per year. Any facility where the 20-D value is greater than the emission value is assumed to have a negligible effect on the ambient air concentrations of the given pollutant at the proposed cement plant. This inventory (the 20-D inventory) was modeled with the source to determine compliance with the FAAQS.

Additionally, background concentrations of NOx were provided by Cleve Holladay (FDEP). These background concentrations account for unpermitted sources, mobile sources, and other background concentrations. The background concentrations are added to the modeled concentrations (high-1st high) to evaluate compliance with the FAAQS.

The proposed cement plant, plus the 20-D inventory, plus the background concentrations, resulted in the following ambient air concentrations of NOx:

Averaging Period	**Modeled Concentration**	**Background Concentration**	**Total Concentration**	**FAAQS**
Annual	7.76 υg/m^3	29 υg/m^3	**36.76 υg/m^3**	**100 υg/m^3**

This air quality modeling showed that the FAAQS WERE not violated for NOx for the annual averaging period.

3.3.2 PSD CLASS II INCREMENTS

The ISC model was used for the PSD Class II increment analysis. The ambient air impacts of the proposed cement plant were evaluated with respect to the allowable PSD Class II increments. Generally, a different inventory is created which includes those facilities that have consumed or expanded the available PSD Class II increments. However, in this case, the ambient air concentrations resulting from the proposed cement plant plus the 20-D inventory were below the allowable increment. The use of the 20-D inventory results in a conservative evaluation of compliance with the PSD Class II increments, as all permitted allowable emissions are assumed as increment-consuming.

The emissions from the proposed cement plant and the 20-D inventory resulted in the following ambient air concentrations (high-1st high) of NOx:

Averaging Period	**Modeled Concentration**	**Allowable PSD Class II Increment**
Annual	**7.76 υg/m³**	**25 υg/m³**

This air quality modeling showed that the PSD Class II increment was not violated for NOx for the annual averaging period.

3.3.3 PSD CLASS I INCREMENTS

Ambient air impact modeling for the Chassahowitzka and Okefenokee Class I areas was performed using the MESOPUFF II model, because the source is approximately 100 kilometers from either Class I area. The MESOPUFF II model is appropriate for long-range transport, i.e. transport distances in excess of 50 kilometers. As this model is quite complex, meteorological data for one year was used (1986). The modeling for was performed separately for each Class I area. The modeling for Chassahowitzka utilized upper-air meteorological data from the Ruskin, Florida station, and surface meteorological data from the Gainesville and Tampa, Florida stations. The modeling for Okefenokee utilized upper-air meteorological data from the Waycross, Georgia station, and surface meteorological data from the Gainesville and Jacksonville, Florida stations. The MESOPUFF II model outputs air concentrations in grams per cubic meter (g/m^3) with the input emission rate in grams per second (g/s). Because reference air concentrations are described using units of micrograms per cubic meter ($\upsilon g/m^3$), the modeling was performed using a generic emission rate of $1.0X10^6$ grams per second. This resulted in output concentrations in units of grams per cubic meter (g/m^3). These concentrations, when multiplied by the proposed pollutant-specific emission rates in micrograms per second (υg/s), were used to determine whether the proposed emissions would have a significant impact on either Class I area. Significance was determined with respect to guideline air concentrations proposed by the National Park Service. An example of the emission rate and concentration computations follow:

Generic Emission = $1.0X10^6$ grams per second (g/s)
Generic Concentration = 0.0003138 grams per cubic meter (g/m^3)
NOx Emission = 56.25 grams/second (g/s)
Ratio of Emission = Ratio of Concentration = (56.25 g/s) / ($1.0X10^6$ g/s) = 10.94 X 10^{-6}
Effective Concentration = Ratio X Generic Concentration X 1.0 X 10^6 υg/g
= 56.25 X 10^{-6} X 0.0003138 g/m^3 X 1.0 X 10^6 υg/g = **0.0177 υg/m^3**

These computations show that (with the generic emission rate of $1.0X10^6$ g/s) the proposed emission rate in grams per second (g/s) multiplied by the generic concentration in grams per cubic meter (g/m^3) yields the actual concentration in micrograms per cubic meter.

The modeled emissions from the source resulted in the following ambient air impacts at Chassahowitzka and Okefenokee:

Averaging Period	**Modeled Concentration**	**Class I Area**	**Proposed NPS PSD Class I Significance**
Annual	**0.019 υg/m^3**	**Chassahowitzka**	**0.025 υg/m^3**
	0.018 υg/m^3	**Okefenokee**	

This air quality modeling showed that the NOx impacts at both Class I areas, for the annual averaging period, were well below the NPS significance level. As the impacts from the source are less than significant, no further Class I impact modeling is necessitated.

3.4 AIR QUALITY MODELING: CO

The ambient air impacts resulting from the emissions of carbon monoxide (CO) were evaluated using the SCREEN model. The applicable air quality standard for CO is the FAAQS. The emissions from the proposed cement plant resulted in the following maximum ambient air concentrations of CO:

Averaging Period	**Modeled Concentration**	**Class II Significance**	**FAAQS**
1-hour	**141.7 υg/m^3**	**2000 υg/m^3**	**40,000 υg/m^3**
8-hour	**99.2 υg/m^3**	**500 υg/m^3**	**10,000 υg/m^3**

This air quality modeling showed that the proposed emissions of CO will result in source-alone ambient air concentrations that are less than the Class II significance level. These results demonstrates compliance with the FAAQS, and no further air quality analysis is necessitated for CO.

3.5 AIR QUALITY MODELING: BERYLLIUM

The ambient air impacts resulting from the emissions of beryllium (Be) were evaluated using the SCREEN model. The ambient air concentrations from the source alone were compared with guidelines in the federal BIF rule and the FDEP Air Toxics Working List (Version 3).

The emissions from the proposed cement plant resulted in the following maximum ambient air concentrations of beryllium:

Averaging Period	**Modeled Concentration**	**BIF Guideline**	**FDEP NTL**
8-hour	**0.00007 υg/m³**	---	**0.02 υg/m³**
24-hour	**0.00004 υg/m³**	---	**0.0048 υg/m³**
Annual	**0.000008 υg/m³**	**0.0042 υg/m³**	**0.00042 υg/m³**

This air quality modeling showed that the proposed emissions of beryllium will result in ambient air concentrations that are below all applicable guideline concentrations. Additionally, the 24-hour concentration is below the de minimus ambient impact level as defined in the Florida Administrative Code (0.001 υg/m³, 62-212, Table 212.400-3).

3.6 AIR QUALITY MODELING: LEAD

The ambient air impacts resulting from the emissions of lead (Pb) were evaluated using the SCREEN model. The ambient air concentrations from the source alone were compared with guidelines in the federal BIF rule and the FDEP Air Toxics Working List (Version 3).

The emissions from the proposed cement plant resulted in the following maximum ambient air concentrations of lead:

Averaging Period	**Modeled Concentration**	**BIF Guideline**	**FDEP NTL**	**FAAQS**
8-hour	**0.02 υg/m³**	**---**	**0.5 υg/m³**	**---**
24-hour	**0.01 υg/m³**	**---**	**0.12 υg/m³**	**---**
Quarterly	**<0.01 υg/m³**	**---**	**---**	**1.5 υg/m³**
Annual	**0.002 υg/m³**	**0.09 υg/m³**	**0.09 υg/m³**	**---**

This air quality modeling showed that the proposed emissions of lead will result in ambient air concentrations that are below all applicable guideline concentrations.

3.7 AIR QUALITY MODELING: HYDROGEN CHLORIDE

The ambient air impacts resulting from the emissions of hydrogen chloride (HCl) were evaluated using the SCREEN model. The ambient air concentrations from the source alone were compared with guidelines in the federal BIF rule and the FDEP Air Toxics Working List (Version 3).

The emissions from the proposed cement plant resulted in the following maximum ambient air concentrations of hydrogen chloride:

Averaging **Period**	**Modeled** **Concentration**	**BIF** **Guideline**	**FDEP** **NTL**
8-hour	**1.31 υg/m^3**	---	**75 υg/m^3**
24-hour	**0.75 υg/m^3**	---	**18 υg/m^3**
Annual	**0.15 υg/m^3**	7 υg/m^3	7 υg/m^3

This air quality modeling showed that the proposed emissions of hydrogen chloride will result in ambient air concentrations that are below all applicable guideline concentrations.

3.8 AIR QUALITY MODELING: BENZENE

The ambient air impacts resulting from the emissions of benzene were evaluated using the SCREEN model. The ambient air concentrations from the source alone were compared with guidelines in the federal BIF rule and the FDEP Air Toxics Working List (Version 3). The emissions from the proposed cement plant resulted in the following maximum ambient air concentrations of benzene:

Averaging **Period**	**Modeled** **Concentration**	**BIF** **Guideline**	**FDEP** **NTL**
8-hour	**0.08 υg/m^3**	---	**30 υg/m^3**
24-hour	**0.05 υg/m^3**	---	7.2 υg/m^3
Annual	**0.01 υg/m^3**	**1.2 υg/m^3**	**0.12 υg/m^3**

This air quality modeling showed that the proposed emissions of benzene will result in ambient air concentrations that are below all applicable guideline concentrations.

4.0 GOOD ENGINEERING PRACTICE STACK HEIGHT

The criteria for good engineering practice stack height in FAC Rule 62-210.550 states that the height of a stack should not exceed the greater of 65 meters (213) feet or the height of nearby structures plus the lesser of 1.5 times the height or cross-wind width of the nearby structure. This stack height policy is designed to prevent achieving ambient air quality goals solely through the use of excessive stack heights and air dispersion. The nearby structure for the plant's main stack is the homogenization silo. The main stack height will be 250 feet (76.3 meters). This stack height and the nearby silo conform to the GEP rule as specified by 62-210.550(3), FAC.

Stack height: 250 feet (76.3 meters)

Homogenization silo height: 230 feet (70.2 meters)

Homogenization silo width (diameter): 46 feet (14.03 meters)

Therefore, GEP stack height is described by $Hg = H + 1.5L$, or $Hg = 70.2 + 7 = 77.2$ meters. The proposed stack height is less than the GEP stack height and will be used for air quality modeling.

5.0 IMPACTS ON SOILS, VEGETATION AND VISIBILITY

No adverse impacts on soils, vegetation, or visibility are expected as a result of this project. The VISCREEN modeling showed no adverse impacts on visibility outside either Class I area.

5.1 IMPACT ON SOILS AND VEGETATION

The U. S. Environmental Protection Agency was directed by Congress to develop primary and secondary ambient air quality standards. The primary standards were to protect human health and the secondary standards were to:

> "... protect the public welfare from any known or anticipated adverse effects of a pollutant."

The public welfare was to include soils, vegetation and visibility.

As a basis for promulgating the air quality standards, EPA undertook studies related to the effects of all major air pollutants and published criteria documents summarizing the results of the studies. The studies included in the criteria documents were related to both acute and chronic effects of air pollutants. Based on the results of these studies, the criteria documents recommended air pollutant concentration limits for various periods of time that would protect against both chronic and acute effects of air pollutants with a reasonable margin of safety.

The air quality modeling conducted as a requirement for the PSD application demonstrates that the levels of particulate matter (PM10), sulfur dioxide (SO2), nitrogen oxides (NOx),carbon monoxide (CO), beryllium (Be), lead (Pb), hydrogen chloride (HCl), and benzene expected as a result of the proposed project will be below all applicable thresholds or guideline levels. It is reasonable to conclude that there will be no adverse effect to the soils or vegetation of the area.

5.2 GROWTH RELATED IMPACTS

The proposed construction will require an increase in personnel to operate the cement plant. The overall level of activity at the site is expected to be consistent with previous mining activity. No increase in residential or commercial construction is expected in the area surrounding the plant. Therefore, no additional growth impacts are expected as a result of the proposed project.

5.3 VISIBILITY IMPACTS

The VISCREEN model was used to determine if there were any visibility impacts caused by the proposed cement plant. The modeling results demonstrated that the screening criteria for maximum visual impacts were not exceeded inside or outside either Class I area (Chassahowitzka and Okefenokee).

5.4 IMPACTS ON AIR QUALITY RELATED VALUES FOR CLASS I AREAS

No adverse impacts on any air quality related values for Class I areas are expected, for the following reasons:

1. The source is located approximately 100 kilometers from either nearby Class I area.
2. The VISCREEN modeling showed no adverse visibility impacts.
3. The MESOPUFF II modeling showed that concentrations of NOx, SO2, and PM10 at the Class I areas were less than significant.

5.4.1 IMPACTS ON VEGETATION

No adverse impacts on vegetation at Class I areas are expected, for the following reasons:

1. The source is located approximately 100 kilometers from either nearby Class I area.
2. The VISCREEN modeling showed no adverse visibility impacts.
3. The MESOPUFF II modeling showed that concentrations of NOx, SO2, and PM10 at the Class I areas were less than significant.

5.4.2 IMPACTS ON SOILS

No adverse impacts on soils at Class I areas are expected, for the following reasons:

1. The source is located approximately 100 kilometers from either nearby Class I area.
2. The VISCREEN modeling showed no adverse visibility impacts.
3. The MESOPUFF II modeling showed that concentrations of NOx, SO2, and PM10 at the Class I areas were less than significant.

5.4.3 IMPACTS ON WILDLIFE

No adverse impacts on wildlife at Class I areas are expected, for the following reasons:

1. The source is located approximately 100 kilometers from either nearby Class I area.
2. The VISCREEN modeling showed no adverse visibility impacts.
3. The MESOPUFF II modeling showed that concentrations of NOx, SO2, and PM10 at the Class I areas were less than significant.

5.4.4 VISIBILITY IMPAIRMENT ANALYSIS

The VISCREEN model was used to determine if there were any visibility impacts caused by the proposed cement plant. The modeling results demonstrated that the screening criteria for maximum visual impacts were not exceeded inside or outside either Class I area (Chassahowitzka and Okefenokee).

6.0 CONCLUSION

It can be concluded from the information in this report that the proposed allowable emission rates of particulate matter (PM10), sulfur dioxide (SO2), nitrogen oxides (NOx), carbon monoxide (CO), beryllium (Be), lead (Pb), hydrogen chloride (HCl), and benzene, from the Florida Rock Industries cement plant will not cause or contribute to a violation of any air quality standard, PSD increment, or any other provision of Chapter 62-212, FAC.

ATTACHMENTS

PSD Class II Area 20-D Inventory

Significant PM-10, NOx, and SO2 Emitting Facilities (20 D Table)
Florida Rock Cement Plant
Newberry, Florida

20D TITLES	20D UTM E	20D UTM N	Sum PM (TPY)	PM-10 20D Emis Model?	Sum NOx (TPY)	NOx 20D Emis Model?	SO2 (TPY)	SO2 20D Emis Model?
Florida Rock	346.81	3285.44						
A.O._SMITH AUTOMOTIVE P	357	3248.8	9	NO				
AAA_READY MIX	386.3	3236.3	2	NO				
AAA_READY-MIX	362.8	3250.8	53	NO				
ACTICARB, INC.	360.2	3230	112	NO	3	NO		
ALUMAX DOOR PRODUCTS, I	389.09	3227.7			3	NO		
ANDERSON COLUMBIA THERM	340.7	3340.6	65	NO				
ANDERSON COLUMBIA, INC.	322.2	3315	38	NO			161	NO
ANDERSON COLUMBIA, INC.	341.1	3343.4	169	NO				
ANDERSON COLUMBIA, INC.	370.41	3345.25	45	NO			82	NO
ANDERSON COLUMBIA, INC.	400.8	3335.3	45	NO			162	NO
ASPHALT PAVERS INC #2 P	345.24	3322	45	NO	28	NO	103	NO
CENTRAL FL CREMATORIUM L	371.8	3280.3	1	NO	1		4	NO
CLAIRSON INTERNATIONAL	386.2	3228.9	14	NO	17	NO	1	NO
CLAIRSON INTERNATIONAL	388.5	3227.3	1	NO				
CLAIRSON INTERNATIONAL	390	3231.1	5	NO	2	NO		
COLUMBIA READY MIX CONC	341.6	3342.9	142	NO				
COUNTS_CONSTRUCTION CO	385.9	3231.4	0	NO	24	NO	58	NO
CROSS_CITY VENEER COMPA	295.2	3279.6	5	NO			75	NO
DELTA_LABORATORIES	385	3238	19	NO				
E.I._DUPONT DE NEMOURS D	398.7	3325	146	NO			295	NO
E.I._DUPONT DE NEMOURS E	400.23	3308.58	173	NO	121	NO	877	NO
ECO2,_INC.	393.5	3274.3	0	NO				
ENRON_GAS PROCESSING CO	372.3	3311.3	3	NO	2819	YES	2	NO
EVEREADY BATTERY COMPAN	361.49	3294.78	45	NO				
FELDSPAR CORP/EDGAR PLA	407.8	3274.2	158	NO			73	NO
FL DEPT OF CORRECTIONS	385.9	3325.84	1	NO			46	NO
FL DEPT OF CORRECTIONS .	329.18	3277.68	1	NO			31	NO
FL DEPT OF CORRECTIONS N	367.7	3342.5	2	NO			71	NO
FL_DEPT OF CORRECTIONS T	368.86	3318.18	2	NO			74	NO
FLORIDA ARMY NATIONAL GG	405.02	3312.01	34	NO			42	NO
FLORIDA GAS TRANSMISSIOO	371.9	3310.6	2	NO	1140	YES	13	NO
FLORIDA MINING & MATERI	390.5	3227.4	13	NO				
FLORIDA MINING & MATERIC	370.2	3279	128	NO				
FLORIDA POWER CORPORATI	369.4	3279.3	206	NO	475	YES	2546	YES
FLORIDA ROCK INDUSTRIESD	393.1	3313.1	110	NO				
FLORIDA ROCK INDUSTRIESE	279.8	3265.3	13	NO				
FLORIDA ROCK INDUSTRIEST	411.3	3274.2	21	NO			23	NO
FOREST LAWN MEMORIAL GA	342.91	3332.65	1	NO	1	NO	1	NO
FOREST MEADOWS FUNERAL	371.4	3283.8	4	NO	1	NO	4	NO
FRANKLIN INDUSTRIAL MIN	384.7	3244.2	247	NO	96	NO	607	NO
GAINESVILLE REGIONAL UTA	372.1	3280.1	491	NO	2376	YES	6709	YES
GAINESVILLE REGIONAL UTN	365.7	3292.6	1753	YES	10017	YES	25394	YES
GEORGIA-PACIFIC CORP. T	399.6	3273.8	204	NO				
GEORGIA-PACIFIC CORP. W	300.3	3278.8	76	NO				

Significant PM-10, NOx, and SO2 Emitting Facilities (20 D Table)
Florida Rock Cement Plant
Newberry, Florida

20D TITLES	20D UTM E	20D UTM N	Sum PM (TPY)	PM-10 20D Emis Model?	Sum NOx (TPY)	NOx 20D Emis Model?	SO2 (TPY)	SO2 20D Emis Model?
GILMAN BUILDING PRODUCT	373.5	3319.7	96	NO				
GOLDEN FLAKE SNACK FOOD	385.9	3228.9	54	NO	11	NO		
GRIFFIN INDUSTRIES OF F	389.7	3294.9	78	NO	125	NO	1116	YES
GRIMES AEROSPACE COMPAN	392.06	3231.26	2	NO	2	NO		
HIERS_FUNERAL HOME	390.5	3228.9	0	NO	1	NO		
HOWLAND FEED MILL, INC.	312.7	3351.4	16	NO				
J-M_MANUFACTURING CO, I	344.5	3279.8	38	NO				
JOHN_C. HIPP CONSTRUCTIA	356.7	3296.5	29	NO			123	NO
JOHN_C. HIPP CONSTRUCTIY	334.3	3235	27	NO			96	NO
KOPPERS INDUSTRIES, INC	371.7	3283.3	25	NO				
MADDOX FOUNDRY & MACHIN	352.4	3267.3	30	NO				
MARION_COMMUNITY HOSPIT	389.3	3227.6	5	NO	3	NO	1	NO
MARION_CORRECTIONAL INS	384.6	3243	3	NO	4	NO	21	NO
MARK_III INDUSTRIES	377.8	3228.7	36	NO	0	NO	9	NO
MID-FLORIDA MINING CO	384.5	3245.1	192	NO	44	NO	206	NO
MOBILCRAFT WOOD PRODUCT	387.8	3227.8	7	NO				
MOBILE RECLAIM, INC.	355.3	3282	23	NO				
MUNROE REGIONAL MEDICAL	389.2	3227.8	5	NO	1	NO		
NORTH_FLORIDA CONCRETE,	291	3326.4	6	NO				
NORTH_FLORIDA CONCRETE,S	347.3	3299.4	16	NO				
NORTH_FLORIDA CONCRETE,Y	342.2	3340	32	NO				
NORTHEAST FLORIDA STATE	390.5	3347.8	43	NO			616	NO
PNEUMATIC PRODUCTS CORP	384.05	3224			0	NO		
PURINA_MILLS, INC.	341.2	3341.4	151	NO			15	NO
REBEL_ASPHALT INDUSTRIE	385.2	3237.5						
RINKER MATERIALS CORP	388.7	3227.3	2	NO				
RINKER MATERIALS CORPORL	372	3279.9	22	NO				
ROBERTS CREMATORY	389.2	3228.2	3	NO	1	NO		
ROBERTS FUNERAL HOME OF	357.05	3214	1	NO				
ROYAL_OAK/HUSKY IND.	387.5	3231.1	97	NO	97	NO		
STARKE, CITY OF	393.1	3314			14066	YES		
SUWANNEE LUMBER COMPAN	292.43	3279.74	58	NO	4	NO	1	NO
TAMROCK-DRILTECH	355.7	3295.2	1	NO				
THE_BREWER COMPANY	390.8	3230.8	89	NO				
UNIV. OF FLORIDA BIOTEC.	355.3	3295.5	6	NO				
UNIV._OF FLORIDA - ANMLE	369.93	3279.37	5	NO	1	NO	2	NO
UNIV._OF FLORIDA - TACA	374.35	3282.77	0	NO	0	NO	0	NO
UNIV._OF FLORIDA - VETER	370.2	3279.3	2	NO				
UNIV._OF FLORIDA-ANIMAL	367.03	3279.62	2	NO	3	NO	7	NO
V._E._WHITEHURST & SONS	368.7	3289	131	NO				
V.A. MEDICAL CENTER	369.7	3279.1	11	NO			0	NO
VETERANS AFFAIRS MEDICA	340.65	3340.04	3	NO				
WHITE_CONSTRUCTION COMP	347	3299.8	41	NO			357	YES
WILLIAMS COLONIAL CREMA	371.65	3281.23	1	NO	1	NO	2	NO