SUMTER
COUNTY
CEMENT
CENTER HILL, FLORIDA, USA

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BUREAU OF AIR REGULATION

October 17, 2005

Mr. A.A. Linero
Bureau of Air Regulation
Department of Environmental Protection
2600 Blair Stone Road, MS # 5500
Tallahassee, Florida 32399-2400

SUBJECT: Response to Request for Additional Information dated October 7, 2005
Sumter Cement – Center Hill Plant
DEP File No. 1190041-001-AC (PSD-FL-358)
Proposed Portland Cement Plant in Sumter County, Florida

Dear Mr. Linero:

Sumter Cement Company (SCC) includes the following information in response to the Florida Department of Environmental Protection's (Department) request for additional information (RAI) dated October 7, 2005. SCC has included text from the Department's RAI in *italics* for clarity with SCC responses following each question.

Should the Department have additional questions or wish to meet to discuss the application, SCC would welcome this opportunity. SCC would be pleased to meet with the Department to clarify any outstanding issues or present the information in the application.

If the Department should have any additional questions please feel free to contact me directly to discuss at (386) 935-5039 or by e-mail at jbhorton@suwanneecement.com.

Sincerely,

Joe Horton
Sumter Cement Company

CC: Trina Vielhauer – DEP (w/o Attachments)
Dan Fritz - SCC
Celso Martini – SCC

1. SCC relies on "good combustion" (GC) to control carbon monoxide (CO). SCC proposes a best available control technology (limit) by GC of 3.6 pounds of CO per ton of clinker (lb/ton) on a 30-day basis. The cost of further control by other technologies was calculated presuming that emissions without further control by GC will be 3.6 lb/ton. Please estimate the costs and cost-effectiveness of further control by GC by evaluating the following possibilities. Applicant's own possibilities are also encouraged.

Carbon Monoxide (CO) is generated primarily from two sources in the cement pyro-processing. First from the incomplete combustion of fuel, and second from incomplete combustion and/or release from raw materials. Additionally, CO can be formed as a secondary reaction in the SNCR process depending on reagent usage and the location for injection for the primary reaction of oxidizing NO to NO_2. If reagents such as urea are used, CO is generated in the dissociation of the urea to ammonia (NH_3) and ultimately NH2 radicals. Even if ammonia is used directly a competitive reaction between the OH radicals for conversion of NO to NO2 and CO to CO2 occurs which can result in increased CO emissions. Suwannee American Cement (SAC), through testing at its other facilities, has seen increases in CO with the use of SNCR as a control technology. This has been reported to the Department in test reports from SAC and Polysius dated February 10, 2005. If the intent of SNCR is to minimize NOx, then the unintentional formation of CO may be unavoidable.

SCC has estimated CO emissions for the project with the assumptions of good combustion controls. This is meant to insure the design and operation of the combustion source (calciner) and insure the proper burn-out of CO to CO2. This is accomplished by proper oxygen, temperatures, mixing and residence time. This minimizes the amount of CO generation from the combustion of fuel only. Typical calciner designs allow for 3 to 5 seconds of retention time with mixing and the presence of oxygen to insure proper burn-out of the selected fuels. SCC will insure the correct amount of residence time for all proposed fuels in the final design of the calciner. Additionally, the use of SNCR will minimize the need to utilize harsh reducing conditions for the reduction of NO. This will again allow for the most efficient means to minimize the CO associated with incomplete combustion. However, use of the SNCR may contribute to the overall CO as a secondary reaction.

The second portion of CO generation comes from the raw materials and, in the case of SCC, is the primary means of generation. Little can be done to minimize the generation of CO from naturally occurring organic materials in the raw materials. As the materials travel through the pyro-process, they are heated through a temperature profile in a gradual manner allowing for the release of and incomplete combustion of hydrocarbons.

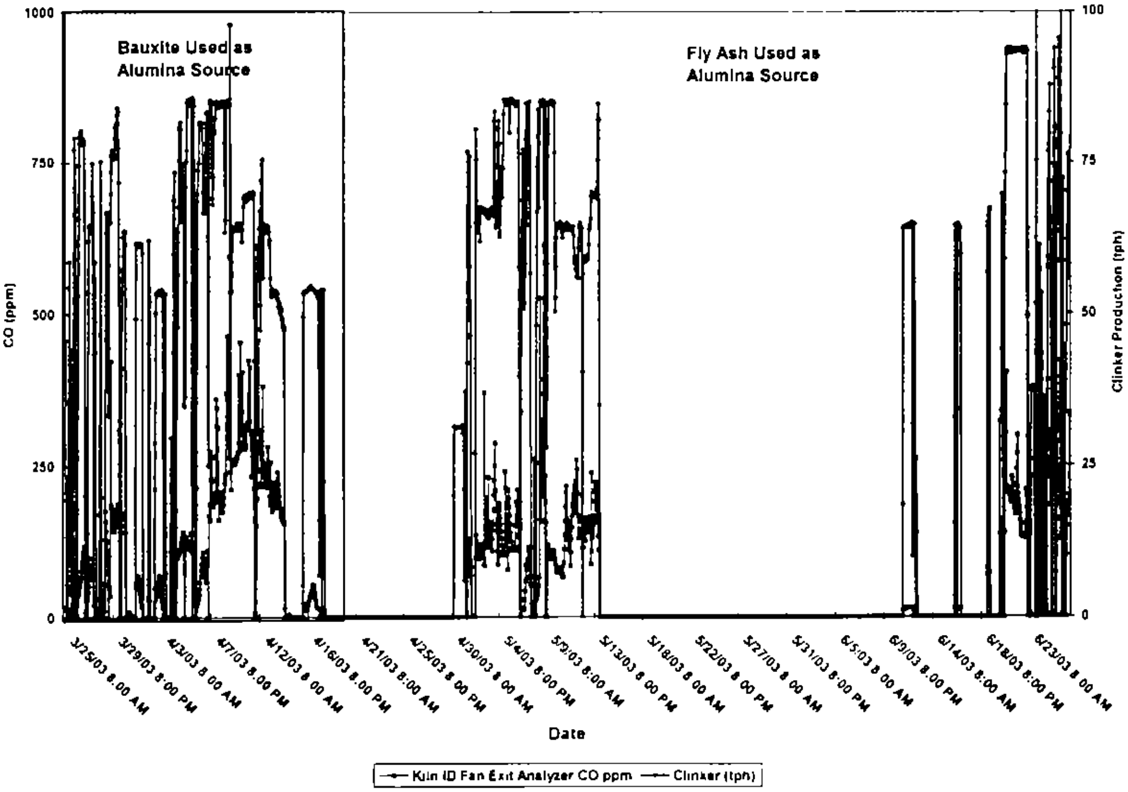
Based on 2.5 years plus of CO process data, CO stack testing, SNCR data, and Fly Ash Injection data at SAC, which fundamentally uses similar raw materials, a baseline for CO was developed. Improvements to combustion controls were evaluated and added to SCC, reducing the CO formation from incomplete combustion of fuels in the calciner. Projects such as Fly Ash Injection, which contribute some reduction to CO, were also included at SCC. SNCR for control of NO_x emissions was included for SCC, and the subsequent possible increase in CO was accounted for. The overall evaluations of these factors lead to a CO emission rate of 3.6 pounds per ton of clinker. This included the primary control of good combustion through extension of the retention time in the calciner to insure proper burn-out of fuel generated CO regardless of the fuel and including low volatile fuels such as Pet Coke.

a. *Given the present calciner design, estimate the CO emissions when using bauxite instead of fly ash as a raw material and only coal as fuel (except during startup).*

SCC has yet to design or have a calciner designed. The process flow sheets were done with the help of Polysius Corporation, a worldwide cement design expert to help in proper sizing and layout of the plant. Any preheater tower with vendor specific calciner such as FL Smidth, Polysius, or KHD could be utilized. SCC would insure the proper retention time of the calciner regardless of vendor and for all operating scenarios including proposed fuels.

Based on data from SAC, which actually ran with bauxite for several months prior to using fly ash, SCC determined minimal impact to CO emission from the use of bauxite versus fly ash. Chart 1 shows the CO as measured by a process analyzer for CO located in the downcomer after formation of CO from raw materials. It can be seen that during the limited time frame of bauxite use, the CO emissions appear comparable to the use of fly ash.

Chart 1: CO with Bauxite and Fly Ash Use at SAC



As stated previously, provisions for the injection of fly ash into the calciner will be included in the SCC project as a means to insure proper combustion of fly ash with higher carbon content instead of gradual heating through the tower. The data from SAC with use of bauxite as well as Fly Ash Injection were used to develop the baseline CO emissions for SCC at 3.6 lb per ton of clinker.

b. Evaluate costs of using bauxite instead of fly ash or other material high in carbon

The cost evaluation for bauxite is not the determining factor for its selection as alumina source for the raw materials. As previously discussed SAC originally used bauxite as an alumina source, and SCC has made provisions in the design for the use of bauxite with storage areas shown in the site layout. Bauxite, although very high in alumina, contains little to no alkalis. SAC switched use from bauxite to fly ash for the alkalis present in the fly ash. For SAC as well as SCC it is foreseen that fly ash will be the major source of alkali which will be discussed in detail later in the RAI response for their impact to the sulfur-alkali balance.

c Evaluate costs of minimizing petroleum coke and other difficult to burn fuels to maximize burnout in the calciner and ducting to the lower cyclone.

The calciner and associated ducting will be designed to insure proper burn-out of CO from any fuel used. The design will incorporate proper retention time to insure that CO from 100% pet coke will have the needed retention time for the burnout of CO, limiting the CO from the calciner region of the pyro-process. As stated previously, the major portion of the CO presumed from SCC is from raw materials.

d. Evaluate costs and benefits of increasing retention time (in increments of 0.5 seconds) in the calciner and duct work to the lower cyclone to maintain the requested fuel and raw materials options while achieving the CO emissions estimated in paragraph a. above.

As outlined in paragraph a and c, the calciner will be designed with maximum retention time to insure proper combustion and minimize the CO generation. The retention time will be on the order of 3 to 5 seconds, and any increase beyond that will not result in any measurable decrease in CO emissions from the fuels used. Extensions in calciner length and subsequent retention time would have no impact on CO generation from the raw material. The choices of raw materials and impacts from use of 100% fly ash to 100% bauxite have also been evaluated in determining the CO emissions. SCC has yet to decide on the alumina source for the project and has made provisions for the use of 100% fly ash, 100% bauxite, or a combination of the two. Storage and transportation for both sources have been included in the application in duplicate for each of the sources. The availability of sources and overall chemical composition of the raw mixture will decide the usage rates of each source.

e. The Department notes that the above procedure would certainly be considered by any operator prior to assuming that a regenerative thermal oxidizer (RTO), estimated by the applicant at $47,000,000 (capital) and $17,900,000 per year, would be necessary to achieve lower CO emissions.

SCC agrees that minimization of CO from proper design and operation of the calciner and reduction in organic materials in the raw materials is the most cost effective means to reduce CO emissions. In the cost analysis and baseline CO emissions, SCC has incorporated a calciner with the maximum retention time to reduce CO emissions from incomplete or partial combustion. Additionally, the major portion of CO present in the presumed 3.6 lb/ton BACT limit comes from raw materials, with fly ash only contributing a small portion. The use of bauxite versus fly ash seemed to have little impact on the overall CO emissions based on data from SAC. Although fly ash does contribute more to the overall CO emissions, it appears that the overall reduction in CO from the use of bauxite does not result in drastic reductions in CO. Naturally occurring organics in the limestone, which makes up far more of the raw material input, would be believed to be the primary source of CO. These factors in conjunction with unknown contributions of CO from SNCR at SCC were the basis used when arriving at a BACT limit of 3.6 lb/ton.

f. *With respect to the comment on page 35 about the decommissioning of the RTO at TXI, an agreement was reached between TXI and petitioners to operate the RTO all year round.*

SCC has learned that TXI in fact has reached an agreement to run the RTO unit year round. SCC understood that TXI had requested to operate the RTO only during ozone season and was unaware of the most recent agreement. However, it should be noted that SCC has learned the RTO still experiences operational problems and does not operate year round due to these operational problems.

g. *Provide estimate of impacts on CO due to operation rates between the guaranteed manufacturer production rates and the expected (greater) production rates foreseen by SCC. This may be just a part of the exercise described in d. above.*

All emission rates for SCC are based on a maximum production rate above and beyond the design rates. SCC has only worked with Polysius Corporation in developing process flows and design calculations and not obtained quotes or guarantees for any throughputs from a vendor. All emissions are estimated from maximum throughput rates which are above the design rates, insuring all emissions are at the absolute maximum for the equipment designed and presented to the Department. No greater production rates are foreseen from those presented in the application.

[Rule 62-212.400(h)3., F.A.C. Requirement for: "A detailed description of the system of continuous emissions reduction proposed by the facility or modification as BACT, emissions estimates and any other information as necessary to determine that BACT would be applied to the facility or modification"]

2. *Tarmac America, LLC, dba Titan Florida Cement, recently proposed a BACT limit for CO of 2.0 lb/ton (30-day basis) at the Pennsuco cement plant in Miami-Dade County. Please replace the "ND" value in Table 5-1 with the revised proposal. Also replace the value of 1.77 lb/ton given in the table for the Suwannee American Cement (SAC) Plant with the present BACT limit. It is possible that as many as half of the lb/ton values in the table are erroneous or possibly shifted by one row.*

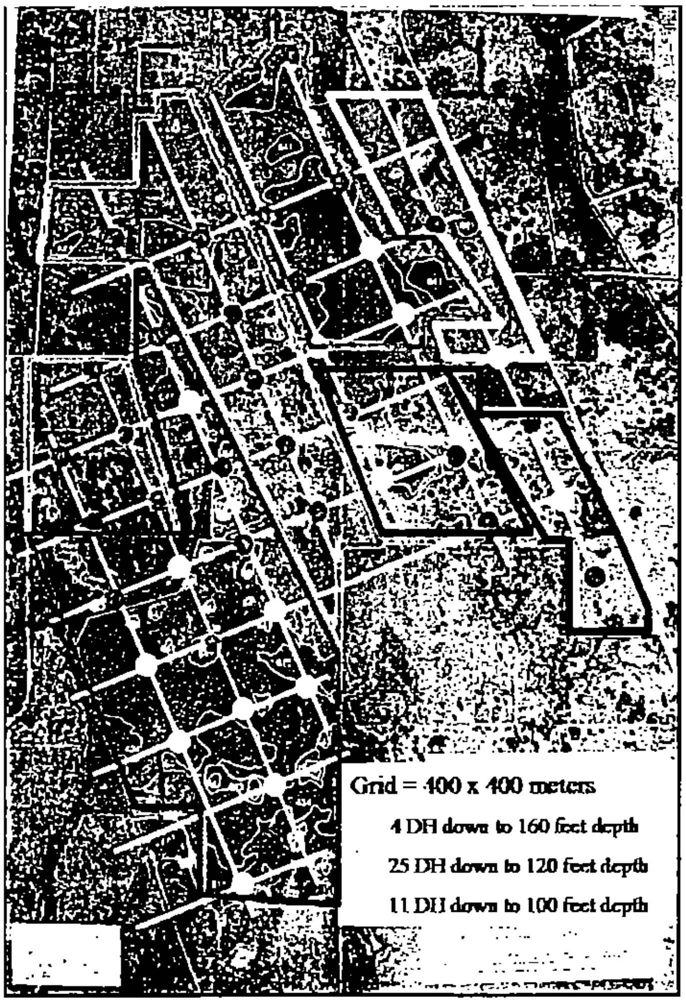
Table 5-1 in the BACT has been updated and corrected. It is included as part of Attachment 1 and is also provided in electronic form on the enclosed CD.

3. *VOC control to achieve 0.12 lb/ton of clinker is also given as GC. Regardless of combustion practices, VOC emissions can be high unless raw materials (especially additives) are selected that will not evolve VOC in the preheater. Please describe the raw material procurement practices for mill scale, fly ash, etc. that can influence both VOC and CO emissions. The proposed value appears to be adequate*

   [Rule 62-4.070(1), F.A.C. (1) "A permit shall be issued to the applicant upon such conditions as the Department may direct, only if the applicant affirmatively provides the Department with reasonable assurance based on plans, test results, installation of pollution control equipment, or other information, that the construction, expansion, modification, operation, or activity of the installation will not discharge, emit, or cause pollution in contravention of Department standards or rules."]

SCC has evaluated the naturally occurring limestone and silica sources (sand/clay) onsite for organic deposits. SCC conducted an extensive drilling campaign to insure the appropriate amounts of limestone and quality of limestone including carbon content. The data was compared to similar raw materials present at SAC for comparison of organics and correlation to VOC emissions. The following diagram shows the drilling and sampling campaign for the silica and limestone sources.

Diagram 1: Drilling Campaign



The carbon content in the limestone area proposed for use at SCC was similar or lower than that at SAC, eliminating concerns of high organic material homogenously mixed in the limestone and silica. SCC would closely monitor additional raw materials used onsite in a similar manner to what is presently done at SAC to insure that high carbon sources are not introduced that could adversely impact the VOC emissions. All raw materials used onsite would be pre-approved for use based on control limits for several parameters. This is done to insure proper quality of product as well as eliminate materials which could lead to elevated emissions such as VOC and SO_2. Control limits for fixed carbon and hydrocarbons for sources such as mill scale and fly ash would be established and all materials would be analyzed to insure that they are under these limits prior to use in the process. This has also allowed SCC to re-evaluate and lower its proposed VOC limit to the newly proposed 0.115 lb of VOC per ton of clinker. This will be discussed in further detail in response to question 17.

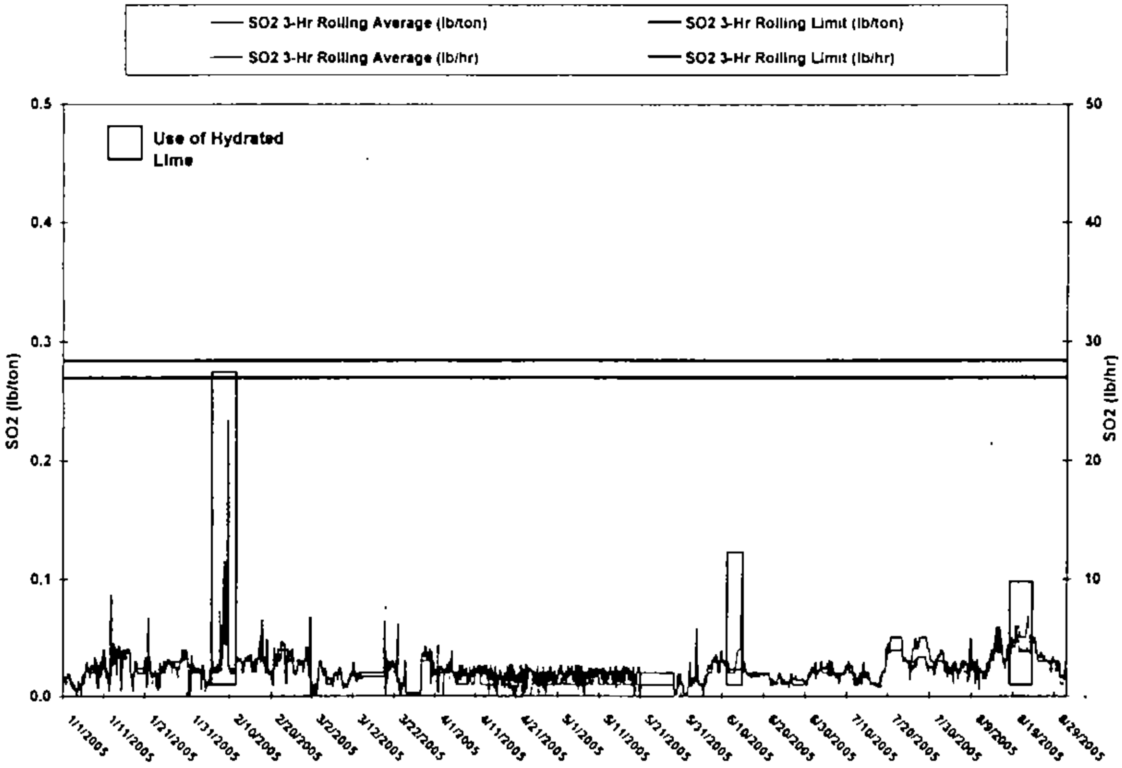
4. *Please provide a disk that includes a summary of 2005 data for 24-hr-averaged SO_2 emissions in terms of lb/ton from operation of the SAC plant. Indicate instances when injection of hydrated lime was practiced and the total amount of hydrated lime actually used for this purpose in 2005*
[Rule 62-212.400(h)3., F.A.C.]

SCC has included a spreadsheet on the enclosed disk with the hourly and 24 hour data for SO_2 emissions as well as the hydrated lime usage for SAC. SAC has to date used approximately 60 tons of hydrated lime during 2005. Hydrated lime acts as a backup to insure compliance with SO_2 emissions during critical time periods when the sulfur-alkali balance has shifted and proper amounts of alkali are not present to capture the sulfur in the clinker. The hydrated lime does not alleviate the sulfur cycle but only traps the sulfur in the internal kiln cycle until the alkali balance can shift to a proper balance and the sulfur can exit through the clinker. SAC has only had to use this backup system on a few occasions.

SAC closely monitors the sulfur inputs, but due to limited alkali the smallest shift in sulfur in limestone can cause the balance to be lost and excess sulfur to circulate in the raw mill/kiln system. SCC proposed to install the hydrated lime system as SAC has done as a means to insure compliance with the extremely low SO_2 limit. The use of the system would be very limited, with control of sulfur inputs being the means to insure long term compliance.

Chart 2 shows the SO_2 emission data for SAC for 2005.

Chart 2: SAC SO_2 Emission Data 2005



5. *Please clarify whether fly ash injected into the calciner will be introduced within the area of the calciner burner as described on Section 1, page 1 or in the upper section of the calciner as apparent in the drawing referenced as Sheet 5 in Appendix F. The different locations have different implications regarding carbon monoxide burnout and emissions. [Rules 62-4.070(1) and 62-212 400(h)3., F A C.]*

Fly ash will be injected into the calciner as described in Section 1, page 1. Sheet 5 in Appendix F is for process flow only and does not show the correct detail.

6. *With reference to Table 3-1, please note that a 24-hour limit of 0.16 lb SO_2/ton applies to Florida Rock Industries pursuant to a permit issued in 2002 for a production increase at the existing FRI kiln.*

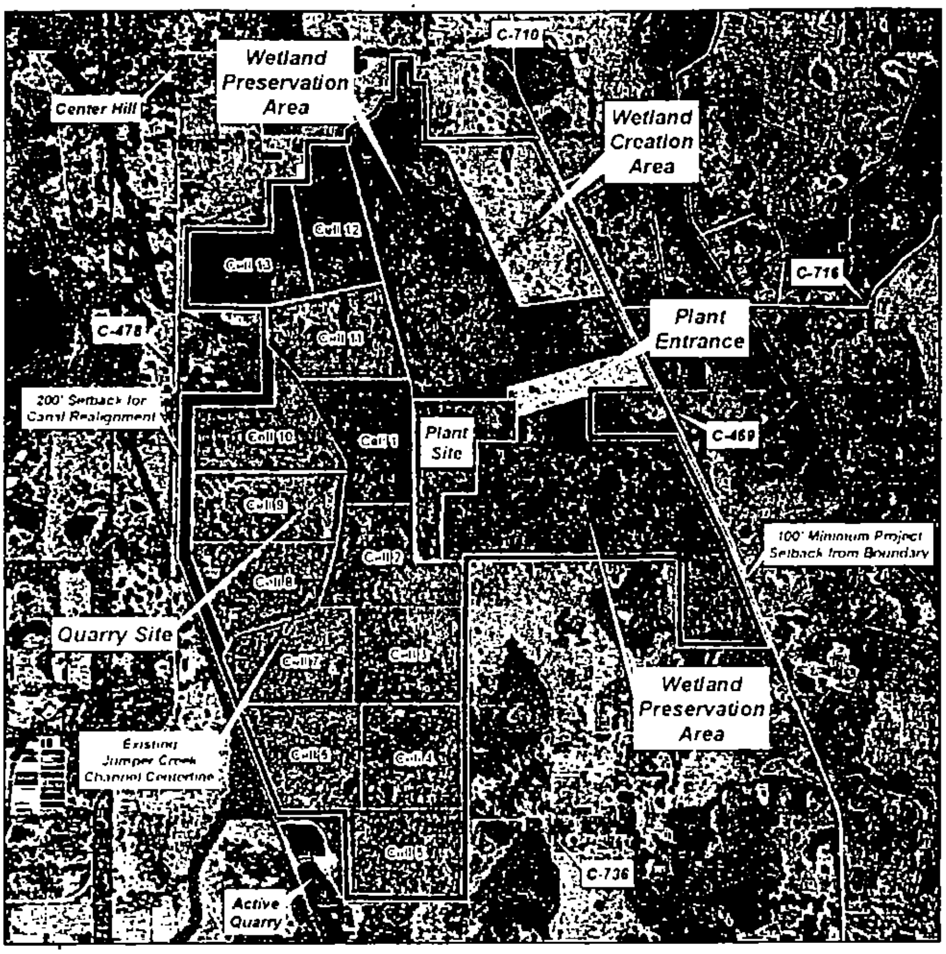
Table 3-1 in the BACT has been updated. It is included as part of Attachment 1 and provided in electronic form on the enclosed CD.

7. *Provide a qualitative if not quantitative discussion of the differences in sulfur and SO_2 generation potential due to raw materials differences between the quarries at SAC and SCC.*
   [Rule 62-212.400(h)3., F.A.C]

As described in Response 3, SCC has conducted an extensive drilling campaign to identify the chemical composition of the possible quarry reserves for mix calculations and design of equipment as well as for possible concerns over VOC and SO_2 emissions. Due to the relatively low alkali content of the raw materials currently available, stringent monitoring of raw materials is the only means to insure compliance with the SO_2 limits proposed as BACT. This includes the quarrying of limestone and silica which are generally low in sulfur, however isolated pockets of material have been identified at SAC which are high in sulfur. Selectively quarrying and continuous monitoring of raw materials is required at SAC to insure these materials are not introduced into the system in improper ratios as to negatively affect the sulfur-alkali ratio. The same practices will be followed at SCC.

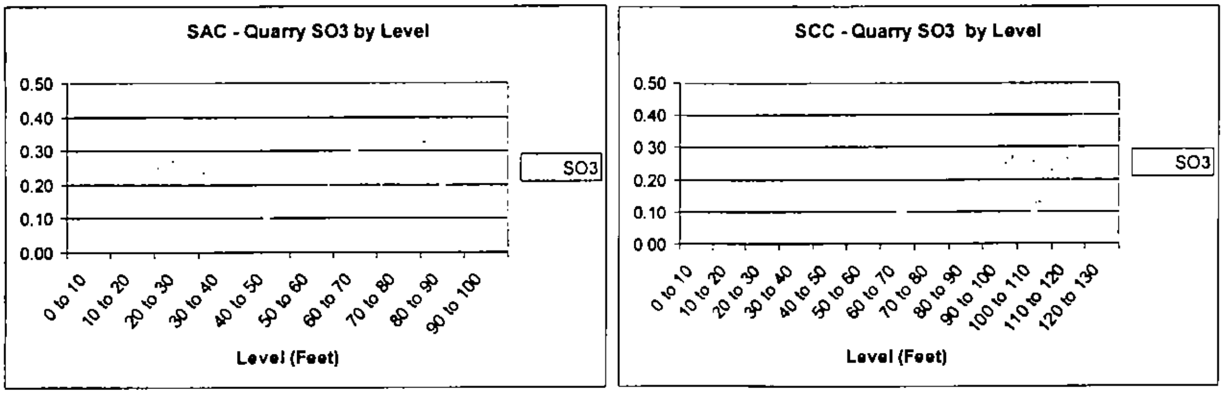
For SCC, the results of the quarry survey revealed that in areas were the limestone was present very little sulfur was detected. Some areas which did not present high concentrations of limestone contained sulfur levels similar to those found at SAC, which is predominately pyritic sulfur. SCC has designed its quarry around these areas as shown in the following Figure.

Figure 1: SCC Proposed Quarry Area



Analysis of the coring conducted in the proposed quarrying area were similar or lower in SO_3 (oxide of sulfur detected by X-Ray Diffraction) than SAC. The following charts show the relation at the varying depths between SAC and SCC.

Chart 3: SCC and SAC Limestone Sulfur Comparison



From the quarry survey and analysis, SCC will be able to control its sulfur contribution from the quarry in a similar manner to SAC. Monitoring of the limestone will insure the sulfur-alkali balance is kept and the quarry survey areas with higher concentrations of sulfur will be avoided.

8. *SCC relies on selective non-catalytic reduction (SNCR) to control nitrogen oxides (NO_X) carbon monoxide (CO). SCC proposes a BACT limit by SNCR of 1.95 lb NO_X/ton on a 30-day basis. The cost of further control by other technologies was calculated presuming that emissions without further control by SNCR would be 1.95 lb/ton. Please estimate the costs and cost-effectiveness of further control by SNCR by evaluating the following possibilities. Applicant's own possibilities are also encouraged.*

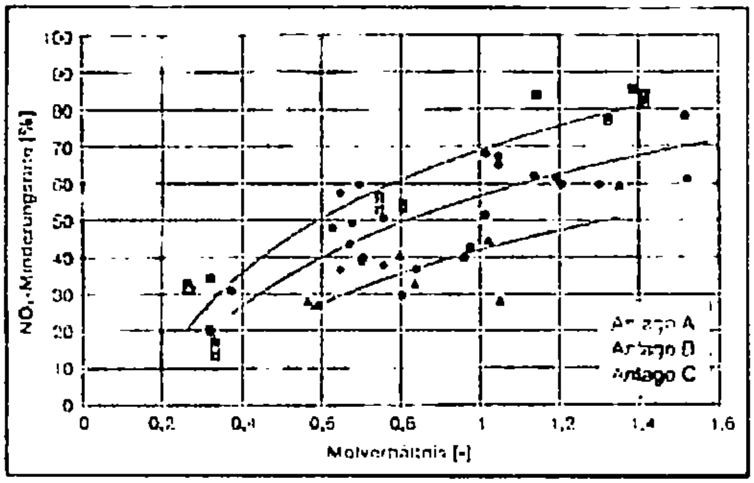
SCC has evaluated and selected SNCR for control of NO_x emissions. SCC used testing and long term data generated from SAC to help in determining the BACT limit. SAC was one of the first facilities in the U.S. to install and operate a SNCR system. To date SAC has over 6 months of continuous operating data on SNCR reduction of NO_x. SCC is also owned and operated by Votorantim Cimentos (VC) who has conducted extensive testing on SNCR at other locations throughout North America. SCC has relied on this extensive data and expertise in developing a BACT limit for NO_x.

   a. *Evaluate costs and NO_X reductions of further increasing ammonia injection up to a molar ratio of 1.0 (NH_3/NO_X) in increments of 0.1 moles NH_3 per mole NO_X. There would be separate cases depending upon the extent to which the calciner is operated in a reducing atmosphere for NO_X reduction prior to further control. [Rule 62-212.400(h)3., F.A.C.]*

In Appendix B of the BACT Report submitted in the application, SCC outlines the assumptions made for SNCR and cost associated with the system. On page 3 of 13 in Appendix B of the BACT Report, SCC gives a maximum molar ratio of 1.0 which was used in the cost analysis. SCC has already evaluated the maximum molar ratio for cost analysis and would not propose to exceed a 1:1 molar ratio of ammonia to NO_x.

The assumptions for efficiency of reduction from the SNCR system for uncontrolled NO_x come from the data and operation experience gained at SAC. NO_x levels with and without SNCR can vary greatly and in setting a baseline for the NO_x levels to be controlled by SNCR, SCC took into consideration the NO_x reductions from the calciner as well. With all of this, SCC felt that 1.95 lb/ton was an extremely low NO_x limit and would require reduction of uncontrolled NO_x with all tools listed in the BACT and use of SNCR injection with a normalized stoichiometric ratio of around 1:1. SCC has also assumed a very high reduction efficiency for the SNCR system of around 70%. This level has been demonstrated at SAC but is not guaranteed to directly transfer over to a new facility even with similar raw materials. Changes in the dynamics of the gas flow and gas interaction, as well as material interaction and calciner design may not allow for the same reductions seen at SAC. SCC, through its parent company VC, has assisted in several SNCR pilot tests and has yet to achieve efficiency such as those seen at SAC at other facilities for a variety of reasons. Additionally, the SCC plant will be approximately 65% greater in size for gas flows and material throughput. This will greatly increase ducting size which has been shown to decrease the efficiency of the injection of SNCR. This was noted by Polysius during testing of several kilns in varying sizes, "It can be presumed from the investigations that the dependence on size is attributable mainly to the fact that the blending of a small quantity of liquid into a large quantity of exhaust gas becomes more difficult, with increasing quantity of gas and increasing calciner diameter" (D. Rose, K. Adler, R. Erpelding). The following chart, also from Polysius, shows the decrease in SNCR efficiency as a relation to size of the plant.

Chart 4: NOx Reduction as a Function of Molar Ratio and Plant Size



Therefore, the final BACT cost analysis and limit was based upon all of this information and with the assumption of a molar ratio of 1:1 (NH_3 to NO_x as NO_2).

b The Department notes that the above procedure would certainly be considered by any operator prior to assuming that a selective catalytic reduction (SCR) system, estimated by the applicant at $5,520,000 (capital) and $9,580,000 per year, would be necessary to achieve lower NO_X emissions.

SCC agrees with the Department that an increase of the SNCR injection molar ratio to 1:1 is more cost effective then consideration of a SCR system. However, SCC has already evaluated the maximum injection molar ratio in determining its' BACT for both cost and NO_x reductions as discussed in response to paragraph a.

c. With respect to the "experimental" nature (Section 4 4, page 23) at an SCR unit in Europe, it is noted that articles by the supplier, plant representative, and German government expert describe the system as a success. This is noteworthy because fewer of the factors claimed in the application to reduce the effectiveness of SCR are actually present in Florida compared with Germany These include amount of sulfur and alkali in the exhaust gases.

SCC is aware of documented reports of the success of the system at Solnhofen. Through conversations and visits to Solnhofen, SCC has been able to gather data and form its own opinion. SCC agrees that the system had demonstrated successful NO_x reduction but at great cost and over several years as the process evolved. The actual reductions in comparison to baseline emissions are unclear and currently proposed BACT technologies such as SNCR in conjunction with MSC may offer equal or greater reductions then the SCR system.

[Rule 62-212.400(h)3., F.A.C.]

9. *Please advise the meaning of the statement in Section 4, Page 22, "For the reaction to occur the ammonia must be present in excess molar ratio". If this means that the NH_3/NO_X ratio must be greater than 1.0, then the applicant is referred to the papers by the mentioned authors (Haug, Samant, and Sauter) showing that substantial reduction is possible at molar ratios much less than 1.0 (by SCR) at the Solnhofer Portland Cement Plant.*

The intent of the statement was that ammonia reaction efficiencies are not 100%. Thus one mole of ammonia does not react equally with one mole of NO. Some portion of the reagent goes un-reacted with NO and is utilized. NO_x reductions should be present at stoichiometric ratios well below 1:1 as the Department has noted.

10. *Please submit the information required on Page 3-61 related to the Process Fuel Segment for all fuels to be used at the facility.*

Please see Appendix H, Raw Material and Fuel Chemical Analyses, of the Application submitted to the Department.

11. *Typical fuel specifications were provided for the proposed fuels with the exception of tires, the non-hazardous liquids including on-spec used oil, non-hazardous solids including plastics, filter fluff and wood waste. From the application, non-hazardous solids and non-hazardous liquids may account for up to 50 % of the total heat input in the kiln and calciner respectively. Provide a description and expected analysis of these additional fuels to be combusted.*

Please find a table below including example fuel analysis for tires, used oils, oil filter fluff, wood waste, and plastic.

Table 1: Fuel Information

Fuel Type	Moisture (%)	Sulfur (%)	Ash (%)	Volatiles (%)	Cal. Value BTU/lb
Tires	0.62	1.3	4.78	65	15,500
Used Oils	10 - 25	0 - 1	0 - 5	-	10,000 – 15,000
Oil Filter Fluff	-	0.36	3.63	-	14,000
Wood Waste	-	0.01	0.36	-	7,000
Plastics	-	0.02	1.81	93	16,000

During discussions with the Department in regards to utilization of similar fuels as SAC, the intent was to outline possible fuels that could be utilized in the system. With the exception of tires, the following fuels would require specific permission from the Department to test and evaluate each of the fuels before allowing usage and setting acceptable rates based on testing. For each of the fuels, SCC would request permission from the Department to test and then request permission from the Department for continual use on the basis of the testing.

12. *What additives will be used to insure the correct alkali to sulfur ratio is maintained when using petroleum coke? Florida limestone is low in alkali. Use of high sulfur petroleum coke can upset the balance between alkali and sulfur that is needed to insure fuel sulfur is incorporated into the clinker rather than deposited within the internal cycle (calciner/bottom cyclone/kiln inlet). Submit a projected chemical analysis of the additives likely to be used at this plant.*

As the Department is aware, sulfur from fuels used in the calciner and kiln main burner do not exit the lower stages of the preheater during normal conditions due to the large amounts of CaO present and its scrubbing affect. However, during upset conditions or with high levels of CO the scrubbing presence of CaO is greatly reduced. The source of sulfur in relation to SO_2 emissions is from raw materials. As previously discussed, SCC has already conducted extensive sampling of the proposed quarry for deposits of sulfur and would closely monitor all raw material inputs to insure that excess sulfur is not introduced into the upper portions of the tower as is done at SAC. The hydrated lime would serve as a means to insure compliance should excess sulfur occur in the feed materials.

Sulfur cycles in the lower stage of the cyclone from fuel contributions or more stable forms of sulfur present in raw materials have limited options for release out of the system. A bypass could be incorporated for large amounts of sulfur to release excess sulfur while it is volatilized. The sulfur can also be captured into the clinker through the formation of stable sulfur-alkali compounds. This is the need for alkalis in the process, to allow for the alleviation of the lower sulfur cycle and entrap the sulfur in the clinker. If either of these are not present then the sulfur will be forced into buildup, typically called sulfospurrite (2C2S·CS or C2S2S), which will then begin to restrict flow and ultimately lead to blockage of the kiln.

As discussed in Response 1 paragraph c, alkali sources for the area are extremely limited. This led SAC to use fly ash as the major source of alkali. For SCC, it was assumed as well that fly ash would make up the major portion of alkali and, with the small amounts of sulfur present in the raw materials and in most fuels, lead to an acceptable sulfur-alkali balance. SCC through testing at SAC and other VC plants throughout the world is confident it can utilize pet coke with the readily available sources of alkali. If sulfur cycles in the lower stages of the cyclone are formed then operational sacrifices will be experienced and these will not lead to SO_2 emissions.

SCC has evaluated several sources of alkali but most have limiting factors that would preclude their use. Very few sources of alkali are present in the immediate area. Most sources that SCC has considered are high in both alkali and sulfur, negating the advantage of the alkali. Others have organics which could lead to elevated VOC emissions. Some are difficult to grind and increase the burnabilty of the kiln feed leading to higher NO_x. SCC has proposed the use of Feldspar in Appendix H of the application, which if needed is an available source of high alkali. The following is the information pertaining to Feldspar presented in the Appendix H of the application.

From Appendix H of Permit Application

Raw Material Additive Type	Moisture %	CaO %	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	MgO %	K_2O %	NaO %	SO3 %	LOI %	Fixed C %
Feldspar (Alkali Source)	0.55	1.73	73.80	15.90	0.52	0.00	3.47	4.00	0.00	-	-
Feldspar (Alkali Source)	1.01	2.10	70.90	18.30	0.46	0.00	3.03	4.72	0.00	-	-

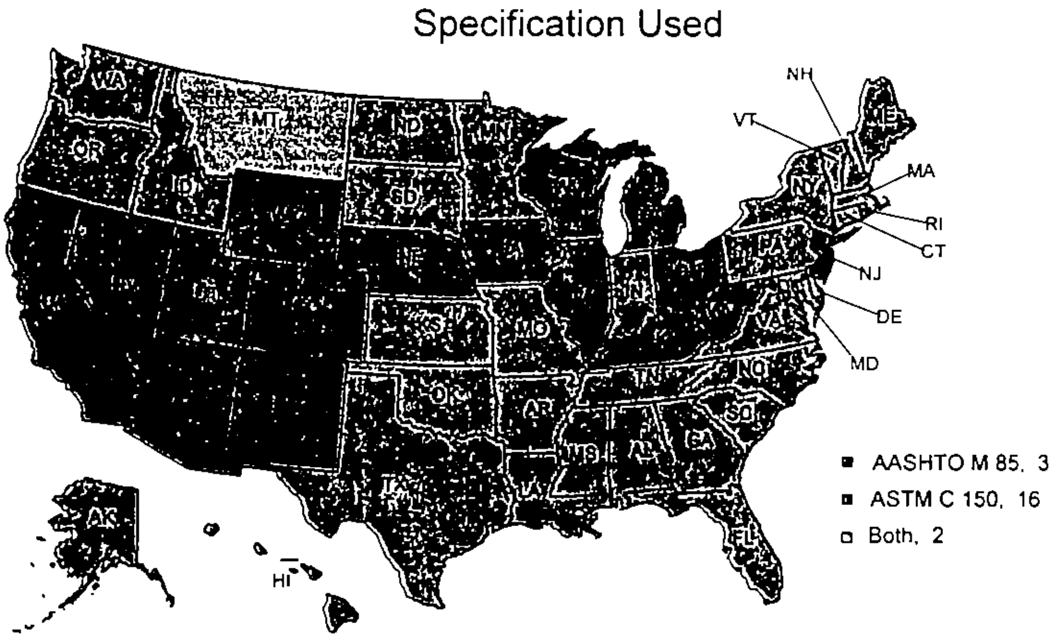
13. What measures have been considered to minimize emissions of mercury entering the process or emitted from the kiln stack? Has SCC considered the possibility of inter-grinding a small portion of the dust collected in the (kiln/calciner/raw mill) air pollution control device with the clinker?

SCC has closely examined the mercury emissions from the stack. As stated in the application, SCC will closely monitor all inputs into to the system to track the mercury input. SCC will assume detection limits of all materials as the input concentration which will insure conservatively high estimates of mercury to insure the actual mercury never exceeds proposed limits. SCC will assume all mercury inputs, which as stated will be overestimated, will be emitted out the stack as well. All of this will insure the proposed limitations will not be exceeded.

Additionally, SCC has studied the possibility of reducing the mercury through the possible use of enriched baghouse dust in finished grinding to entrap mercury in the cement. SAC voluntarily performed an extensive mercury study over several days to determine the feasibility of such a process. The overall conclusion was that baghouse dust although higher then raw material inputs in mercury due to the cycling of mercury in the kiln-mill system was never at a level to sufficiently purge the system of mercury. To adequately reduce mercury from the kiln-raw mill system, thousands of tons of baghouse dust would have to be wasted and then incorporated into cement. This constitutes more baghouse dust then could possibly be used in finish grinding.

Secondly, even if mercury could be concentrated in baghouse dust, the Department of Transportation (DOT) for the State of Florida requires its' cement meet the AASHTO M 85, 33 standards. This prohibits the use of limestone or baghouse dust in the finish grinding product. SCC, along with the Portland Cement Association (PCA), is working with state DOT offices to evaluate alternatives to the standard that may allow the use of limestone or baghouse dust in the final product. Without the re-evaluation of this, SCC could not sell its cement to the majority of its consumers. The following figure from PCA shows the states and what standard they are currently using for cement.

Figure 3: State Cement Requirements



(From PCA)

14. *Has Sumter Cement Company or its affiliates had any violations (or received warning letters) in the past two years related to any Department regulations at any of their facilities? Please provide the status of any matters that have not yet been resolved.*

    [Rule 62-4.070(5), F.A.C., "The Department shall take into consideration a permit applicant's violation of any Department rules at any installation when determining whether the applicant has provided reasonable assurances that Department standards will be met".

SCC is operated by Votorantim Cimentos (VC) which also operates SAC. SAC resolved compliance issues that occurred shortly after startup of the existing facility in late 2003 and early 2004. These issues were finalized in Consent Order OGC File No.: 03-2031. SAC also has received and responded to a warning letter from the Department (WL05-30-AP61-NED). SCC is unaware of any other violations or warning letters from the Department against SAC or VC.

15. *Has Sumter Cement Company or its cement operations affiliates (such as Votorantim and St. Mary's Cement) had any violations (or received warning letters) in the past two years related to the regulations of other states or EPA? Please provide the status of any matters that have not yet been resolved. Provide additional information in case the matters relate to actions by previous owners of the assets. [Rule 62-4.070(5), F.A.C.]*

SCC is operated by VC which owns and operates St. Mary's Cement. SCC is unaware of any violations or warnings issued against its operations by other states or the EPA while under operations of VC. Issues prior to ownership by VC are not available to SCC or relevant to the operations under VC.

16. *If the positions of plant manager and plant production manager are still to be determined, please describe the minimum requirements for this position established by your company including, but not limited to, total years experience in the cement industry, total years experience as plant operator, educational background, etc. [Rule 62-4.070(1), F.A.C.]*

As previously stated, VC will be in charge of operations of the SCC Plant. VC has been established in the cement industry since 1936 and currently is the 7th largest producer of cement in the world. VC operates 12 cement plants in South America with over 25 million metric tons of cement capacity. In North America, VC operates 5 cement plants and 2 grinding facilities. VC has among the highest operating standards of any cement company in the world. It has tremendous experience in the cement industry and technical expertise from its 20,000 employees.

VC will insure the positions of Plant Manager and Production Manager are filled with personnel with experience in the cement industry and appropriate educational background. VC would prefer not to set defined years for experience or education as these can limit the opportunities for promotion and growth within the company. To give an example of typical qualifications, the position of Plant Manager at SAC has been filled by two people under VC's period of operations. Both had 20+ years of experience in the cement industry and strong technical backgrounds in education.

17 According to the application, the project has the potential to emit 103 tons per year of VOC. If a project has the potential to emit VOC over 100 tons per year, the applicant is required to perform an air quality analysis for this PSD pollutant. This includes a Pre-Construction Monitoring Analysis. Please provide a Pre-Construction Analysis for VOC and further, please explain how projected VOC emissions will not contribute to a violation of the National Ambient Air Quality Standard for ozone.

VOC PTE emissions from the SCC Plant were conservatively estimated based on 0.12 lb VOC per short ton of clinker. SCC has decided to reduce the level of conservatism associated with VOC emissions. With current annual PTE VOC emissions at 103 short tons per year, this would require SCC to perform an ambient impact analysis, including pre-construction monitoring. As a result, SCC is revising the estimated annual PTE VOC emissions based on a revised emission factor of 0.115 lb VOC per short ton of clinker. This will result in annual PTE VOC emissions of 98.7 short tons per year and eliminates the requirement to perform an ambient impact analysis, including pre-construction monitoring.

Provided in Attachment 2 and 5 are applicable updated sections of the Permit-To-Construct Application. This information is also included on the enclosed CD.

18. Although associated growth is addressed in the application, please provide an additional analysis to comply with Rule 62-212.400(5)(h)5, F.A.C

The secondary impact analysis addressed the direct impact of PTE TSP and PM_{10} emissions on surrounding soils, flora, fauna, and any associated direct and indirect growth attributable to the proposed project. These two regulated NSR pollutants had predicted maximum 24-hour and annual air quality impacts above their corresponding "significant impact levels" (SIL).

The recommended EPA methodology specified in "*A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals*" (EPA 450/2-81-078, December 12, 1980) and the EPA document "*New Source Review Workshop Manual*" (Draft October 1990) were used as references to perform the secondary impact analysis. Also, the secondary impact analysis of the project's air pollution impact on soil, vegetation, wildlife, direct growth, and indirect growth was assessed per the requirements stipulated in Florida Rule 62-212.400(5)(e)(1-3) and 62-212.400(5)(h)(5). Specifically, Rule 62-212.400(5)(h)5 states "*Information relating to the air quality impacts of, and the nature and extent of, all general commercial, residential, industrial and other growth which has occurred since August 7, 1977, in the area of the facility or modification would affect.*"

In the PTC Application, the following was presented relative to soils, flora, and fauna, including wildlife:

- **Soils, Flora, and Fauna, Including Wildlife**

  The estimated, maximum, total annual PM_{10} impact plus representative annual PM_{10} background value is 29.96 $\mu g/m^3$. This value is within the applicable annual PM_{10} NAAQS value of 50.0 $\mu g/m^3$.

  The estimated, highest second-highest, total 24-hour PM_{10} impact plus representative annual PM_{10} background value is 79.88 $\mu g/m^3$. This value is within the applicable 24-hour PM_{10} NAAQS value of 150.0 $\mu g/m^3$.

From the results of this analysis it is concluded that there will be no adverse impacts from PTE PM_{10} emissions on any surrounding soils, flora, or fauna, including wildlife, from the SCC Plant.

To supplement the information presented in the PTC Application, the following additional information is provided in response to Item No. 18.

- **Associated Direct and Indirect Growth**

  Work Force
  The construction of the SCC Plant is expected to produce 500 temporary jobs for a period of 18 months. The operation of the SCC Plant will also produce approximately 118 new permanent jobs. Of the 118 new permanent jobs, 24 of the jobs will be initially filled with technical personnel from the SCC parent, Votorantim Cementos. Votorantim Cementos will be the operator of the SCC Plant and also operates SAC which has a cement plant located in nearby Branford, Florida. The remaining 94 new permanent jobs are expected to be filled by the existing workforce from the surrounding population. No new significant air emissions are expected associated with the construction or operation of the SCC Plant from workers traveling to and from the SCC Plant.

  Residential
  The predominant existing housing units in the vicinity of the SCC Plant are single family and mobile homes. The easy availability of mobile homes and lots in the vicinity of the SCC Plant provides a local capacity for quick expansion. It can be anticipated that 12 new homes can be expected to be built in Center Hill and an additional 89 new homes can be expected to be built in Sumter County. The anticipated air emissions associated with the new home construction will be temporary and are considered insignificant because of the limited number of new homes expected to be constructed as the result of the SCC Plant. New air emissions associated with the heating of any new homes are also expected to be minimal and considered insignificant due to the climatology of the area.

  Industrial
  The construction and operation of the SCC Plant is not expected to produce any new industrial growth and no new air emissions.

  Commercial
  It is possible that a modest increase in commercial growth associated with the establishment of new small commercial establishments such as restaurants, convenience stores, and gas stations can be expected. However, it is concluded that no new significant emissions are expected from any realized commercial growth.

  Other
  No other direct or indirect growth is expected as the result of the construction and operation of the SCC Plant.

To summarize, no significant new emissions associated with direct and indirect growth impacts due to the construction or operation of the SCC Plant are expected.

19. *The modeling submitted with the application has fugitive road emissions evaluated as "Area" sources. Please provide justification for using this type of source for the roads.*

In the Modeling Protocol submitted to the Department in June of 2005, fugitive emissions from roads were identified as area sources and outlined to the Department that they would be modeled as such.

Fugitive emissions from roads were selected to be modeled as area sources since area sources are characterized as having a low-level release with no plume rise. Volume sources were not selected since they have initial dispersion prior to release which is not representative of particulate emissions from haul roads. Representing haul roads as area sources in generally considered more conservative than representing them as volume sources. The treatment of haul roads as area sources is consistent with EPA modeling guidance. As stated in the User's Guide for the ISC3 Dispersion Models[1], "The use of the ISC area source algorithm for elongated rectangles would be most applicable to near ground level line sources."

[1] Air Quality Modeling Guidelines, July 2001, South Carolina Department of Health & Environmental Control, Bureau of Air Quality.

20. *Please provide a table summarizing all pollutant emission rates from all sources that were included in the Class II PSD increment and NAAQS modeling. Include a list of major nearby sources that were omitted as well.*

Provided in Attachment 4 are three tables which identify the emission rates for all sources included in the Class II PSD Increment and NAAQS modeling, identify the sources excluded based on the 20D rule, and identify the sources excluded which were located just outside of the significant impact area (60 km). These tables are also provided in electronic format on the enclosed CD.

21. *Since the modeling protocol was deemed sufficient, the standard for the Receptor Grid has become more refined within the Department. In order to have continuity with other cement projects in the State, it is requested that a 25 meter plant boundary receptor grid interval be used for this project. This includes 2 receptors, one on either side of each road where it intersects the plant boundary, at a minimum distance of 25 meters from the road edge. Please update modeling to reflect the new standard to ensure that this continuity is satisfied.*

SCC submitted a modeling protocol for the Department's review and comment on June 16th. SCC and the Department reviewed and modified the protocol on several occasions before receiving final approval on the protocol from the Department on August 18th. The intent of submitting a protocol for review and approval was to avoid this exact situation where the Department would change the parameters by which the modeling should be performed causing SCC to remodel, and expending time and resources to do so. SCC understands the changing parameters by which the Department may need to re-evaluate modeling results, but SCC made every possible effort to work with the Department to insure modeling would be conducted in the appropriate manner prior to submittal of the updated Application on September 8th. Irregardless, SCC has conducted the requested modeling changes and remodeled the results as requested and attached the updated modeling results and associated input, output and intermediate files on the enclosed CD.

22. *Please provide a more detailed plot plan. The Department is requesting both an electronic version (preferably a .dwg file) and an updated paper plan (preferably 2 x 3 feet). Please grid the plot plan in UTM coordinates and highlight the buildings and structures.*

Updated drawings are included as AutoCAD files (.dwg file) on the enclosed CD. The UTM coordinates of the center of the kiln stack are noted on each file and have been provided below:

Easting 403754.39 (M), Northing 3167561.97 (M), Zone 17, WGS-84 Ellipsoid.

23. *Please provide a diagram showing each road segment, its location and its emission parameters.*

Provided in Attachment 3 is a table listing the exact location and emission parameters for each road segment and a chart showing the location of each road segment. The table and chart are also provided electronically on the enclosed CD.

24. *Please provide any Excel files for Tables in Appendix A to show how emission calculations were completed.*

SCC has provided in the Modeling Protocol, Modeling Report, Calculation Methodology (Section 4), and Potential to Emit (PTE) Spreadsheets in Appendix A all formulas used in calculating emissions. From these formulas every emission output can be duplicated and checked. SCC will provide the actual spreadsheets in Excel to the Department so they may more easily track the calculations through the spreadsheet cells. These can be found on the enclosed CD. SCC would request this Excel version of Appendix A be deemed a "Proprietary Work Product" and only the PDF version be made available to the public so that the work product may be protected. An updated PDF version of these spreadsheets is also included in the enclosed CD.

25. *On page 5-18 of the application, Table 5-7 details the results of the PSD Class II Increment PM10 analysis. According to the text above the table, the modeling results for the 24-hour averaging period are based on the High, Fourth-High concentrations. The Increment should be based on the High, Second-High concentrations for the 24-hour averaging period. Please correct the table/Increment analysis.*

We have modified the modeling runs and report to reflect the usage of High, Second-High for the 24-hour period. Provided in Attachment 6 is a copy of the revised Modeling Report. An electronic copy of the Modeling Report is also included along with the modeling files on the enclosed CD.

26. *Please update Tables in Appendix A to reflect the "Source ID" or "Source Description" for all sources in the modeling or vice versa.*

Provided in Attachment 5 is an updated Appendix A or PTE Inventory which now includes a column labeled "Modeling Source ID" to identify the Source ID used in the modeling input and output files for each emission source. As mentioned in the response above, the PTE Inventory is also provided on the enclosed CD in both PDF and Excel format.

27. *Please explain how the Initial Lateral Dimension and Initial Vertical Dimension were determined for the Volume Sources.*

Initial lateral dimensions for volume sources, such as buildings, were defined as the length of a side (square) divided by 4.3 which is consistent with EPA modeling guidance. Rectangular buildings were assumed to be a square with the same area as the actual building. Initial vertical dimensions for volume sources were determined for elevated sources not on or adjacent to a building by taking the vertical dimensions of the source and dividing it by 4.3. Initial vertical dimensions for volume sources were determined for elevated sources on or adjacent to a building by taking the building height and dividing it by 2.15. This approach is consistent with EPA modeling guidance.[2]

28. *Please explain how the Initial Vertical Dimension of the Plume of 1.86m was determined for the Road Sources in the modeling.*

The initial vertical dimension of 1.86 meters represents an estimated value of approximately six feet which represents the average physical tire height and attending turbulent vertical dispersion initially produced by the truck tire traveling over plant road surfaces.

29. *Although Building Downwash is included in the modeling, please provide the actual BPIP input and output files.*

BPIP input and output files are included on the enclosed CD.

30. *Please ask your professional engineer to review the seal used for compliance with the latest requirements of the Florida Board of Professional Engineers. It may be necessary to resubmit the P.E certification. These are given at.* http.//www.engineerseals com/order/floridape.php

Contact was made with the Florida Board of Professional Engineers regarding the validity of the Florida P.E. Seal used for the SCC PTC Application. The Florida P.E. Seal used for the SCC PTC Application and this response is still valid until December 31, 2005. Beginning January 1, 2006, the new Florida P.E. Seal referenced in the RAI is required to be used.

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[2] U.S. EPA 1995 – "User's Guide for the Industrial Source Complex (ISC3) Dispersion Models, Volume I – User Instructions", U. S. Environemntal Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, September 1995.

Attachment 1

Revised Table 3-1 and Table 5-1 from the BACT Analysis (Appendix B)

TABLE 3-1. SUMMARY OF RECENT SO_2 BACT DETERMINATIONS FOR CEMENT KILNS (2000-PRESENT)

Company	Location	Kiln Type	Permit Date	Technology Applied and $/Ton	Removal (%)	In Operation (Yes/No)	Limit (lb/ton clinker)	Rejected Technology and $/Ton
CEMEX	Demopolis, AL	PC (mod)	09/13/02	Low S Coal	NA	Yes	1.14	WS - $10,327
Florida Rock Industries	Newberry, FL	PC (mod)	2002	Process – NA	NA	Yes	0.16	
Florida Rock Industries	Newberry, FL	PC (new)	App. 11/8/04	Process – NA	NA	No	0.28 (proposed)	WS - $20,453
GCC Dacotah	Rapid City, SD	PC (mod)	04/10/03	Process – NA	NA	Yes	2.16	Fuel or raw mix S limits
Holcim	Holly Hill, SC	PC (new)	12/22/99	Process - NA	NA	Yes	3.26	
Holcim	Artesia, MS	WET (mod)	See Note 1	No BACT limit for SO2		Yes		
Holcim (Devil's Slide)	Morgan, UT	PC (mod)	11/20/02	No BACT limit for SO2		Yes		
Holcim	Theodore, AL	PC (mod)	02/04/03	Limit not based on BACT	NA	Yes	0.13	
Holcim	Lee Island, MO	PC (new)	06/08/04	Lime spray drying – mill off	93	No	1.26	WS - $13,225
Lafarge	Davenport, IA	PC (mod)	11/09/99	Process	NA	Yes	1.01	
Lehigh Portland Cement	Mason City, IA	PC (mod)	12/11/03	Wet Scrubbing	90	Yes	7.26	
Lone Star Industries	Cape Girardeau, MO	PC (new)	See Note 1		NA	No		
Monarch Cement	Humboldt, KS	2PC (mod)	01/27/00	Process – NA	NA	Yes	1.10	WS - $10,345 Lo S Fuel, WAA, DAA
North Texas Cement	Whitewright, TX	PC (new)	03/04/99	Wet Scrubbing	85	No[2]	2.75	
St. Lawrence Cement	Hudson, NY	PC (new)	See Note 1	Dry & Wet Scrubbing		No	0.65	
Suwannee American Cement	Branford, FL	PC (new)	06/01/00	Process	NA	Yes	0.27	WS - $29,700 DAA - $7,400
Rinker/Florida Crushed Stone	Brooksville, FL	PC (new)	App. 12/04	Process – NA	NA	No	0.23 (proposed)	

Notes:
1. Permit under negotiation
2. May never be built

TABLE 5-1. CARBON MONOXIDE (CO) LIMITS FOR PRECALCINER KILNS

Facility Name	Plant Name	Facility Location	Facility Status	Annual average emissions (lb/h)	Annual average emissions (lb/ton clinker)	Control Technology*
Alamo Cement Company	1604	San Antonio, TX	Existing	460.00	4.14	GC
Ash Grove Cement Company	Chaunte	Chaunte, KS	Existing	321.69	1.66	GC
Ash Grove Cement Company	Durkee	Durkee, OR	Existing	490.00	4.34	GC
Ash Grove Cement Company	Louisville	Louisville, NE	Existing	NL	NL	GC
Ash Grove Cement Company	Leamington	Nephi, UT	Existing	502.27	4.88	GC
Ash Grove Cement Company	Seattle	Seattle, WA	Existing	537.21	6.27	GC
Blue Circle Cement, Inc.	Harleyville	Harleyville, SC	Existing	1209.59	9.68	GC
Calaveras Cement Company	Redding	Redding, CA	Existing	1156.85	15.83	GC
Calaveras Cement Company	Tehachapi	Tehachapi, CA	Existing	900.00	11.86	GC
California Portland Cement	Mojave	Mojave, CA	Existing	183.50	2.85	GC
California Portland Cement	Arizona Portland	Rillito, AZ	Existing	1157.31	4.41	GC
Capitol Aggregates, Inc.	Capitol Cement Division	San Antonio, TX	Existing	622.50	7.47	GC
Capitol Cement Corporation	Capitol Cement Corporation	Martinsburg, WV	Withdrawn	468.75	2.50	GC
Capitol Cement Corporation	Capitol Cement Corporation	Martinsburg, WV	Existing – Modification	3960.00	4.00	GC
Sunbelt Cement, Inc. (prev Cemex USA)	Balcones	New Braunfels, TX	Existing	497.72	4.52	GC
Continental Cement Co., Inc.	Continental Cement Co., Inc.	Hannibal, MO	Withdrawn	ND	ND	
CSR/Rinker Materials, Inc.		Miami, FL	Existing	412.40	3.01	GC
ESSROC	Nazareth	Nazareth, PA	New – Not Constructed	1364.06	4.50	GC
Florida Crushed Stone – Kiln 1		Brooksville, FL	Existing	208.33	2.00	GC
Florida Rock Industries, Inc.		Brooksville, FL	Proposed	292.92	3.60	GC
Florida Rock Industries, Inc.	Thompson S. Baker Plant	Newberry, FL	Existing	294.20	3.62	GC
Florida Rock Industries, Inc.	Thompson S. Baker Plant	Newberry, FL	Proposed	450.00	3.60	GC
Hanson Permanente Cement	Permanente	Cupertino, CA	Existing	1008.72	4.72	GC
Holcim (US)	Portland	Florence, CA	Existing	1940.64	6.80	GC
Holcim (US)	Holly Hill	Holly Hill, SC	Constructed		8.00	GC
Holcim (US)		Lee Island, MO	Proposed	2739.73	6.00	GC
Holcim (US)	Fort Collins	Laport, CO	Existing	26.48	0.40	GC
Holcim (TEXAS)LP	Holcim (TEXAS)LP	Midlothian, TX	Existing – Modification	811.99	5.33	GC
Holcim (TEXAS)LP	Holcim (TEXAS)LP	Midlothian, TX	Existing – Modification	811.99	5.33	GC
Holcim (US)	Devil's Slide	Morgan, UT	Existing	620.00	5.05	GC
Holcim (US)	Theodore	Theodore, AL	Existing	NL	NL	GC
Kosmos Cement Company	Kosmosdale	Louisville, KY	Existing	1325.00	10.60	GC
Lafarge Corporation	Davenport	Buffalo, IA	Existing	313.00	2.15	GC
Lafarge Corporation	Sugar Creek	Sugar Creek, MO	Existing	192.24	1.64	GC
Lehigh Portland Cement	Union Bridge	Union Bridge, MD	Existing	ND	ND	
Lehigh Portland Cement	Mason City	Mason City, IA	Existing – Prop. Mod.	NL	NL	GC
Lone Star Industries	Cape Girardeau	Cape Girardeau, MO	Existing	NL	NL	GC
Lone Star Industries	Cape Girardeau	Cape Girardeau, MO	New – Not Constructed	ND	ND	
Lone Star Industries	Greencastle	Greencastle, IN	Existing	552.97	3.02	GC

TABLE 5-1. CARBON MONOXIDE (CO) LIMITS FOR PRECALCINER KILNS (CONTINUED)

Facility Name	Plant Name	Facility Location	Facility Status	Annual average emissions (lb/h)	Annual average emissions (lb/ton clinker)	Control Technology*
Mitsubishi Cement Corporation	Cushenbury	Lucerne Valley, CA	Existing			
National Cement Company of Alabama	Ragland	Ragland, AL	Existing			
National Cement Company of California	Lebec	Lebec, CA	Existing	384.00	2.71	GC
North Texas Cement Company		Whitewright, TX	New – Not Constructed	ND	ND	
Phoenix Cement	Clarkdale	Clarkdale, AZ	New – Not Constructed	ND	2.00	GC
RC Cement Company, Inc.	Hercules Cement Company	Stockertown, PA	New – Not Constructed	ND	ND	GC
Rio Grande Portland Cement		Pueblo, CO	New – Not Constructed	254.06	2.11	GC
RMC Pacific Materials	Santa Cruz	Davenport, CA	Existing	NL	NL	GC
Roanoke Cement Company	Roanoke Cement Company	Cloverdale, VA	Existing – Modification	494.67	3.00	GC
St. Lawrence Cement		Hudson, NY	Proposed	783.48	2.59	GC
Signal Mountain Cement		Chattanoga, TN	Existing	248.00	2.77	GC
Southdown, Inc.	Charlevoix	Charlevoix, MI	Existing	179.91	2.14	GC
Southdown, Inc.	Clinchfield	Clinchfield, GA	Existing	1187.50	12.42	GC
Southdown, Inc.	Knoxville Plant	Knoxville, TN	Existing	NL	NL	GC
Southdown, Inc.	Lyons	Lyons, CO	Existing	98.21	1.32	GC
Southdown, Inc.	Victorville Cement	Victorville, CA	Existing	ND	ND	
Suwannee American Cement		Branford, FL	Existing	378.00	3.60	GC
Tarmac America, Inc.	Pennsuco Cement	Medley, FL	Existing	369.61	1.77	GC
Texas Industries	Hunter Plant	New Braunfels, TX	Existing	ND	ND	GC
Texas Industries (Riverside Cement)	Oro Grande	Oro Grande, CA	New – Not Constructed	375.00	1.50	GC
Texas-Lehigh Cement Company	Buda	Buda, TX	Existing	1262.10	9.37	GC
TXI Operations, L.P.	Midlothian	Midlothian, TX	Existing	84.42	0.34	RTO

* GC = Good Combustion, RTO = Regenerative Thermal Oxidizer

Attachment 2

Revised Application Section 3 Emission Unit Form Page 3-70

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

1. Pollutant Emitted: **VOC**	2. Total Percent Efficiency of Control: **N/A**
3. Potential Emissions: **23.95** lb/hour **98.64** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.115 lb/ton clinker** Reference: **Proposed BACT**	7. Emissions Method Code: **2**
8. Calculation of Emissions: **See Section 4 and Appendix A**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

Attachment 3

Road Segment Emission Parameter Table and Road Segment Chart

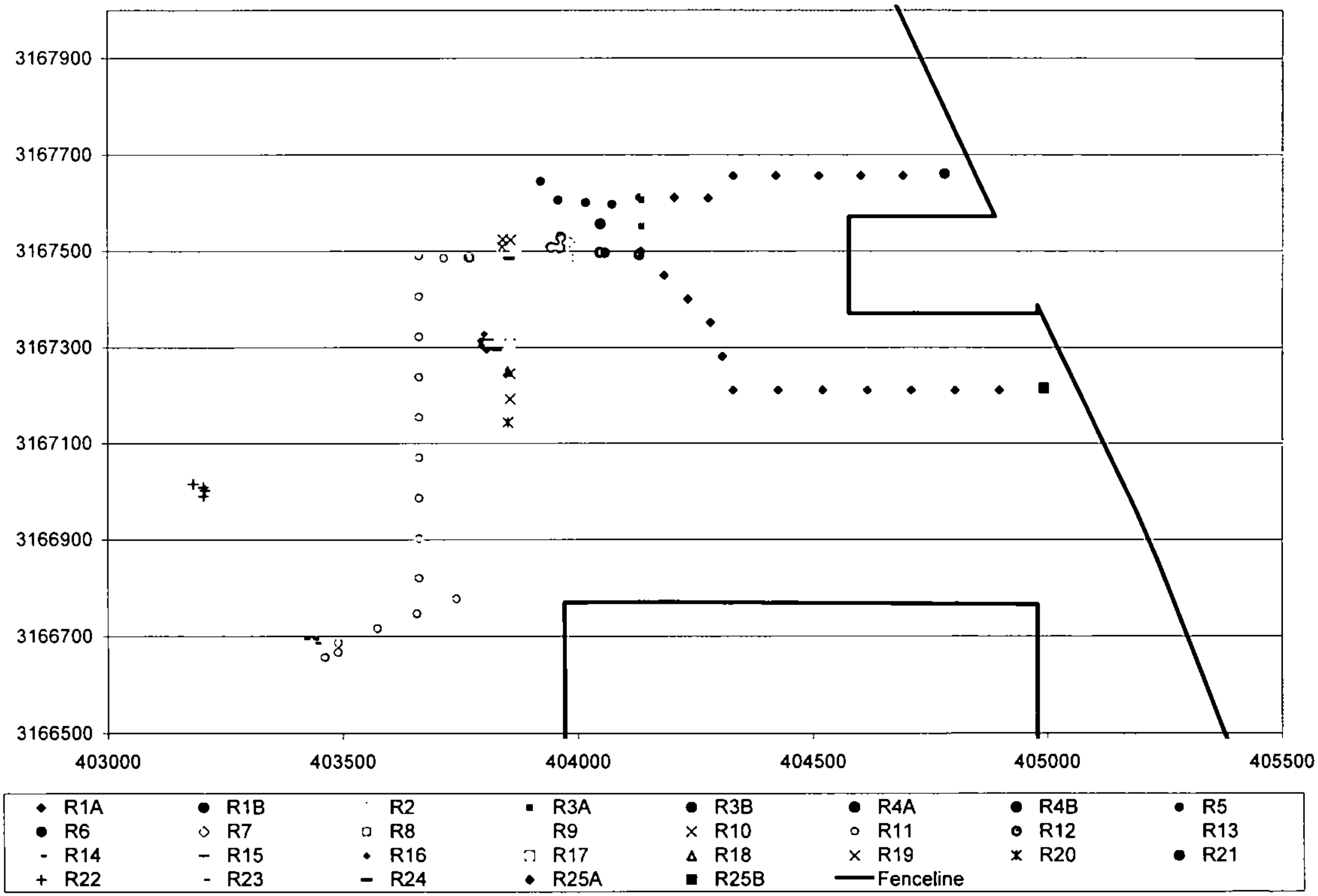
SCC Road Segment and Emission Parameter Table

Road Segment	UTM X	UTM Y	Q (g/s)	Release Height (m)	Width (m)	Length (m)	Angle	Szinit (m)
R1A_1	404130.4	3167611	1.32E-05	4	9.91	75	90	1.86
R1A_2	404205.4	3167611	1.32E-05	4	9.91	75	90	1.86
R1A_3	404276.9	3167610	1.32E-05	4	9.91	70.71	45	1.86
R1A_4	404330.4	3167656	1.32E-05	4	9.91	90	90	1.86
R1A_5	404420.4	3167656	1.32E-05	4	9.91	90	90	1.86
R1A_6	404510.4	3167656	1.32E-05	4	9.91	90	90	1.86
R1A_7	404600.4	3167656	1.32E-05	4	9.91	90	90	1.86
R1A_8	404690.4	3167656	1.32E-05	4	9.91	90	90	1.86
R1B_1	404780.4	3167661	7.15E-06	4	18.29	70	90	1.86
R2_1	404135	3167606	6.56E-06	4	9.14	58.19	-175.32	1.86
R3A_1	404135	3167606	6.53E-06	4	9.14	54.75	180	1.86
R3A_2	404135	3167552	6.53E-06	4	9.14	54.75	180	1.86
R3B_1	404130.4	3167492	2.25E-05	4	9.14	78.53	-89.82	1.86
R4A_1	404047.3	3167497	7.86E-06	4	9.14	57.5	-0.4	1.86
R4B_1	404047.3	3167556	7.86E-06	4	9.14	51.45	24.01	1.86
R5_1	404072.1	3167597	5.00E-08	4	9.14	56.22	-86.18	1.86
R5_2	404016	3167601	5.00E-08	4	9.14	56.22	-86.18	1.86
R5_3	403957.1	3167606	5.00E-08	4	9.14	57.1	-45.53	1.86
R5_4	403919.5	3167645	5.00E-08	4	9.14	73.47	-90	1.86
R6_1	404056.5	3167497	1.46E-05	4	9.14	69.86	-174.46	1.86
R7_1	403977.4	3167490	1.05E-06	4	9.14	33.5	0.37	1.86
R7_2	403982.2	3167519	1.05E-06	4	9.14	20.62	-90	1.86
R8_1	403981.9	3167486	1.35E-05	4	9.14	64.81	-90	1.86
R8_2	403917.1	3167486	1.35E-05	4	9.14	64.81	-90	1.86
R9_1	403836.8	3167490	1.26E-06	4	9.14	19.75	0	1.86
R9_2	403841.3	3167514	1.26E-06	4	9.14	20.34	90	1.86
R9_3	403866.3	3167510	1.26E-06	4	9.14	19.75	180	1.86
R10_1	403837.4	3167509	2.02E-06	4	3.05	14.25	0	1.86
R10_2	403839	3167525	2.02E-06	4	3.05	14.75	90	1.86
R10_3	403855.3	3167523	2.02E-06	4	3.05	14.25	180	1.86
R11_1	403770.9	3167486	3.66E-06	4	9.14	57.08	-90	1.86
R11_2	403713.8	3167486	3.66E-06	4	9.14	57.08	-90	1.86
R11_3	403661.3	3167490	3.66E-06	4	9.14	84	180	1.86
R11_4	403661.3	3167406	3.66E-06	4	9.14	84	180	1.86
R11_5	403661.3	3167322	3.66E-06	4	9.14	84	180	1.86
R11_6	403661.3	3167238	3.66E-06	4	9.14	84	180	1.86
R11_7	403661.3	3167154	3.66E-06	4	9.14	84	180	1.86
R11_8	403661.3	3167070	3.66E-06	4	9.14	84	180	1.86
R11_9	403661.3	3166986	3.66E-06	4	9.14	84	180	1.86
R11_10	403661.3	3166902	3.66E-06	4	9.14	84	180	1.86
R11_11	403660.8	3166820	3.66E-06	4	9.14	88.05	153.53	1.86
R11_12	403739.8	3166777	3.66E-06	4	9.14	88.94	-159.89	1.86
R11_13	403656.3	3166747	3.66E-06	4	9.14	88.94	-159.89	1.86
R11_14	403572.8	3166716	3.66E-06	4	9.14	88.94	-159.89	1.86
R11_15	403489.5	3166687	3.66E-06	4	9.14	18	180	1.86
R11_16	403489.2	3166667	3.66E-06	4	9.14	22.13	-156	1.86
R11_17	403461.3	3166657	3.66E-06	4	9.14	32.68	-40.77	1.86
R12_1	403767	3167488	1.66E-06	4	9.14	40.24	-31.67	1.86
R13_1	403856.9	3167490	7.01E-06	4	9.14	61.17	180	1.86
R13_2	403856.9	3167429	7.01E-06	4	9.14	61.17	180	1.86

SCC Road Segment and Emission Parameter Table

Road Segment	UTM X	UTM Y	Q (g/s)	Release Height (m)	Width (m)	Length (m)	Angle	SzInit (m)
R13_3	403856.9	3167368	7.01E-06	4	9.14	61.17	180	1.86
R14_1	403850.1	3167302	2.62E-06	4	9.14	24.44	-90	1.86
R15_1	403825.6	3167295	1.46E-05	4	3.05	17.5	-90	1.86
R15_2	403806.6	3167297	1.46E-05	4	3.05	18.25	0	1.86
R15_3	403808.1	3167316	1.46E-05	4	3.05	17.5	90	1.86
R16_1	403804.7	3167294	3.61E-06	4	3.05	13.39	-50.59	1.86
R16_2	403793.8	3167304	3.61E-06	4	3.05	9.02	-14.04	1.86
R16_3	403791.7	3167313	3.61E-06	4	3.05	15.38	24.48	1.86
R16_4	403799.2	3167328	3.61E-06	4	3.05	17.02	79.85	1.86
R17_1	403854.6	3167307	4.39E-06	4	9.14	61	180	1.86
R18_1	403850	3167250	2.30E-06	4	9.14	67.06	90	1.86
R19_1	403854.6	3167246	2.10E-06	4	9.14	53.12	180	1.86
R19_2	403854.6	3167193	2.10E-06	4	9.14	53.12	180	1.86
R20_1	403850	3167144	2.10E-06	4	9.14	66.84	90	1.86
R21_1	403962.7	3167529	1.13E-05	4	3.05	21	180	1.86
R21_2	403961.2	3167507	1.13E-05	4	3.05	17.53	-90	1.86
R21_3	403942.1	3167508	1.13E-05	4	3.05	21	0	1.86
R22_1	403182.1	3167015	1.57E-04	4	3.05	20.98	-164.8	1.86
R22_2	403203.3	3167009	1.57E-04	4	3.05	9.61	-110.56	1.86
R22_3	403207	3167003	1.57E-04	4	3.05	12.45	100.41	1.86
R22_4	403203.8	3166990	1.57E-04	4	3.05	8.87	139.57	1.86
R23_1	403441.9	3166686	9.28E-06	4	3.05	10.6	-31.86	1.86
R23_2	403437	3166695	9.28E-06	4	3.05	12.03	-69.3	1.86
R23_3	403427.7	3166700	9.28E-06	4	3.05	9.95	-154.72	1.86
R23_4	403418.4	3166695	9.28E-06	4	3.05	12.71	-134.9	1.86
R24_1	403852.3	3167486	5.30E-06	4	9.14	81.44	-90	1.86
R25A_1	404133.9	3167500	1.32E-05	4	9.91	70.65	135.05	1.86
R25A_2	404183.9	3167450	1.32E-05	4	9.91	70.65	135.05	1.86
R25A_3	404233.9	3167401	1.32E-05	4	9.91	70.65	135.05	1.86
R25A_4	404282.1	3167352	1.32E-05	4	9.91	74.8	109.53	1.86
R25A_5	404307.1	3167281	1.32E-05	4	9.91	74.8	109.53	1.86
R25A_6	404330.4	3167211	1.32E-05	4	9.91	94.6	90	1.86
R25A_7	404425	3167211	1.32E-05	4	9.91	94.6	90	1.86
R25A_8	404519.6	3167211	1.32E-05	4	9.91	94.6	90	1.86
R25A_9	404614.2	3167211	1.32E-05	4	9.91	94.6	90	1.86
R25A_10	404708.8	3167211	1.32E-05	4	9.91	94.6	90	1.86
R25A_11	404803.4	3167211	1.32E-05	4	9.91	94.6	90	1.86
R25A_12	404898	3167211	1.32E-05	4	9.91	94.6	90	1.86
R25B_1	404992.6	3167215	7.15E-06	4	18.29	70	90	1.86

SCC Road Segment Chart



Attachment 4

Class II PSD Increment and NAAQS Modeling Source Tables

Emission Units Excluded from the Class II PSD Increment Modeling based on the 20D Rule

Facility ID	Source	Distance (km)	20D Value (1)
0690046	Covanta Lake	15.0	1.33
0690014	Sliver Springs Citrus	22.5	2.56
0690002	Cutrale Citrus Juices	23.0	1.40
1010060	Helena Chemical Co	37.7	1 09
0950053	Louis Dreyfus Citrus	40.8	4 50
0530021	Florida Crushed Stone - Brooksville	42 8	1.29
0570005	CF Industries	53 9	1 53

Note 1 - (Distance from Sumter Stack - 10)*20 divided by Emissions in tons/yr . A value of greater than 1 leads to exclusion.
Note 2 - The emission units of Progress Energy - Intercession (59.3 km distant) were primarily operating in 1974, prior to the PM PSD baseline date.

Key Emission Units Excluded From Modeling Outside of the 60 km Range

Facility ID	Source	Distance (km)
0970043	Kissimmee Utility Authority - Kua Cane Power	60.7
1050004	Lakeland Electric - CD McIntosh	61 5
1010056	Pasco RRF	62.1
1050003	Lakeland Electric - CD McIntosh	65 2
1050221	Calpine - Auburndale Power	66.4
1050352	Lakeland Electric - Winston Peaking	67 0
0970001	Kissimmee Utility Authority - Roy B Hansel	68.0
1270009	Florida Power and Light - Sanford	68 4
1270028	Progress Energy - Debary	70 3

Emission Units Included in the Class II PSD Increment and NAAQS Modeling

Facility ID	Owner / Site Name	EU ID	Distance from Stack (km)	Annual Emission Rate (g/s)	Hourly Emission Rate (g/s)
1190018	CONSOLIDATED MINERALS, INC. - CENTER HILL MINE	2	3.05	1.11E+00	1.11E+00
1190018	CONSOLIDATED MINERALS, INC. - CENTER HILL MINE	4	3.05	1.90E-01	1.89E-01
1190018	CONSOLIDATED MINERALS, INC. - CENTER HILL MINE	5	3.05	2.18E-01	2.18E-01
1190018	CONSOLIDATED MINERALS, INC. - CENTER HILL MINE	6	3.05	1.03E-01	1.03E-01
0530010	CEMEX	2	46.37	1.29E-01	1.29E-01
0530010	CEMEX	3	46.37	3.39E+00	3.74E+00
0530010	CEMEX	4	46.37	1.71E+00	1.88E+00
0530010	CEMEX	5	46.37	4.54E+00	4.54E+00
0530010	CEMEX	6	46.37	1.65E-01	1.83E-01
0530010	CEMEX	8	46.37	4.69E-01	4.71E-01
0530010	CEMEX	9	46.37	7.19E-01	4.54E+00
0530010	CEMEX	11	46.37	2.71E-01	2.71E-01
0530010	CEMEX	12	46.37	2.17E-01	2.47E-01
0530010	CEMEX	13	46.37	1.59E+00	1.70E+00
0530010	CEMEX	14	46.37	3.39E+00	3.74E+00
0530010	CEMEX	15	46.37	1.71E+00	1.88E+00
0530010	CEMEX	16	46.37	1.71E-01	1.83E-01
0530010	CEMEX	17	46.37	6.01E-02	6.43E-02
0530010	CEMEX	18	46.37	1.71E-01	1.83E-01
0530010	CEMEX	19	46.37	4.72E-01	5.04E-01
0530010	CEMEX	21	46.37	1.18E-01	1.26E-01
0530010	CEMEX	22	46.37	1.08E-01	1.26E-01
0530010	CEMEX	23	46.37	5.41E-02	6.30E-02
0530010	CEMEX	24	46.37	7.31E-02	7.56E-02
0530010	CEMEX	25	46.37	8.05E-04	1.08E-03
0530010	CEMEX	26	46.37	5.38E-02	7.56E-02
0530010	CEMEX	27	46.37	1.14E+00	1.60E+00
1190011	ROBBINS MANUFACTURING CO.	1	11.16	5.30E-01	5.30E-01
1190011	ROBBINS MANUFACTURING CO.	2	11.16	5.30E-01	5.30E-01
1190011	ROBBINS MANUFACTURING CO	5	11.16	2.50E-01	2.50E-01

Attachment 5

Revised PTE Inventory (Appendix A)

TABLE A-1
Potential Plant-Wide Emission Totals

EU No.	EU Description	PM tons/yr	PM_{10} tons/yr	SO_2 tons/yr	NO_x tons/yr	CO tons/yr	VOC tons/yr	HCl tons/yr	Lead tons/yr	Mercury tons/yr	Beryllium tons/yr	Dioxin/Furans tons/yr	Fluorides tons/yr
CH-1	Primary Crushing & Associated Conveyors	1.48	0.69										
CH-2	Raw Material Conveying	1.74	0.82										
CH-3	Raw Material Processing and Storage	12.10	10.28										
CH-4	Kiln System with In-Line Raw Mill and Clinker Cooler	180.98	153.14	231.59	1,672.61	3,087.90	98.64	120.09	0.064	0.092	0.0002	2.49E-07	0.772
CH-5	Clinker Storage and Conveying	24.97	21.23										
CH-6	Finish Mills and Cement Processing	119.55	101.62										
CH-7	Coal Mill System	20.70	17.60										
CH-8	Coal Conveying	0.08	0.04										
CH-9	Emergency Generator (See Note 1)	0.07	0.06	0.55	2.31	0.43	0.08						
CH-10	Storage Piles	10.51	5.26										
CH-11	Paved and Unpaved Roads	68.69	13.64										
	Pollutant Totals	**437.67**	**322.87**	**232.14**	**1,674.93**	**3,088.33**	**98.72**	**120.085**	**0.064**	**0.092**	**0.0002**	**2.49E-07**	**0.772**

Point Sources
Fugitive Sources

NOTE 1 - Emergency Generator is exempt from being included in the Permit to Construct Application as it will use less than 32,000 gallons of diesel per year (Per Rule 62-210.300(3)(a)20

TABLE A-2
Potential Throughput Data for Center Hill Plant

Material	Center Hill Throughput (tons/yr)	Center Hill Hourly Rates (tons/hr)	Comments
Limestone crushed	3,798,428	2142.5	
Base Rock	500,000	NA	
Limestone - raw material	3,298,428	443.0	
Bauxite/Alumina Source	352,662	47.4	
Sand/Clay/Silica Source	385,854	51.8	
Steel Slag/Iron Source	87,128	11.7	
Wet Fly Ash Storage	352,662	47.4	
Coal Mill	211,160	28.4	
Raw Mill Feed (Wet)	3,607,797	484.5	
Kiln Feed from Raw Mill (Dry) to Blend Silo	2,958,393	397.3	
Kiln Preheater Feed from Blend Silo	2,553,019	323.8	
Kiln Baghouse Dust Recirculation	231,351	28.3	
Kiln Feed Total	2,784,370	353.2	Preheater Feed + Baghouse Dust Recirculation
Clinker Produced by Kiln	1,715,500	208.3	
Total Clinker Needed for Cement	2,354,425	316	
Gypsum/Synthetic Gypsum/Limestor	177,215	23.8	Assume 7% Gypsum
Finish Mill #1 (Clinker)	1,177,213	158.10	
Finish Mill #2 (Clinker)	1,177,213	158.10	
FM #1 (Cement Feed)	1,265,820	170	
FM #2 (Cement Feed)	1,265,820	170	
Cement Total	2,531,640	340.0	
Dry Fly Ash	278,437	35.3	

TABLE A-3
Potential Particulate Emissions from Point sources

Stack Parameters >>

EU No.	EP No.	Modeling Source ID	Description	Annual Throughput	Hourly Throughput	Flow ACFM	Temp. deg F	Moisture % (Note 1)	Flow DSCFM	Operating Hours	PM gr/dscf	PM-10 gr/dscf	PM		PM-10		Height	Diam.	Velocity	Orien-
													lb/hr	tons/yr	lb/hr	tons/yr	ft	ft	fpm	tation
CH-3	NDC-01	CH_P_001	Raw Matenal Transport	2,958,393 3	397.3	3,000	200	2%	2,352	8 760	0.01	0 0085	0 20	0 88	0 17	0 75	30	1.0	3820	H
	NDC-02	CH_P_002	Baghouse Dust Bin	231,351.4	28.25	4,500	450	2%	2,559	8 760	0.01	0 0085	0.22	0 96	0 19	0.82	60	1.0	5730	H
	NDC-03	CH_P_003	Raw Matenal Transport	2 958,393 3	397.3	3,000	200	2%	2,352	8 760	0.01	0 0085	0 20	0 88	0 17	0.75	15	1.0	3820	H
	NDC-04	CH_P_004	Blend Silo Inlet	2,958,393 3	397 3	8,500	200	2%	6,664	8 760	0.01	0.0085	0 57	2 50	0 49	2 13	240	1.4	5522	H
	NDC-05	CH_P_005	Blend Silo	2,553,018 8	323 8	5,000	200	2%	3,920	8,760	0.01	0 0085	0 34	1 47	0 29	1 25	45	1 0	6366	H
	NDC-06	CH_P_006	Blend Silo Outlet	2,553,018 8	323 8	3,000	200	2%	2,352	8,760	0.01	0 0085	0 20	0 88	0 17	0 75	15	1.0	3820	H
	NDC-07	CH_P_007	Kiln Feed Transport	2,784,370 2	353 2	5,500	200	2%	4,312	8,760	0 01	0 0085	0 37	1 62	0 31	1 38	345	1.1	5787	H
	NDC-08	CH_P_008	Fly Ash Silo	278,437.0	35 30	8 000	110	2%	5,447	8,760	0.01	0 0085	0 47	2 04	0 40	1 74	180	1.1	6314	H
	NDC-09	CH_P_009	Fly Ash Transport	278,437.0	35 30	2,500	110	2%	2,269	8,760	0.01	0 0085	0 19	0 85	0 17	0 72	20	1.0	3183	H
CH-4	DC-01	Kiln	Preheater/Precaliner Kiln with In-Line Raw Mill Up(Compound)	1,715,500 0	208 30	679 600	203	16 5%	451 919	8,760	Assumes 85% runtime for kiln in compound condition and 15% runtime for direct condition									
	DC-01		Preheater/Precaliner Kiln with In-Line Raw Mill Down (Direct)	1,715 500.0	208.30	630,350	400	7 5%	357,980	8,760										
	DC-01		Kiln System with In-Line Raw Mill and Clinker Cooler (Total)	1,715,500.0	208.3	672 213	233	15%	434,852	8,760	N/A	N/A	45 9	180 98	38 8	153 14	427	16 5	3144	V
CH-5	NDC-10	CH_P_010	Clinker Transport From Kiln	1,715,500 0	208.3	4 000	300	2%	2,723	8,760	0 01	0 0085	0 23	1 02	0 20	0.87	40	1	5093	H
	NDC-11	CH_P_011	Clinker Silo #1	1,715,500.0	208 3	16 000	300	2%	10 893	8 760	0 01	0 0085	0.93	4 09	0 79	3.48	186	2	5093	H
	NDC-12	CH_P_012	Clinker Silo #2	1,715,500.0	208 3	15,000	300	2%	10 213	8 760	0 01	0 0085	0 88	3 83	0 74	3 26	186	2	4775	H
	NDC-13	CH_P_013	Off-Spec Clinker Silo	85,775 0	208.3	11,000	300	2%	7,489	8,760	0 01	0 0085	0 64	2 81	0 55	2 39	100	1.5	8225	H
	NDC-14	CH_P_014	FM #1 Clinker Silo Outlet Conveyor	1,177,212.6	158 1	10,000	250	2%	7,288	8,760	0 01	0 0085	0 62	2.74	0 53	2 33	20	1.5	5659	H
	NDC-15	CH_P_015	FM #2 Clinker Silo Outlet Conveyor	1 177,212.6	158.1	10 000	250	2%	7,288	8,760	0 01	0 0085	0 62	2 74	0 53	2 33	20	1 5	5659	H
	NDC-16	CH_P_016	Gypsum & Limestone Silos	177,214.8	23 8	6,000	70	2%	5,858	8 760	0 01	0 0085	0 50	2 20	0 43	1 87	70	1 1	6314	H
	NDC-17	CH_P_017	Conveying to Finish Mills (2 Feed Belts)	2 531,640 0	340 0	24,000	250	2%	17,491	8 760	0.01	0 0085	1 50	6 57	1.27	5.58	20	3	3395	H
CH-6	NDC-18	CH_P_018	FM #1 Clinker Conveying	1,265,820 0	170	6,000	250	2%	4,373	8,760	0 01	0 0085	0 37	1 64	0 32	1 40	40	1.1	6314	H
	DC-02	FM1Sep	Finish Mill #1 Separator BH	1,265,820 0	170	128 000	175	3%	103,239	8,760	0.01	0 0085	8 85	38 76	7.52	32.94	131	7 5	2897	V
	DC-03	FM1Sw	Finish Mill #1 Sweep BH	1,265,820.0	170	35,000	230	4 6%	25,551	8 760	0.01	0.0085	2 19	9 59	1.66	8.15	131	4	2785	V
	NDC-21	CH_P_021	Fringe Cement Bin	25,316.4	170.0	5,000	230	2%	3,750	8,760	0 01	0 0085	0 32	1.41	0.27	1.20	75	1	6368	H
	NDC-19	CH_P_019	Finish Mill #1 Baghouse No 3	1,265,820 0	170	8,500	230	2%	6,374	8 760	0 01	0.0085	0 55	2 39	0.46	2.03	45	1 4	5522	H
	DC-04	FM2Sep	Finish Mill #2 Separator BH	1,265,820 0	170	128,000	175	3%	103,239	8,760	0 01	0 0085	8.85	38.76	7 52	32 94	131	7 5	2897	V
	DC-05	FM2Sw	Finish Mill #2 Sweep BH	1,265,820 0	170	35,000	230	4 6%	25,551	8 760	0.01	0.0085	2 19	9 59	1.66	8.15	131	4	2785	V
	NDC-20	CH_P_020	Finish Mill #2 Baghouse No 3	1,265,820 0	170	8,500	230	2%	6,374	8 760	0.01	0 0085	0 55	2 39	0 46	2 03	45	1.4	5522	H
	NDC-22	CH_P_022	Cement Silos	2,531,640	170	6,000	160	2%	5,007	8 760	0.01	0 0085	0 43	1 88	0.36	1.60	187	1 1	6314	H
	NDC-23	CH_P_023	Cement Silos	2,531,640	170	5,000	160	2%	4,173	8 760	0.01	0 0085	0 36	1 57	0 30	1 33	187	1	6366	H
	NDC-24	CH_P_024	Cement Silos	2,531,640	170	7,500	160	2%	6,259	8 760	0.01	0 0085	0 54	2 35	0 46	2 00	187	1.2	6631	H
	NDC-25	CH_P_025	Truck Loadout #1	2,531,640	170	4,000	130	2%	3,508	8,760	0.01	0 0085	0 30	1.32	0 26	1.12	35	1	5093	H
	NDC-26	CH_P_026	Truck Loadout #2	2,531,640	170	4,000	130	2%	3,508	8,760	0.01	0 0085	0 30	1 32	0 26	1.12	35	1	5093	H
	NDC-27	CH_P_027	Truck Loadout #3	2,531,640	170	4,000	130	2%	3,508	8 760	0.01	0 0085	0 30	1 32	0 26	1 12	35	1	5093	H
	NDC-28	CH_P_028	Packaging Plant	506,328	170	16 000	130	2%	14,032	8 760	0 01	0 0085	1 20	5 27	1 02	4 48	35	2	5093	H
CH-7	DC-06	CoalMill	Coal Mill No. 1 BH	211,160	28 36	32 000	150	6 5%	25 898	8,760	0 01	0 0085	2.22	9 72	1 89	8 26	135	5 5	2691	V
	DC-07		Coal Mill No. 2 BH	211,160	28 36	31 937	150	6.5%	25,847	8,760	0 01	0 0085	2 22	9 70	1 88	8 25				
	NDC-29	CH_P_029	Pulverized Coal Bin	105,580	14.18	2 000	150	2%	1,697	8,760	0 01	0 0085	0.15	0 64	0.12	0.54	85	1	2546	H
	NDC-30	CHP_P039	Pulverized Coal Bin	105,580	14 18	2,000	150	2%	1,697	8,760	0.01	0 0085	0 15	0 64	0 12	0 54	85	1	2546	H
												TOTAL	86.63	359.33	73.46	304.74				

Note 1 : The moisture content of the nuisance dust collectors is excepted to be higher than 2%, however to conservatively estimate potential emissions 2% was used.

TABLE A-4
Potential Emissions from the Kiln System, Clinker Cooler, and Emergency Generator

Hourly Emissions:

EU No.	EU Description	Kiln Feed lbs/hr	Clinker lbs/hr	PM lbs/hr	PM_{10} lbs/hr	SO2 lbs/hr	NO_x lbs/hr	CO lbs/hr	VOC lbs/hr	HCl lbs/hr	Lead lbs/hr	Mercury lbs/hr	Dioxin/Furan lbs/hr	Beryllium lbs/hr	Fluorides lbs/hr
CH-4	New Kiln System	353	208.3	45.91	38.85	56.24	406.19	749.88	23.95	29.16	0.016	0.022	3.02E-11	0.00	0.00

EU No.	EU Description	Size	Fuel Rate gal/hr	Heat Input MMBtu/hr	Output hp-hr	PM lbs/hr	PM_{10} lbs/hr	SO2 lbs/hr	NO_x lbs/hr	CO lbs/hr	VOC lbs/hr
CH-9	Emergency Generator	750 kW	54.8	7.51	1,006	0.48	0.43	3.79	15.90	2.97	0.55

Annual Emissions:

EU No.	EU Description	Kiln Feed tons/yr	Clinker tons/yr	PM tons/yr	PM_{10} tons/yr	SO2 tons/yr	NO_x tons/yr	CO tons/yr	VOC tons/yr	HCl tons/yr	Lead tons/yr	Mercury tons/yr	Dioxin/Furan (tons/yr)	Beryllium tons/yr	Fluorides tons/yr
CH-4	New Kiln System	2,784,370	1,715,500	180.98	153.14	231.59	1,672.61	3,087.90	98.64	120.09	0.064	0.092	2.49E-07	0.0002	0.772

EU No.	EU Description	Operating Hours	Fuel Rate gal/yr	Heat Input MMBtu/yr	Output hp-hr/yr	PM tons/yr	PM_{10} tons/yr	SO2 tons/yr	NO_x tons/yr	CO tons/yr	VOC tons/yr
CH-9	Emergency Generator	291	15,947	2,185	292,673	0.07	0.06	0.55	2.31	0.43	0.08

Notes: The emergency generators operate during testing and power outages only
In the event of a power outage, fuel to the kiln is cut off and the generator is the only combustion source operating.
Generators are diesel fuel-fired. Assume 137,000 Btu/gal heat value of fuel and sulfur content of 0.5 percent
Total diesel fuel consumed by both emergency generators will not exceed 32,000 gal/yr (permit exemption level)

Emissions Basis:

Proposed Kiln

Pollutant	Emission Factor	Emission Factor Units	Source of Emission Factor
PM	0.13	lb/ton dry feed	Proposed BACT
PM_{10}	0.11	lb/ton dry feed	Proposed BACT
SO_2	0.27	lb/ton clinker	Proposed BACT
NO_x	1.95	lb/ton clinker	Proposed BACT
CO	3.60	lb/ton clinker	Proposed BACT
VOC	0.115	lb/ton clinker	Proposed BACT
HCl (annual)	0.1400	lb/ton clinker	AP-42 Table 11.6-9
Lead	7.50E-05	lb/ton clinker	AP-42 Table 11.6-9
Mercury	1.078E-04	lb/ton clinker	Based on Stack Test Data from similar SAC Plant in Brandford, FL
Beryllium	2.41E-07	lb/ton clinker	Similar PH/PC Plant Stack Test Dec 9-12 2003
Fluorides	9.00E-04	lb/ton clinker	AP-42 Table 11.6-9
Dioxin/ Furans	2.90E-10	lb/ton clinker	AP-42 Table 11.6-9

Emergency Generator

Pollutant	Emission Factor	EF Units	Source of EF
PM	0.215	lb/hp-hr	Generator specifications
PM_{10}	0.0573	lb/MMBtu	AP-42 Table 3.4-2
SO_2	0.505	lb/MMBtu	AP-42 Table 3.4-1
NO_x	7.17	lb/hp-hr	Generator specifications
CO	1.34	lb/hp-hr	Generator specifications
VOC	0.25	lb/hp-hr	Generator specifications

TABLE A-5
Mercury Calculation Methodology

Mercury Emissions from the Center Hill plant will be estimated based on a calculated emission factor of 1.078E-04 lb of mercury per ton of clinker. This emission factor is based on data on two years worth of data on Raw Material Mercury Input from Suwannee American Cement in Branford, Fl. Provided below is an analysis of how this emission factor was derived:

Based on two plus years of raw material and feed samples from Suwannee American Cement (SAC) in Branford, Fl which use limestone from the same formation as SCC and proposes use of similar other raw materials and fuels, a average mercury concentration was developed for each input. Additionally, an extensive two day mercury mass balance test was conducted at SAC which involved hourly samples of raw materials, intermediate process outputs, final clinker outputs and stack testing. Based on results from these data sources and the proposed dry mass input of materials needed at SCC an emission factor was developed for total mercury input, then divided by the total clinker output. The estimated total mercury input was approximately 185 pounds of mercury per year which divided by a total maximum clinker output of 1,715,500 tons per year equals a mercury factor of 0.00010784 lbs of mercury per ton of clinker. When compared to two separate stack tests conducted at SAC the results matched closely the mercury factors from the stack testing when evaluating mill on and mill off conditions.

To insure that mercury emissions will not exceed the estimated potential emissions, the SCC Center Hill Plant will conduct mercury monitoring through sampling and analysis of raw materials and feeds. To determine the total mass input of mercury into the kiln system all inputs have to be identified and then sampled. The following figure shows all the mercury input locations into the kiln system.

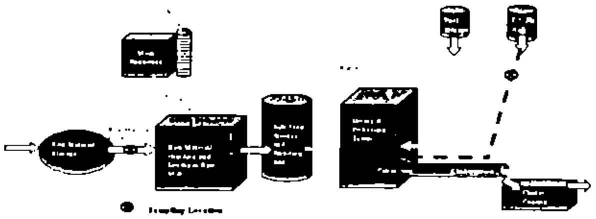


Figure 1

The inputs shown include the combined raw material feed to the Raw Mill which includes the pre-determined amounts of calcium carbonate, silica, alumina, and iron from the raw materials. The fuel from the fuel storage is also accounted as an input for the system which may contain coal or petcoke blended together. Finally the dry fly ash which is injected into the calciner is identified as an input. Overall these represent the total mass inputs into the kiln system for which mercury may be introduced.

Also identified in Figure 1 are the sampling locations for all the inputs. The raw materials sampling location represents the total of all raw materials into the kiln system prior to being ground and dried in the raw mill. Samples for raw material feed, fuel fed to the kiln system, and dry fly ash injected into the calciner are taken at appropriate intervals through out the day. These samples are combined into daily composites and at the end of the month the daily composites are combined into a monthly composite. As appropriate the monthly composites will be combined to form quarterly composites and semi-annual composites. For purposes of the example the monthly calculation will be shown.

These monthly composites are then sent to an appropriate offsite lab for analysis to determine the mercury concentration using the currently approved EPA Method 7471A Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique) or other approved or appropriate methods that may be developed in the future.

The analytical results are then used with the total dry feed rates of the component to determine a mass input of mercury into the system for the month, this could just as easily be quarterly or semi-annually. The mass input for the raw material feed is a total mass of all of the material fed into the raw material for the corresponding month on a dry basis. The overall calculation for mercury input for all of the components is shown in below.

Equation 1: Monthly Composite of Material (unit of weight dry) * Concentration of Mercury (ppb) = Mass of Mercury (unit of weight)

This formula is repeated for all three inputs (Raw Material Feed, Fuel Feed, and Dry Fly Ash) and the total sum of these three inputs equals the total monthly input of mercury. This is shown in Equation 2.

Equation 2:

Monthly Mass of Mercury from Raw Material (dry)_
Monthly Mass of Mercury from Fuel (dry)
+ Monthly Mass of Mercury from Dry Fly Ash
Total Monthly Mercury Input into Kiln System

This is repeated for every month, quarter or semi-annual period and then a yearly mass input for mercury can be determined and compared to the yearly emission limit.

This estimate for mercury emissions is overly conservative for demonstration of compliance with the Mercury Emission Limit proposed in the permit because it first assumes that all the mercury entering the kiln systems exits through the main stack. Through the testing conducted at SAC and studies conducted by Portland Cement Association (PCA), small amounts of mercury have been shown to exit through the clinker.

Additionally, analytical results for the samples of raw material are typically below detection limits when utilizing the currently approved EPA Method 7471A Mercury in Solid or Semisolid Waste (Manual Cold Vapor Technique). SCC considers the detection limit as the amount of mercury present in that material despite the fact that the actual mercury concentration maybe well below this. This intem effectively overestimates the entire input of mercury into the system due to limitations of the currently analytical technology which routinely measure down to parts per billion (ppb) of mercury.

TABLE A-6
Potential Particulate Emissions from Fugitive Sources

Modeling Source ID	Segment Number	Description	Material	Material Information			Emission Factor (lb/ton)	Emission Factor Reference	Number of Transfer Points	Building Control Efficiency (%)[1]	Enclosed Conveyor Control Efficiency (%)[1]	Annual	PM10 Fraction	Annual	Hourly	Hourly
				Annual Qty (ton/yr)	Hourly Rate (ton/hr)	Moisture Content (%)[1]						PM Emissions (tons/year)		PM10 Emissions (tons/year)	PM Emissions (lb/hr)	PM10 Emissions (lb/hr)
CH-1 Primary Crushing and Associated Conveyors																
CH_V_020	**CH-1-1**	**Primary Crushing and Conveying**														
	A	Loader to Primary Crusher	Limestone	3 798 428	2,143	25	1 05E-04	AP-42 Section 13 2 4, 1/95	1			0 200	0 47	0 094	0 23	0 11
		Primary Crusher Operation	Limestone	3,798,428	2,143	25	3 00E-04	AP-42 Table 11.19 2-2, 8/04[4]	1			0 570	0 45	0 256	0 64	0 29
		Conveyors B01 thru B08	Limestone	3,798,428	2,143	25	1 05E-04	AP-42 Section 13 2 4 1/95	8		90%	0 160	0 47	0 075	0 18	0 08
CH_V_021	**B**	Conveying B08 to B20	Limestone	3,798,428	2,143	25	1 05E-04	AP-42 Section 13 2.4 1/95	1		90%	0 020	0 47	0 009	0 02	0 01
CH_V_022	**C**	Conveying B20 to B21	Limestone	3,798,428	2,143	25	1 05E-04	AP-42 Section 13 2 4, 1/95	1		90%	0 020	0 47	0 009	0 02	0 01
CH_V_023	**D**	Conveying B21 to B22	Limestone	3,798,428	2,143	25	1.05E-04	AP-42 Section 13 2 4, 1/95	1		90%	0 020	0 47	0 009	0 02	0 01
											Sub Total	**0.990**		**0.454**	**1.117**	**0.512**
CH_V_024	**CH-1-2**	**Base Rock Conveying**														
	A	Belt B22 to B24[2]	Base Rock	500 000	2,143	17	1 81E-04	AP-42 Section 13 2 4, 1/95	1			0 045	0 47	0 021	0 39	0 18
CH_V_025	**B**	Belt B24 to B27[2]	Base Rock	500 000	2,143	17	1.81E-04	AP-42 Section 13 2 4, 1/95	1			0 045	0 47	0 021	0.39	0 18
CH_V_026	**C**	Belt B27 to Radial Stacker[2]	Base Rock	500 000	2,143	17	1 81E-04	AP-42 Section 13 2 4, 1/95	1			0 045	0 47	0 021	0 39	0 18
											Sub Total	**0.136**		**0.064**	**1.163**	**0.647**
CH_V_027	**CH-1-3**	**Limestone Conveying**														
	A	Belt B22 to B40	Limestone	3 298,428	443	17	1 81E-04	AP-42 Section 13.2.4, 1/95	1			0 298	0 47	0 140	0 08	0 04
CH_V_028	**B**	Belt B40 to C01	Limestone	3,298,428	443	17	1 81E-04	AP-42 Section 13 2 4, 1/95	1		90%	0 030	0 47	0 014	0 01	0 00
CH_V_029	**C**	Belt C01 to C02	Limestone	3,298,428	443	17	1 81E-04	AP-42 Section 13 2.4, 1/95	1		90%	0 030	0 47	0 014	0 01	0 00
											Sub Total	**0.358**		**0.168**	**0.096**	**0.045**
										CH-1 TOTAL EMISSIONS		**1.484**		**0.686**	**2.376**	**1.104**
CH-2 Raw Material Conveying																
CH_V_001	**CH-2-1**	**Limestone Pile Handling**														
		C02 Transfer to Limestone Conveyor	Limestone	3,298,428	443	17	1 81E-04	AP-42 Section 13 2 4, 1/95	1	60%	90%	0 012	0 47	0 006	0 00	0 00
		Transfer to Pile	Limestone	3,298,428	443	17	1 81E-04	AP-42 Section 13 2 4, 1/95	2	60%		0 239	0 47	0 112	0 06	0 03
		Piles to reclaim belts	Limestone	3 298,428	443	17	1 81E-04	AP-42 Section 13 2 4, 1/95	2	60%		0 239	0 47	0 112	0 06	0 03
											Sub Total	**0.469**		**0.230**	**0.131**	**0.062**
CH_V_003	**CH-2-2**	**Wet Fly Ash Hopper Building**														
		Truck Dump to Hopper	Wet Fly Ash	352 662	47	27	9 47E-05	AP-42 Section 13 2 4, 1/95	1	75%		0 004	0 47	0 002	0 00	0 00
		Hopper Transfer to Belt	Wet Fly Ash	352 662	47	17	1 81E-04	AP-42 Section 13 2 4, 1/95	1	75%	90%	0 001	0 47	0 000	0 00	0 00
											Sub Total	**0.005**		**0.002**	**0.001**	**0.001**
CH_V_002	**CH-2-3**	**Wet Fly Ash Pile Handling**														
		Belt to Belt Transfer	Wet Fly Ash	352 662	47	27	9 47E-05	AP-42 Section 13 2 4, 1/95	1	60%	90%	0 001	0 47	0 000	0 00	0 00
		Transfer to Pile	Wet Fly Ash	352 662	47	27	9 47E-05	AP-42 Section 13 2 4, 1/95	1	60%		0 007	0 47	0 003	0 00	0 00
		Pile Transfer to Reclaim Belt	Wet Fly Ash	352 662	47	27	9 47E-05	AP-42 Section 13 2 4, 1/95	1	60%		0 007	0 47	0 003	0 00	0 00
											Sub Total	**0.014**		**0.007**	**0.004**	**0.002**
CH_V_004	**CH-2-4**	**Clay/Sand Hopper Building**														
		Truck Dump to Hopper	Clay/Sand	385 854	52	13.01	2 63E-04	AP-42 Section 13 2 4, 1/95	1	75%		0.013	0 47	0 006	0.00	0 00
		Hopper Transfer to Belt	Clay/Sand	385 854	52	27	9 47E-05	AP-42 Section 13 2 4, 1/95	1	75%	90%	0 000	0 47	0 000	0 00	0 00
											Sub Total	**0.013**		**0.006**	**0.004**	**0.002**

TABLE A-6
Potential Particulate Emissions from Fugitive Sources

Modeling Source ID	Segment Number	Description	Material	Material Information			Emission Factor (lb/ton)	Emission Factor Reference	Number of Transfer Points	Building Control Efficiency (%)[1]	Enclosed Conveyor Control Efficiency (%)[1]	Annual PM Emissions (tons/year)	PM10 Fraction	Annual PM10 Emissions (tons/year)	Hourly PM Emissions (lb/hr)	Hourly PM10 Emissions (lb/hr)
				Annual Qty (ton/yr)	Hourly Rate (ton/hr)	Moisture Content (%)[1]										
CH_V_002	CH-2-5	**Clay/Sand Pile Handling**														
		Belt to Belt Transfer	Clay/Sand	385 854	52	13 01	2.63E-04	AP-42 Section 13 2.4, 1/95	1	60%	90%	0 002	0 47	0 001	0 00	0.00
		Transfer to Pile	Clay/Sand	385 854	52	13 01	2 63E-04	AP-42 Section 13 2 4, 1/95	1	60%		0 020	0 47	0 010	0 01	0 00
		Pile Transfer to Reclaim Belt	Clay/Sand	385 854	52	13 01	2 63E-04	AP-42 Section 13 2 4, 1/95	1	60%		0 020	0 47	0 010	0.01	0 00
											Sub Total	**0.043**		**0.020**	**0.011**	**0.005**
CH_V_002	CH-2-6	**Steel Slag Pile Handling**														
		Truck Dump to Pile	Steel Slag	87,128	12	0 92	1 07E-02	AP-42 Section 13 2 4, 1/95	1	60%		0.187	0 47	0 088	0 05	0 02
		FEL Reclaim	Steel Slag	87 128	12	0 92	1 07E-02	AP-42 Section 13 2 4, 1/95	2	60%		0 374	0 47	0.176	0 10	0 05
		Transfer to Reclaim Belt	Steel Slag	87 128	12	0 92	1 07E-02	AP-42 Section 13 2 4, 1/95	1	60%	90%	0 019	0 47	0 009	0 01	0 00
											Sub Total	**0.580**		**0.273**	**0.156**	**0.073**
CH_V_002	CH-2-7	**Bauxite Pile Handling**														
		Truck Dump to Pile	Bauxite	352,662	47	10	3 80E-04	AP-42 Section 13 2 4, 1/95	1	60%		0 027	0 47	0 013	0 01	0 00
		FEL Reclaim	Bauxite	352 662	47	10	3 80E-04	AP-42 Section 13 2 4, 1/95	2	60%		0 054	0 47	0 025	0 01	0 01
		Transfer to Reclaim Belt	Bauxite	352 662	47	10	3 80E-04	AP-42 Section 13 2 4, 1/95	1	60%	90%	0 003	0 47	0 001	0 00	0 00
											Sub Total	**0.083**		**0.039**	**0.022**	**0.010**
CH_V_008	CH-2-8	**Limestone Conveying**														
	A	Transfer to Limestone Bin	Limestone	3 298.428	443	17	1 81E-04	AP-42 Section 13 2 4, 1/95	1		90%	0 030	0 47	0 014	0 01	0 00
CH_V_009	B	Limestone Bin Discharge	Limestone	3,298.428	443	17	1 81E-04	AP-42 Section 13 2 4, 1/95	1		90%	0 030	0 47	0 014	0 01	0 00
		Limestone Conveying	Limestone	3 298.428	443	17	1 81E-04	AP-42 Section 13 2 4, 1/95	1		90%	0 030	0 47	0 014	0 01	0 00
											Sub Total	**0.090**		**0.042**	**0.024**	**0.011**
CH_V_010	CH-2-9	**Wet Fly Ash Conveying**														
	A	Transfer to Fly Ash Bin	Wet Fly Ash	352 662	47	27	9 47E-05	AP-42 Section 13 2 4, 1/95	2		90%	0 003	0 47	0 002	0 00	0 00
CH_V_011	B	Fly Ash Bin Discharge	Wet Fly Ash	352,662	47	27	9 47E-05	AP-42 Section 13 2 4, 1/95	1		90%	0 002	0 47	0 001	0 00	0 00
		Fly Ash Conveying	Wet Fly Ash	352 662	47	27	9 47E-05	AP-42 Section 13 2 4, 1/95	1		90%	0 002	0 47	0 001	0 00	0 00
											Sub Total	**0.007**		**0.003**	**0.002**	**0.001**
CH_V_012	CH-2-10	**Clay/Sand Conveying**														
	A	Transfer to Clay/Sand Bin	Clay/Sand	385 854	52	13 01	2 63E-04	AP-42 Section 13 2 4, 1/95	3		90%	0.015	0 47	0 007	0 00	0 00
CH_V_013	B	Clay/Sand Bin Discharge	Clay/Sand	385 854	52	13 01	2 63E-04	AP-42 Section 13 2 4, 1/95	1		90%	0 005	0 47	0 002	0 00	0 00
		Clay/Sand Conveying	Clay/Sand	385 854	52	13 01	2 63E-04	AP-42 Section 13 2 4, 1/95	1		90%	0 005	0.47	0 002	0 00	0 00
											Sub Total	**0.025**		**0.012**	**0.007**	**0.003**
CH_V_014	CH-2-11	**Bauxite Conveying**														
	A	Transfer to Bauxite Bin	Bauxite	352 662	47	10	3 80E-04	AP-42 Section 13 2 4, 1/95	3		90%	0 020	0 47	0 009	0.01	0 00
CH_V_015	B	Bauxite Bin Discharge	Bauxite	352,662	47	10	3 80E-04	AP-42 Section 13 2 4, 1/95	1		90%	0 007	0 47	0 003	0 00	0 00
		Bauxite Conveying	Bauxite	352 662	47	10	3 80E-04	AP-42 Section 13 2 4, 1/95	1		90%	0 007	0 47	0 003	0 00	0 00
											Sub Total	**0.034**		**0.016**	**0.009**	**0.004**
CH_V_016	CH-2-12	**Steel Slag Conveying**														
	A	Transfer to Slag Bin	Steel Slag	87 128	12	0 92	1 07E-02	AP-42 Section 13 2 4, 1/95	3		90%	0 140	0 47	0 066	0 04	0 02
CH_V_017	B	Slag Bin Discharge	Steel Slag	87 128	12	0 92	1 07E-02	AP-42 Section 13 2 4, 1/95	1		90%	0 047	0 47	0 022	0 01	0 01
		Slag Conveying	Steel Slag	87 128	12	0 92	1 07E-02	AP-42 Section 13 2 4, 1/95	1		90%	0 047	0 47	0 022	0 01	0 01
											Sub Total	**0.234**		**0.110**	**0.063**	**0.030**

TABLE A-6
Potential Particulate Emissions from Fugitive Sources

October 2005

Modeling Source ID	Segment Number	Description	Material	Material Information			Emission Factor (lb/ton)	Emission Factor Reference	Number of Transfer Points	Building Control Efficiency (%)[1]	Enclosed Conveyor Control Efficiency (%)[2]	Annual PM Emissions (tons/year)	PM10 Fraction	Annual PM10 Emissions (tons/year)	Hourly PM Emissions (lb/hr)	Hourly PM10 Emissions (lb/hr)
				Annual Qty (ton/yr)	Hourly Rate (ton/hr)	Moisture Content (%)[3]										
CH_V_018	CH-2-13	**Crossbelt Analyzer**														
		Crossbelt Analyzer	Raw Mill Feed	3,607,797	485	17	1 81E-04	AP-42 Section 13 2 4, 1/95	1		90%	0 033	0 47	0 015	0 01	0 00
											Sub Total	**0.033**		**0.015**	**0.009**	**0.004**
CH_V_005	CH-2-14	**Raw Mill Feed Conveying**														
		Belt Transfer to Reject Bin	Raw Mill Feed	25,000	200	17	1 81E-04	AP-42 Section 13 2 4 1/95	1	60%	90%	0 000	0 47	0 000	0 00	0 00
		Elevator Transfer to Reject Bin	Raw Mill Feed	25,000	200	17	1 81E-04	AP-42 Section 13 2 4, 1/95	1	60%	90%	0 000	0 47	0 000	0 00	0 00
		Reject Bin Discharge to Truck	Raw Mill Feed	25,000	200	17	1 81E-04	AP-42 Section 13 2 4, 1/95	1	60%		0 001	0 47	0 000	0 01	0 01
											Sub Total	**0.001**		**0.001**	**0.017**	**0.008**
CH_V_006	CH-2-15	**Gypsum/Limestone Conveying**														
		Gypsum Unloading	Gypsum	88 607	11.90	2 1	3 38E-03	AP-42 Section 13 2 4, 1/95	1	60%		0 060	0 47	0 028	0 02	0 01
		Limestone Unloading	Limestone	88 607	11 90	17	1 81E-04	AP-42 Section 13 2 4 1/95	1	60%		0 003	0 47	0 002	0 00	0 00
		FEL Gypsum/Limestone Reclaim	Gypsum/ Limestone	177 215	23 80	9 55	4 06E-04	AP-42 Section 13 2 4 1/95	1	60%		0 014	0 47	0 007	0 00	0 00
		FEL Unloading	Gypsum/ Limestone	177 215	23 80	9 55	4 06E-04	AP-42 Section 13 2 4 1/95	1	75%		0 009	0 47	0 004	0 00	0 00
		Gypsum/Limestone Belt transfer to Elevator	Gypsum/ Limestone	177 215	23 80	9 55	4 06E-04	AP-42 Section 13 2 4, 1/95	1	75%	90%	0 001	0 47	0 000	0 00	0 00
										Sub Total		**0.087**		**0.041**	**0.023**	**0.011**
										CH-2 TOTAL EMISSIONS		**1.737**		**0.816**	**0.484**	**0.227**
CH-8 Coal Conveying																
CH_V_007	CH-8-1	**Coal/Petcoke Pile Handling**														
		Coal/Pet Coke Unloading	Coal/Petcoke	31 674	28 4	5	1 06E-03	AP-42 Section 13 2 4 1/95	1	60%		0 007	0 47	0 003	0 01	0 01
		FEL Reclaim	Coal/Petcoke	31 674	28 4	5	1 06E-03	AP-42 Section 13 2 4 1/95	1	60%		0 007	0 47	0 003	0 01	0 01
		FEL Transfer to Hopper	Coal/Petcoke	31 574	28 4	5	1.06E-03	AP-42 Section 13 2 4, 1/95	1	75%		0 004	0 47	0 002	0 01	0 00
											Sub Total	**0.018**		**0.008**	**0.032**	**0 015**
CH_V_007	CH-8-2	**Coal/Petcoke Conveying**														
	A	Belt Transfer to Elevator	Coal/Petcoke	31 674	28 4	5	1 06E-03	AP-42 Section 13 2 4, 1/95	1	60%	90%	0 001	0 47	0 000	0 00	0 00
		Transfer to Scrap Metal Box	Coal/Petcoke	1 056	28 4	5	1 06E-03	AP-42 Section 13 2 4, 1/95	2	60%		0 000	0 47	0 000	0 02	0 01
		Coal Conveyor transfer to Piles	Coal/Petcoke	31 674	28 4	5	1 06E-03	AP-42 Section 13 2 4, 1/95	1	60%		0 007	0 47	0 003	0.01	0 01
		Truck Dump to Hopper	Coal/Petcoke	211,160	28 4	5	1 06E-03	AP-42 Section 13 2 4, 1/95	1	75%		0 028	0 47	0 013	0 01	0 00
		Hopper transfer to Elevator	Coal/Petcoke	211,160	28 4	5	1 06E-03	AP-42 Section 13 2 4, 1/95	1	75%	90%	0 003	0 47	0 001	0 00	0 00
CH_V_019	B	Elevator to Coal Conveyor	Coal/Petcoke	31 674	28 4	5	1 06E-03	AP-42 Section 13 2 4 1/95	1		90%	0 002	0 47	0 001	0 00	0 00
		Elevator to Coal Bins	Coal/Petcoke	211 160	28 4	5	1 06E-03	AP-42 Section 13 2 4 1/95	2		90%	0 022	0 47	0 011	0 01	0 00
											Sub Total	**0.063**		**0.030**	**0.058**	**0.028**
										CH-8 TOTAL EMISSIONS		**0.080**		**0.038**	**0.086**	**0.041**
										Total		**3.302**		**1.840**	**2.946**	**1.372**

Note 1 A control efficiency of 60% was used to account for reduction of fugitives due to a partial building enclosure, this control efficiency is based on engineering calculations of the amount of wind that would be blocked by the building enclosure A control efficiency of 75% was use to account for reduction of fugitives due to a building enclosure of three connecting walls and a roof

Note 2 A control efficiency of 90% was used to account for reduction of fugitives due to enclosed conveyor transfer points, enclosed bins, and below ground transfer

Note 3 Moisture Content for limestone, clay, and sand based on the Raw Material Analysis provided in Appendix G all others based on AP-42 Table 13 2 4-1

Note 4 AP-42 lists a "controlled emission factor" for Primary Crushing representing a range of moisture content from 0 55% to 2 88% The moisture content of the SCC Plant limestone is minimally 25% Therefore, an additional 75% control efficiency was applied to the AP-42 "controlled" emission factor of 1 2E-03 to conservatively account for the significant additional moisture contained in the limestone

TABLE A-7
Potential Particulate Emissions from Storage Piles

ID NO.	Modeling Source ID	Description	Material	Surface Area (Acres)	Active Days (n) (days/yr)	Silt Content (s) percent	Material Moisture (%)	Material Throughput (T/yr)	Average Wind Speed (mph)	Wind Speed > 12 mph (f) percent	Rain Days (p) (days/yr)	Enclosure Control Efficiency (%)	TSP Wind Emissions (T/yr)	PM10 Wind Emissions (T/yr)	TSP Hourly Emissions (lb/hr)	PM10 Hourly Emissions (lb/hr)
CH-10-1	CH_A_001	Crushed Limestone Pile	Limestone	3.0	365	3.9	1.7	3,798 428	6.9	9.74	105	0	1 74	0 87	0.397	0 198
CH-10-2	CH_A_002	Base Rock Pile	Limestone	1.5	365	3.9	1.7	500 000	6.9	9 74	105	0	0 87	0.43	0 198	0 099
CH-10-3A	CH_V_001	Raw Limestone Storage	Limestone	1.9	365	3.9	1.7	3,298,428	6.9	9 74	0	50	0 59	0 29	0 134	0 067
CH-10-3B	CH_V_001	Raw Limestone Storage	Limestone	1.9	365	3.9	1.7	3,298 428	6.9	9 74	0	50	0 59	0 29	0 134	0 067
CH-10-4	CH_V_002	Sand/Clay/Silica Components Storage	Sand/Clay	0.3	365	1.2	13.0	385 854	6 9	9 74	0	50	0 32	0.16	0 074	0 037
CH-10-5	CH_V_002	Bauxite/Alumina Components Storage	Bauxite	0.1	365	5	10.0	352 662	6 9	9 74	0	50	0 10	0.05	0 023	0 011
CH-10-6	CH_V_002	Steel Slag/Iron Components Storage	Steel Slag	0.2	365	5.3	0.9	87 128	6.9	9 74	0	50	0 09	0 04	0.020	0 010
CH-10-7	CH_V_002	Wet Fly Ash Storage	Fly Ash	0.3	365	80.0	27.0	352,552	6 9	9 74	0	50	6 01	3 00	1.372	0.686
CH-10-8	CH_V_006	Gypsum/Synthetic Gypsum Storage	Gypsum	0.2	365	3.9	7.1	88 607	6 9	9 74	0	50	0 07	0 03	0 015	0 007
CH-10-9	CH_V_006	Limestone Storage	Limestone	0.05	365	3.9	17.0	88 507	6.9	9 74	0	50	0 02	0.01	0 004	0 002
CH-10-10	CH_V_007	Coal Storage	Coal	0.3	365	1.5	5	22 172	6 9	9 74	0	50	0 12	0 06	0.028	0 013
CH-10-11	CH_V_007	Pet Coke Storage	Pet Coke	0.05	365	1.5	5	9 502	6.9	9 74	0	50	0 02	0 01	0 004	0 002
												TOTALS	10.51	5.26	2.40	1.20

NOTES: Above emissions include only wind erosion emissions from the piles, all emissions from material transfer are accounted for in the Material Handling emissions.

Material transfer to piles
TSP transfer factors from AP-42 Section 13 2 4-3 (Aggregate Handling and Storage Piles 1/95)

E = k * 0 0032 * (U/5)^1 3 / (M/2)^1 4

E = transfer emission factor (lb/ton)
k = particle size multiplier — k (<30 um) = 0 74
U = mean wind speed (mph) — k (<10 um) = 0.35
M = material moisture content (%)

Wind Erosion
Reference Control of Open Fugitive Dust Sources, EPA-450/3-88-008 p. 4-17

Ef = 1.7*(s/1.5)*(f/15)*((365-p)/235)*(1-(C/100)) TSP (lbs/acre/day) PM10 fraction = 0.5
E = A*n*Ef/2000 TSP (tons/yr)

s = Silt content of the aggregate (%)
f = Percent of time that the unobstructed wind speed exceeds 12 mph at the mean pile heigh
p = Number of days with >= 0 01 in of precipitation per year
C = Overall control efficiency (%)
A = Size of the pile (acres)
n = Number of days per year the pile is continuously active

Typical silt contents of materials from AP-42 Table 13 2 4-1
Typical moisture of limestone, sand, and clay are from the raw material analysis provided in Appendix C
All other moisture values are from AP-42 Table 13 2 4-1.

TABLE A-8
Potential Particulate Emissions from Paved and Unpaved Roads

Paved Road Emission Summary

Segment No.	Modeling Source ID	Description	Segment Length (mi)	Silt Loading (g/m2)	Maximum Annual Emissions						Hourly Emissions	
					Material Trips (#/yr)	Total Mileage (Mi/yr)	TSP E Factor lb/VMT	PM10 E Factor lb/VMT	TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)	TSP Emissions (lb/hr)	PM10 Emissions (lb/hr)
CH-11-1A	R1A	**Main Entrance Road Out**	0 42	0 15	256 888	107.122	0 29	0 06	15 73	3 05	3.592	0.697
CH-11-1B	R1B	**Main Entrance Road Out - Gate**	0 04	0 15	256 888	11.175	0 29	0 06	1 64	0 32	0.375	0.073
CH-11-2	R2	**Cement Silos to Main Road**	0 04	0 15	149 750	6.676	0 19	0 04	0 63	0 12	0.143	0.028
CH-11-3A	R3A	**Main Road to Cement silos A**	0.07	0 15	141 813	9.652	0.24	0.05	1 17	0 23	0 268	0 052
CH-11-3B	R3B	**Main Road to Cement silos B**	0 05	0 15	222.213	16 075	0 36	0 07	2 89	0 56	0.659	0.128
CH-11-4A	R4A	**Trucks Entering Cement Silos**	0.04	0 15	115.075	4 108	0 36	0 07	0.74	0 14	0.169	0 033
CH-11-4B	R4B	**Trucks Leaving Cement Silos**	0 03	0 15	115 075	3 671	0 36	0 07	0 66	0.13	0.151	0.029
CH-11-5	R5	**Admin Building Road**	0 15	0 15	34,675	10 479	0 01	0 00	0 03	0 00	0 007	0 001
CH-11-6	R6	**Main Road to Gypsum Building**	0 04	0 15	107 138	9.300	0 36	0 07	1 67	0 32	0.381	0.074
CH-11-7	R7	**Gyspum Building Road**	0 03	0.15	7 089	478	0 39	0 08	0 09	0 02	0.021	0.004
CH-11-8	R8	**Main Road to Coal Building**	0 08	0 15	100.049	16 128	0.36	0 07	2 88	0 56	0 657	0.127
CH-11-9	R9	**Coal Truck Loop**	0.04	0 15	8,446	630	0.39	0 08	0.12	0 02	0.028	0 005
CH-11-10	R10	**FEL - Coal/Petcoke**	0 03	0 15	4,223	228	0 42	0 08	0 05	0 01	0.011	0.002
CH-11-11	R11	**Base Rock Road**	0 75	0 15	33,333	50 280	0 29	0.06	7 29	1 41	1.663	0.323
CH-11-12	R12	**Dry Fly Ash Road**	0 03	0 15	11.137	559	0.39	0 08	0 11	0 02	0.025	0.005
CH-11-13	R13	**Main Road to Raw Material Storage**	0 11	0 15	47.132	10.746	0 39	0 08	2 10	0 41	0 481	0.093
CH-11-14	R14	**Truck Dump for Bauxite and Steel Slag**	0 02	0 15	17 592	535	0.39	0 08	0.10	0 02	0.024	0.005
CH-11-17	R17	**Main Road to Sand/Clay Unloading**	0 04	0 15	29 541	2 233	0 39	0 08	0 44	0.08	0 100	0 019
CH-11-18	R18	**Sand/Clay Unloading Road**	0 04	0 15	15 434	1 287	0 39	0 08	0 25	0 05	0 058	0.011
CH-11-19	R19	**Main Road to Wet Fly Ash Unloading**	0 07	0 15	14.106	1 862	0 39	0.08	0 36	0 07	0.083	0.016
CH-11-20	R20	**Wet Fly Ash Unloading Road**	0 04	0 15	14,106	1.171	0 39	0.08	0 23	0 04	0.052	0 010
CH-11-21	R21	**FEL - Gypsum/Limestone**	0.04	0 15	23,629	1.739	0.42	0.08	0 36	0 07	0 083	0.016
CH-11-24	R24	**Main Road to Dry Fly Ash**	0.05	0 15	44,471	4.500	0.31	0 06	0 71	0 14	0.162	0.031
CH-11-25A	R25A	**Main Entrance Road In**	0 62	0 15	256.888	158 024	0 29	0 06	23 21	4 50	5.299	1 028
CH-11-25B	R25B	**Main Entrance Road In - Gate**	0 04	0.15	256.888	11 175	0 29	0 05	1.64	0 32	0.375	0.073
TOTAL			**2.90**			**439,832.32**			**65.12**	**12.63**	**14.87**	**2.88**

Unpaved Road Emission Summary

Segment No.	Modeling Source ID	Description	Trip Length (mi)	Silt Content (%)	Maximum Annual Emissions						Hourly Emissions	
					Material Trips (#/yr)	Total Mileage (Mi/yr)	TSP E Factor lb/VMT	PM10 E Factor lb/VMT	TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)	TSP Emissions (lb/hr)	PM10 Emissions (lb/hr)
CH-11-15	R15	**FEL - Bauxite**	0.03	8 3	47,022	1,556	7.46	2 12	0 29	0 08	0.066	0.019
CH-11-16	R16	**FEL - Steel Slag**	0 03	8 3	11,617	395	7.46	2.12	0 07	0 02	0.017	0.005
CH-11-22	R22	**FEL - Limestone**	0.03	8 3	506 457	16 359	7.46	2 12	3.05	0.87	0.696	0.198
CH-11-23	R23	**FEL - Base Rock**	0 03	8 3	33 333	940	6.68	1.90	0 16	0.04	0.036	0.010
TOTAL			**0.13**			**19,249.96**			**3.57**	**1.02**	**0.82**	**0.23**

TOTAL PAVED AND UNPAVED EMISSIONS

TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)	TSP Emissions (lb/hr)	PM10 Emissions (lb/hr)
68.69	**13.64**	**15.68**	**3.12**

TABLE A-9
Paved Roads Emission Worksheet

Segment No. CH-11-1A **Main Entrance Road Out**

Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights				Truck Trips		Truck Weight (Tons)	Material Net (Tons)	Material (Tons/Yr)	Material Trips (#/Yr)	Empty Mileage (Mi/Yr)	Loaded Mileage (Mi/Yr)	Total Mileage (Mi/Yr)	Weight x Mileage	TSP Emission Factor lb/VMT	PM10 Emission Factor lb/VMT	TSP Emissions (Tons/Yr)	PM10 Emissions (Tons/Yr)
			Empty (Tons)	Capacity (Tons)	Loaded (Tons)	Avgerage (Tons)	Empty	Loaded												
0.42	Cement	0.15	15	22	37	26		X	26.0	22	2,531,640	115,075	0	47,986	47,986	1,247,638				
0.42	Wet Flyash	0.15	15	25	40	27.5	X		27.5	25	352,662	14,106	5,882	0	5,882	161,766				
0.42	Sand/Clay	0.15	15	25	40	27.5	X		27.5	25	385,854	15,434	6,436	0	6,436	176,991				
0.42	Bauxite	0.15	15	25	40	27.5	X		27.5	25	352,662	14,106	5,882	0	5,882	161,766				
0.42	Steel Slag	0.15	15	25	40	27.5	X		27.5	25	87,128	3,485	1,453	0	1,453	39,966				
0.42	Coal/Fuels	0.15	15	25	40	27.5	X		27.5	25	211,160	8,446	3,522	0	3,522	96,859				
0.42	Gypsum/Limestone Shed	0.15	15	25	40	27.5	X		27.5	25	177,215	7,089	2,956	0	2,956	81,288				
0.42	Dry Fly Ash	0.15	15	25	40	27.5	X		27.5	25	278,437	11,137	4,644	0	4,644	127,719				
0.42	Employee Vehicles	0.15	1.75	0	1.75	1.75		X	1.8	0	34,675	34,875	0	14,459	14,459	25,304				
0.42	Front End Loader 3 Gypsum/Limestone	0.15	25	7.5	32.5	28.75					177,215	0	0	0	0					
0.42	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					31,674	0	0	0	0					
0.42	Base Rock (Limestone)	0.15	15	15	30	22.5		X	22.5	15	500,000	33,333	0	13,900	13,900	312,750				
0.42	SUBTOTAL	0.15							22.7			256,888	30,777	76,346	107,122	2,432,048	0.29	0.06	15.73	3.05

Segment No. CH-11-1B **Main Entrance Road Out - Gate**

Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights				Truck Trips		Truck Weight (Tons)	Material Net (Tons)	Material (Tons/Yr)	Material Trips (#/Yr)	Empty Mileage (Mi/Yr)	Loaded Mileage (Mi/Yr)	Total Mileage (Mi/Yr)	Weight x Mileage	TSP Emission Factor	PM10 Emission Factor	TSP Emissions (Tons/Yr)	PM10 Emissions (Tons/Yr)
			Empty (Tons)	Capacity (Tons)	Loaded (Tons)	Avgerage (Tons)	Empty	Loaded												
0.04	Cement	0.15	15	22	37	26		X	26.0	22	2,531,640	115,075	0	5,006	5,006	130,149				
0.04	Wet Flyash	0.15	15	25	40	27.5	X		27.5	25	352,662	14,108	614	0	614	16,875				
0.04	Sand/Clay	0.15	15	25	40	27.5	X		27.5	25	385,854	15,434	671	0	671	18,463				
0.04	Bauxite	0.15	15	25	40	27.5	X		27.5	25	352,662	14,106	614	0	614	16,875				
0.04	Steel Slag	0.15	15	25	40	27.5	X		27.5	25	87,128	3,485	152	0	152	4,169				
0.04	Coal/Fuels	0.15	15	25	40	27.5	X		27.5	25	211,160	8,448	367	0	367	10,104				
0.04	Gypsum/Limestone Shed	0.15	15	25	40	27.5	X		27.5	25	177,215	7,089	308	0	308	8,480				
0.04	Dry Fly Ash	0.15	15	25	40	27.5	X		27.5	25	278,437	11,137	484	0	484	13,323				
0.04	Employee Vehicles	0.15	1.75	0	1.75	1.75		X	1.8	0	34,675	34,675	0	1,508	1,508	2,640				
0.04	Front End Loader 3 Gypsum/Limestone	0.15	25	7.5	32.5	28.75					177,215	0	0	0	0					
0.04	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					31,674	0	0	0	0					
0.04	Base Rock (Limestone)	0.15	15	15	30	22.5		X	22.5	15	500,000	33,333	0	1,450	1,450	32,625				
0.04	SUBTOTAL	0.15							22.7			256,888	3,211	7,964	11,175	253,703	0.29	0.06	1.64	0.32

Segment No. CH-11-2 **Cement Silos to Main Road**

Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights				Truck Trips		Truck Weight (Tons)	Material Net (Tons)	Material (Tons/Yr)	Material Trips (#/Yr)	Empty Mileage (Mi/Yr)	Loaded Mileage (Mi/Yr)	Total Mileage (Mi/Yr)	Weight x Mileage	TSP Emission Factor lb/VMT	PM10 Emission Factor lb/VMT	TSP Emissions (Tons/Yr)	PM10 Emissions (Tons/Yr)
			Empty (Tons)	Capacity (Tons)	Loaded (Tons)	Avgerage (Tons)	Empty	Loaded												
0.04	Cement	0.15	15	22	37	26		X	26.0	22	2,531,640	115,075	0	4,166	4,166	108,308				
0.04	Wet Flyash	0.15	15	25	40	27.5					352,662	0	0	0	0					
0.04	Sand/Clay	0.15	15	25	40	27.5					385,854	0	0	0	0					
0.04	Bauxite	0.15	15	25	40	27.5					352,662	0	0	0	0					
0.04	Steel Slag	0.15	15	25	40	27.5					87,128	0	0	0	0					
0.04	Coal/Fuels	0.15	15	25	40	27.5					211,160	0	0	0	0					
0.04	Gypsum/Limestone Shed	0.15	15	25	40	27.5					177,215	0	0	0	0					
0.04	Dry Fly Ash	0.15	15	25	40	27.5					278,437	0	0	0	0					
0.04	Employee Vehicles	0.15	1.75	0	1.75	1.75	X	X	1.8	0	34,675	34,875	1,255	1,255	2,510	4,393				
0.04	Front End Loader 3 Gypsum/Limestone	0.15	25	7.5	32.5	28.75					177,215	0	0	0	0					
0.04	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					31,674	0	0	0	0					
0.04	Base Rock (Limestone)	0.15	15	15	30	22.5					500,000	0	0	0	0					
0.04	SUBTOTAL	0.15							16.9			149,750	1,255	5,421	6,676	112,701	0.19	0.04	0.63	0.12

TABLE A-9
Paved Roads Emission Worksheet

Segment No. CH-11-3A **Main Road to Cement silos A**

Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights				Truck Trips		Truck Weight (Tons)	Material Net (Tons)	Material (Tons/Yr)	Material Trips (#/Yr)	Empty Mileage (Mi/Yr)	Loaded Mileage (Mi/Yr)	Total Mileage (Mi/Yr)	Weight x Mileage	TSP Emission Factor lb/VMT	PM10 Emission Factor lb/VMT	TSP Emissions (Tons/Yr)	PM10 Emissions (Tons/Yr)
			Empty (Tons)	Capacity (Tons)	Loaded (Tons)	Avgerage (Tons)	Empty	Loaded												
0.07	Cement	0.15	15	22	37	26					2,531,640	0	0	0	0					
0.07	Wet Flyash	0.15	15	25	40	27.5	X		27.5	25	352,662	14,106	960	0	960	26,402				
0.07	Sand/Clay	0.15	15	25	40	27.5	X		27.5	25	385,854	15,434	1,050	0	1,050	28,886				
0.07	Bauxite	0.15	15	25	40	27.5	X		27.5	25	352,662	14,106	960	0	960	26,402				
0.07	Steel Slag	0.15	15	25	40	27.5	X		27.5	25	87,128	3,485	237	0	237	6,523				
0.07	Coal/Fuels	0.15	15	25	40	27.5	X		27.5	25	211,160	8,446	575	0	575	15,808				
0.07	Gypsum/Limestone Shed	0.15	15	25	40	27.5	X		27.5	25	177,215	7,089	482	0	482	13,267				
0.07	Dry Fly Ash	0.15	15	25	40	27.5	X		27.5	25	278,437	11,137	758	0	758	20,845				
0.07	Employee Vehicles	0.15	1.75	0	1.75	1.75	X		1.8	0	34,675	34,675	2,360	0	2,360	4,130				
0.07	Front End Loader 3 Gypsum/Limestone	0.15	25	7.5	32.5	28.75					177,215	0	0	0	0					
0.07	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					31,674	0	0	0	0					
0.07	Base Rock (Limestone)	0.15	15	15	30	22.5		X	22.5	15	500,000	33,333	0	2,269	2,269	51,044				
0.07	SUBTOTAL	0.15							20.0			141,813	7,383	2,269	9,652	193,306	0.24	0.05	1.17	0.23

Segment No. CH-11-3B **Main Road to Cement silos B**

Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights				Truck Trips		Truck Weight (Tons)	Material Net (Tons)	Material (Tons/Yr)	Material Trips (#/Yr)	Empty Mileage (Mi/Yr)	Loaded Mileage (Mi/Yr)	Total Mileage (Mi/Yr)	Weight x Mileage	TSP Emission Factor lb/VMT	PM10 Emission Factor lb/VMT	TSP Emissions (Tons/Yr)	PM10 Emissions (Tons/Yr)
			Empty (Tons)	Capacity (Tons)	Loaded (Tons)	Avgerage (Tons)	Empty	Loaded												
0.05	Cement	0.15	15	22	37	26	X		26.0	22	2,531,640	115,075	5,616	0	5,616	146,028				
0.05	Wet Flyash	0.15	15	25	40	27.5	X	X	27.5	25	352,662	14,106	688	688	1,377	37,867				
0.05	Sand/Clay	0.15	15	25	40	27.5	X	X	27.5	25	385,854	15,434	753	753	1,507	41,431				
0.05	Bauxite	0.15	15	25	40	27.5	X	X	27.5	25	352,662	14,106	688	688	1,377	37,867				
0.05	Steel Slag	0.15	15	25	40	27.5	X	X	27.5	25	87,128	3,485	170	170	340	9,355				
0.05	Coal/Fuels	0.15	15	25	40	27.5	X	X	27.5	25	211,160	8,446	412	412	824	22,673				
0.05	Gypsum/Limestone Shed	0.15	15	25	40	27.5	X	X	27.5	25	177,215	7,089	346	346	692	19,029				
0.05	Dry Fly Ash	0.15	15	25	40	27.5	X	X	27.5	25	278,437	11,137	544	544	1,087	29,897				
0.05	Employee Vehicles	0.15	1.75	0	1.75	1.75					34,675	0	0	0	0					
0.05	Front End Loader 3 Gypsum/Limestone	0.15	25	7.5	32.5	28.75					177,215	0	0	0	0					
0.05	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					31,674	0	0	0	0					
0.05	Base Rock (Limestone)	0.15	15	15	30	22.5	X	X	22.5	15	500,000	33,333	1,627	1,627	3,254	73,211				
0.05	SUBTOTAL	0.15							26.0			222,213	10,846	5,229	16,075	417,358	0.36	0.07	2.89	0.56

Segment No. CH-11-4A **Trucks Entering Cement Silos**

Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights				Truck Trips		Truck Weight (Tons)	Material Net (Tons)	Material (Tons/Yr)	Material Trips (#/Yr)	Empty Mileage (Mi/Yr)	Loaded Mileage (Mi/Yr)	Total Mileage (Mi/Yr)	Weight x Mileage	TSP Emission Factor lb/VMT	PM10 Emission Factor lb/VMT	TSP Emissions (Tons/Yr)	PM10 Emissions (Tons/Yr)
			Empty (Tons)	Capacity (Tons)	Loaded (Tons)	Avgerage (Tons)	Empty	Loaded												
0.04	Cement	0.15	15	22	37	26	X		26.0	22	2,531,640	115,075	4,108	0	4,108	106,812				
0.04	Wet Flyash	0.15	15	25	40	27.5					352,662	0	0	0	0					
0.04	Sand/Clay	0.15	15	25	40	27.5					385,854	0	0	0	0					
0.04	Bauxite	0.15	15	25	40	27.5					352,662	0	0	0	0					
0.04	Steel Slag	0.15	15	25	40	27.5					87,128	0	0	0	0					
0.04	Coal/Fuels	0.15	15	25	40	27.5					211,160	0	0	0	0					
0.04	Gypsum/Limestone Shed	0.15	15	25	40	27.5					177,215	0	0	0	0					
0.04	Dry Fly Ash	0.15	15	25	40	27.5					278,437	0	0	0	0					
0.04	Employee Vehicles	0.15	1.75	0	1.75	1.75					34,675	0	0	0	0					
0.04	Front End Loader 3 Gypsum/Limestone	0.15	25	7.5	32.5	28.75					177,215	0	0	0	0					
0.04	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					31,674	0	0	0	0					
0.04	Base Rock (Limestone)	0.15	15	15	30	22.5					500,000	0	0	0	0					
0.04	SUBTOTAL	0.15							26.0			115,075	4,108	0	4,108	106,812	0.36	0.07	0.74	0.14

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Segment No. CH-11-4B **Trucks Leaving Cement Silos**

Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights				Truck Trips		Truck Weight (Tons)	Material Net (Tons)	Material (Tons/Yr)	Material Trips (#/Yr)	Empty Mileage (Mi/Yr)	Loaded Mileage (Mi/Yr)	Total Mileage (Mi/Yr)	Weight x Mileage	TSP Emission Factor lb/VMT	PM10 Emission Factor lb/VMT	TSP Emissions (Tons/Yr)	PM10 Emissions (Tons/Yr)
			Empty (Tons)	Capacity (Tons)	Loaded (Tons)	Avgerage (Tons)	Empty	Loaded												
0.03	Cement	0 15	15	22	37	26		X	26.0	22	2,531 640	115,075	0	3,671	3,671	95,443				
0.03	Wet Flyash	0.15	15	25	40	27 5					352 662	0	0	0	0					
0.03	Sand/Clay	0 15	15	25	40	27.5					385 854	0	0	0	0					
0.03	Bauxite	0 15	15	25	40	27.5					352 662	0	0	0	0					
0.03	Steel Slag	0 15	15	25	40	27 5					87 128	0	0	0	0					
0 03	Coal/Fuels	0 15	15	25	40	27 5					211 160	0	0	0	0					
0.03	Gypsum/Limestone Shed	0 15	15	25	40	27 5					177 215	0	0	0	0					
0 03	Dry Fly Ash	0 15	15	25	40	27 5					278 437	0	0	0	0					
0 03	Employee Vehicles	0.15	1.75	0	1 75	1.75					34 675	0	0	0	0					
0 03	Front End Loader 3 Gypsum/Limestone	0.15	25	7.5	32 5	28 75					177 215	0	0	0	0					
0 03	Front End Loader 4 Coal	0 15	25	7.5	32 5	28.75					31 674	0	0	0	0					
0.03	Base Rock (Limestone)	0 15	15	15	30	22 5					500 000	0	0	0	0					
0 03	SUBTOTAL	0 15							26 0			115 075	0	3,671	3 671	95 443	0 36	0 07	0 66	0.13

Segment No. CH-11-5 **Admin Building Road**

Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights				Truck Trips		Truck Weight (Tons)	Material Net (Tons)	Material (Tons/Yr)	Material Trips (#/Yr)	Empty Mileage (Mi/Yr)	Loaded Mileage (Mi/Yr)	Total Mileage (Mi/Yr)	Weight x Mileage	TSP Emission Factor lb/VMT	PM10 Emission Factor lb/VMT	TSP Emissions (Tons/Yr)	PM10 Emissions (Tons/Yr)
			Empty (Tons)	Capacity (Tons)	Loaded (Tons)	Avgerage (Tons)	Empty	Loaded												
0 15	Cement	0 15	15	22	37	26					2 531 640	0	0	0	0					
0 15	Wet Flyash	0.15	15	25	40	27 5					352 652	0	0	0	0					
0.15	Sand/Clay	0.15	15	25	40	27 5					385 854	0	0	0	0					
0 15	Bauxite	0.15	15	25	40	27 5					352 662	0	0	0	0					
0 15	Steel Slag	0.15	15	25	40	27 5					87 128	0	0	0	0					
0 15	Coal/Fuels	0 15	15	25	40	27 5					211 160	0	0	0	0					
0 15	Gypsum/Limestone Shed	0 15	15	25	40	27 5					177 215	0	0	0	0					
0 15	Dry Fly Ash	0.15	15	25	40	27.5					278 437	0	0	0	0					
0.15	Employee Vehicles	0 15	1 75	0	1.75	1 75	X	X	1 8	0	34 675	34,675	5,239	5,239	10,479	18,338				
0.15	Front End Loader 3 Gypsum/Limestone	0 15	25	7.5	32.5	28 75					177 215	0	0	0	0					
0.15	Front End Loader 4 Coal	0 15	25	7 5	32.5	28.75					31 674	0	0	0	0					
0.15	Base Rock (Limestone)	0 15	15	15	30	22.5					500 000	0	0	0	0					
0.15	SUBTOTAL	0 15							1 8			34,675	5,239	5,239	10,479	18,338	0.01	0 00	0 03	0 00

Segment No. CH-11-6 **Main Road to Gypsum Building**

Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights				Truck Trips		Truck Weight (Tons)	Material Net (Tons)	Material (Tons/Yr)	Material Trips (#/Yr)	Empty Mileage (Mi/Yr)	Loaded Mileage (Mi/Yr)	Total Mileage (Mi/Yr)	Weight x Mileage	TSP Emission Factor lb/VMT	PM10 Emission Factor lb/VMT	TSP Emissions (Tons/Yr)	PM10 Emissions (Tons/Yr)
			Empty (Tons)	Capacity (Tons)	Loaded (Tons)	Avgerage (Tons)	Empty	Loaded												
0 04	Cement	0 15	15	22	37	26					2 531 640	0	0	0	0					
0.04	Wet Flyash	0 15	15	25	40	27 5	X	X	27 5	25	352 652	14,106	612	612	1,224	33 672				
0.04	Sand/Clay	0 15	15	25	40	27 5	X	X	27 5	25	385 854	15,434	670	670	1,340	36,841				
0.04	Bauxite	0.15	15	25	40	27 5	X	X	27 5	25	352 662	14,106	612	612	1,224	33,672				
0 04	Steel Slag	0 15	15	25	40	27 5	X	X	27 5	25	87 128	3,485	151	151	303	8,319				
0.04	Coal/Fuels	0.15	15	25	40	27 5	X	X	27 5	25	211 160	8,446	367	367	733	20,162				
0 04	Gypsum/Limestone Shed	0.15	15	25	40	27 5	X	X	27.5	25	177 215	7,089	308	308	615	16,920				
0.04	Dry Fly Ash	0 15	15	25	40	27 5	X	X	27.5	25	278 437	11,137	483	483	967	26,585				
0 04	Employee Vehicles	0 15	1.75	0	1.75	1 75					34 675	0	0	0	0					
0 04	Front End Loader 3 Gypsum/Limestone	0 15	25	7.5	32 5	28 75					177 215	0	0	0	0					
0 04	Front End Loader 4 Coal	0 15	25	7.5	32 5	28 75					31 674	0	0	0	0					
0 04	Base Rock (Limestone)	0 15	15	15	30	22 5	X	X	22 5	15	500 000	33,333	1,447	1,447	2,893	65,100				
0 04	SUBTOTAL	0 15							25 9			107,138	4 650	4,650	9,300	241,272	0.36	0 07	1 67	0 32

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Segment No. CH-11-7 **Gyspum Building Road**

Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights				Truck Trips		Truck Weight (Tons)	Material Net (Tons)	Material (Tons/Yr)	Material Trips (#/Yr)	Empty Mileage (Mi/Yr)	Loaded Mileage (Mi/Yr)	Total Mileage (Mi/Yr)	Weight x Mileage	TSP Emission Factor lb/VMT	PM10 Emission Factor lb/VMT	TSP Emissions (Tons/Yr)	PM10 Emissions (Tons/Yr)
			Empty (Tons)	Capacity (Tons)	Loaded (Tons)	Avgerage (Tons)	Empty	Loaded												
0.03	Cement	0.15	15	22	37	26					2,531,640	0	0	0	0					
0.03	Wet Flyash	0.15	15	25	40	27.5					352,662	0	0	0	0					
0.03	Sand/Clay	0.15	15	25	40	27.5					385,854	0	0	0	0					
0.03	Bauxite	0.15	15	25	40	27.5					352,662	0	0	0	0					
0.03	Steel Slag	0.15	15	25	40	27.5					87,128	0	0	0	0					
0.03	Coal/Fuels	0.15	15	25	40	27.5					211,160	0	0	0	0					
0.03	Gypsum/Limestone Shed	0.15	15	25	40	27.5	X	X	27.5	25	177,215	7,089	239	239	478	13,139				
0.03	Dry Fly Ash	0.15	15	25	40	27.5					278,437	0	0	0	0					
0.03	Employee Vehicles	0.15	1.75	0	1.75	1.75					34,675	0	0	0	0					
0.03	Front End Loader 3 Gypsum/Limestone	0.15	25	7.5	32.5	28.75					177,215	0	0	0	0					
0.03	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					31,674	0	0	0	0					
0.03	Base Rock (Limestone)	0.15	15	15	30	22.5					500,000	0	0	0	0					
0.03	SUBTOTAL	0.15							27.5			7,089	239	239	478	13,139	0.39	0.08	0.09	0.02

Segment No. CH-11-8 **Main Road to Coal Building**

Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights				Truck Trips		Truck Weight (Tons)	Material Net (Tons)	Material (Tons/Yr)	Material Trips (#/Yr)	Empty Mileage (Mi/Yr)	Loaded Mileage (Mi/Yr)	Total Mileage (Mi/Yr)	Weight x Mileage	TSP Emission Factor lb/VMT	PM10 Emission Factor lb/VMT	TSP Emissions (Tons/Yr)	PM10 Emissions (Tons/Yr)
			Empty (Tons)	Capacity (Tons)	Loaded (Tons)	Avgerage (Tons)	Empty	Loaded												
0.08	Cement	0.15	15	22	37	26					2,531,640	0	0	0	0					
0.08	Wet Flyash	0.15	15	25	40	27.5	X	X	27.5	25	352,662	14,106	1,137	1,137	2,274	62,534				
0.08	Sand/Clay	0.15	15	25	40	27.5	X	X	27.5	25	385,854	15,434	1,244	1,244	2,488	68,420				
0.08	Bauxite	0.15	15	25	40	27.5	X	X	27.5	25	352,662	14,106	1,137	1,137	2,274	62,534				
0.08	Steel Slag	0.15	15	25	40	27.5	X	X	27.5	25	87,128	3,485	281	281	562	15,450				
0.08	Coal/Fuels	0.15	15	25	40	27.5	X	X	27.5	25	211,160	8,446	681	681	1,362	37,443				
0.08	Gypsum/Limestone Shed	0.15	15	25	40	27.5					177,215	0	0	0	0					
0.08	Dry Fly Ash	0.15	15	25	40	27.5	X	X	27.5	25	278,437	11,137	898	898	1,795	49,372				
0.08	Employee Vehicles	0.15	1.75	0	1.75	1.75					34,675	0	0	0	0					
0.08	Front End Loader 3 Gypsum/Limestone	0.15	25	7.5	32.5	28.75					177,215	0	0	0	0					
0.08	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					31,674	0	0	0	0					
0.08	Base Rock (Limestone)	0.15	15	15	30	22.5	X	X	22.5	15	500,000	33,333	2,687	2,687	5,373	120,900				
0.08	SUBTOTAL	0.15							25.8			100,049	8,064	8,064	16,128	416,653	0.36	0.07	2.88	0.56

Segment No. CH-11-9 **Coal Truck Loop**

Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights				Truck Trips		Truck Weight (Tons)	Material Net (Tons)	Material (Tons/Yr)	Material Trips (#/Yr)	Empty Mileage (Mi/Yr)	Loaded Mileage (Mi/Yr)	Total Mileage (Mi/Yr)	Weight x Mileage	TSP Emission Factor lb/VMT	PM10 Emission Factor lb/VMT	TSP Emissions (Tons/Yr)	PM10 Emissions (Tons/Yr)
			Empty (Tons)	Capacity (Tons)	Loaded (Tons)	Avgerage (Tons)	Empty	Loaded												
0.04	Cement	0.15	15	22	37	26					2,531,640	0	0	0	0					
0.04	Wet Flyash	0.15	15	25	40	27.5					352,662	0	0	0	0					
0.04	Sand/Clay	0.15	15	25	40	27.5					385,854	0	0	0	0					
0.04	Bauxite	0.15	15	25	40	27.5					352,662	0	0	0	0					
0.04	Steel Slag	0.15	15	25	40	27.5					87,128	0	0	0	0					
0.0373	Coal/Fuels	0.15	15	25	40	27.5	X	X	27.5	25	211,160	8,446	315	315	630	17,328				
0.04	Gypsum/Limestone Shed	0.15	15	25	40	27.5					177,215	0	0	0	0					
0.04	Dry Fly Ash	0.15	15	25	40	27.5					278,437	0	0	0	0					
0.04	Employee Vehicles	0.15	1.75	0	1.75	1.75					34,675	0	0	0	0					
0.04	Front End Loader 3 Gypsum/Limestone	0.15	25	7.5	32.5	28.75					177,215	0	0	0	0					
0.04	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					31,674	0	0	0	0					
0.04	Base Rock (Limestone)	0.15	15	15	30	22.5					500,000	0	0	0	0					
0.04	SUBTOTAL	0.15							27.5			8,446	315	315	630	17,328	0.39	0.08	0.12	0.02

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Segment No. CH-11-10 — **FEL - Coal/Petcoke**

Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights				Truck Trips		Truck Weight (Tons)	Material Net (Tons)	Material (Tons/Yr)	Material Trips (#/Yr)	Empty Mileage (Mi/Yr)	Loaded Mileage (Mi/Yr)	Total Mileage (Mi/Yr)	Weight x Mileage	TSP Emission Factor lb/VMT	PM10 Emission Factor lb/VMT	TSP Emissions (Tons/Yr)	PM10 Emissions (Tons/Yr)
			Empty (Tons)	Capacity (Tons)	Loaded (Tons)	Avgerage (Tons)	Empty	Loaded												
0 03	Cement	0 15	15	22	37	26					2 531 640	0	0	0	0					
0 03	Wet Flyash	0 15	15	25	40	27 5					352 662	0	0	0	0					
0 03	Sand/Clay	0 15	15	25	40	27 5					385 854	0	0	0	0					
0 03	Bauxite	0 15	15	25	40	27 5					352 562	0	0	0	0					
0 03	Steel Slag	0 15	15	25	40	27 5					87 128	0	0	0	0					
0 03	Coal/Fuels	0 15	15	25	40	27.5					211 160	0	0	0	0					
0 03	Gypsum/Limestone Shed	0 15	15	25	40	27 5					177 215	0	0	0	0					
0 03	Dry Fly Ash	0 15	15	25	40	27.5					278 437	0	0	0	0					
0 03	Employee Vehicles	0 15	1 75	0	1.75	1 75					34 675	0	0	0	0					
0 03	Front End Loader 3 Gypsum/Limestone	0.15	25	7.5	32 5	28.75					177 215	0	0	0	0					
0 03	Front End Loader 4 Coal/Petcoke	0 15	25	7.5	32 5	28 75	X	X	28 8	7.5	31 674	4,223	114	114	228	6 557				
0 03	Base Rock (Limestone)	0.15	15	15	30	22 5					500 000	0	0	0	0					
0 03	SUBTOTAL	0.15							28 8			4 223	114	114	228	6.557	0 42	0.08	0 05	0.01

Segment No. CH-11-11 — **Base Rock Road**

Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights				Truck Trips		Truck Weight (Tons)	Material Net (Tons)	Material (Tons/Yr)	Material Trips (#/Yr)	Empty Mileage (Mi/Yr)	Loaded Mileage (Mi/Yr)	Total Mileage (Mi/Yr)	Weight x Mileage	TSP Emission Factor lb/VMT	PM10 Emission Factor lb/VMT	TSP Emissions (Tons/Yr)	PM10 Emissions (Tons/Yr)
			Empty (Tons)	Capacity (Tons)	Loaded (Tons)	Avgerage (Tons)	Empty	Loaded												
0.75	Cement	0 15	15	22	37	26					2 531 640	0	0	0	0					
0.75	Wet Flyash	0 15	15	25	40	27 5					352 662	0	0	0	0					
0 75	Sand/Clay	0 15	15	25	40	27 5					385 854	0	0	0	0					
0.75	Bauxite	0 15	15	25	40	27.5					352 662	0	0	0	0					
0.75	Steel Slag	0 15	15	25	40	27 5					87 128	0	0	0	0					
0 75	Coal/Fuels	0 15	15	25	40	27 5					211 160	0	0	0	0					
0 75	Gypsum/Limestone Shed	0 15	15	25	40	27.5					177 215	0	0	0	0					
0.75	Dry Fly Ash	0.15	15	25	40	27 5					278 437	0	0	0	0					
0.75	Employee Vehicles	0 15	1.75	0	1 75	1 75					34 675	0	0	0	0					
0 75	Front End Loader 3 Gypsum/Limestone	0.15	25	7 5	32 5	28.75					177 215	0	0	0	0					
0 75	Front End Loader 4 Coal	0.15	25	7.5	32 5	28 75					31 674	0	0	0	0					
0 75	Base Rock (Limestone)	0.15	15	15	30	22.5	X	X	22 5	15	500 000	33,333	25,140	25,140	50,280	1,131,300				
0 75	SUBTOTAL	0 15							22 5			33,333	25 140	25 140	50,280	1,131 300	0 29	0 06	7 29	1 41

Segment No. CH-11-12 — **Dry Fly Ash Road**

Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights				Truck Trips		Truck Weight (Tons)	Material Net (Tons)	Material (Tons/Yr)	Material Trips (#/Yr)	Empty Mileage (Mi/Yr)	Loaded Mileage (Mi/Yr)	Total Mileage (Mi/Yr)	Weight x Mileage	TSP Emission Factor lb/VMT	PM10 Emission Factor lb/VMT	TSP Emissions (Tons/Yr)	PM10 Emissions (Tons/Yr)
			Empty (Tons)	Capacity (Tons)	Loaded (Tons)	Avgerage (Tons)	Empty	Loaded												
0 03	Cement	0.15	15	22	37	26					2 531 640	0	0	0	0					
0 03	Wet Flyash	0 15	15	25	40	27.5					352 662	0	0	0	0					
0 03	Sand/Clay	0 15	15	25	40	27.5					385 854	0	0	0	0					
0 03	Bauxite	0 15	15	25	40	27.5					352 662	0	0	0	0					
0.03	Steel Slag	0 15	15	25	40	27.5					87 128	0	0	0	0					
0 03	Coal/Fuels	0 15	15	25	40	27.5					211 160	0	0	0	0					
0 03	Gypsum/Limestone Shed	0 15	15	25	40	27.5					177 215	0	0	0	0					
0 03	Dry Fly Ash	0 15	15	25	40	27.5	X	X	27 5	25	278 437	11,137	280	280	559	15,375				
0.03	Employee Vehicles	0 15	1.75	0	1 75	1 75					34 675	0	0	0	0					
0 03	Front End Loader 3 Gypsum/Limestone	0.15	25	7.5	32 5	28.75					177 215	0	0	0	0					
0 03	Front End Loader 4 Coal	0 15	25	7.5	32 5	28 75					31 674	0	0	0	0					
0 03	Base Rock (Limestone)	0 15	15	15	30	22.5					500 000	0	0	0	0					
0 03	SUBTOTAL	0 15							27 5			11,137	280	280	559	15,375	0.39	0 08	0 11	0.02

TABLE A-9
Paved Roads Emission Worksheet

Segment No. CH-11-13 **Main Road to Raw Material Storage**

Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights				Truck Trips		Truck Weight (Tons)	Material Net (Tons)	Material (Tons/Yr)	Material Trips (#/Yr)	Empty Mileage (Mi/Yr)	Loaded Mileage (Mi/Yr)	Total Mileage (Mi/Yr)	Weight x Mileage	TSP Emission Factor lb/VMT	PM10 Emission Factor lb/VMT	TSP Emissions (Tons/Yr)	PM10 Emissions (Tons/Yr)
			Empty (Tons)	Capacity (Tons)	Loaded (Tons)	Avgerage (Tons)	Empty	Loaded												
0.11	Cement	0.15	15	22	37	26					2,531,640	0	0	0	0					
0.11	Wet Flyash	0.15	15	25	40	27.5	X	X	27.5	25	352,562	14,106	1,608	1,608	3,216	88,448				
0.11	Sand/Clay	0.15	15	25	40	27.5	X	X	27.5	25	385,854	15,434	1,759	1,759	3,519	96,772				
0.11	Bauxite	0.15	15	25	40	27.5	X	X	27.5	25	352,662	14,106	1,608	1,608	3,216	88,448				
0.11	Steel Slag	0.15	15	25	40	27.5	X	X	27.5	25	87,128	3,485	397	397	795	21,852				
0.11	Coal/Fuels	0.15	15	25	40	27.5					211,160	0	0	0	0					
0.11	Gypsum/Limestone Shed	0.15	15	25	40	27.5					177,215	0	0	0	0					
0.11	Dry Fly Ash	0.15	15	25	40	27.5					278,437	0	0	0	0					
0.11	Employee Vehicles	0.15	1.75	0	1.75	1.75					34,675	0	0	0	0					
0.11	Front End Loader 3 Gypsum/Limestone	0.15	25	7.5	32.5	28.75					177,215	0	0	0	0					
0.11	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					31,674	0	0	0	0					
0.11	Base Rock (Limestone)	0.15	15	15	30	22.5					500,000	0	0	0	0					
0.11	SUBTOTAL	0.15							27.5			47,132	5,373	5,373	10,746	295,519	0.39	0.08	2.10	0.41

Segment No. CH-11-14 **Truck Dump for Bauxite and Steel Slag**

Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights				Truck Trips		Truck Weight (Tons)	Material Net (Tons)	Material (Tons/Yr)	Material Trips (#/Yr)	Empty Mileage (Mi/Yr)	Loaded Mileage (Mi/Yr)	Total Mileage (Mi/Yr)	Weight x Mileage	TSP Emission Factor lb/VMT	PM10 Emission Factor lb/VMT	TSP Emissions (Tons/Yr)	PM10 Emissions (Tons/Yr)
			Empty (Tons)	Capacity (Tons)	Loaded (Tons)	Avgerage (Tons)	Empty	Loaded												
0.02	Cement	0.15	15	22	37	26					2,531,640	0	0	0	0					
0.02	Wet Flyash	0.15	15	25	40	27.5					352,652	0	0	0	0					
0.02	Sand/Clay	0.15	15	25	40	27.5					385,854	0	0	0	0					
0.02	Bauxite	0.15	15	25	40	27.5	X	X	27.5	25	352,662	14,106	214	214	429	11,793				
0.02	Steel Slag	0.15	15	25	40	27.5	X	X	27.5	25	87,128	3,485	53	53	106	2,914				
0.02	Coal/Fuels	0.15	15	25	40	27.5					211,160	0	0	0	0					
0.02	Gypsum/Limestone Shed	0.15	15	25	40	27.5					177,215	0	0	0	0					
0.02	Dry Fly Ash	0.15	15	25	40	27.5					278,437	0	0	0	0					
0.02	Employee Vehicles	0.15	1.75	0	1.75	1.75					34,675	0	0	0	0					
0.02	Front End Loader 3 Gypsum/Limestone	0.15	25	7.5	32.5	28.75					177,215	0	0	0	0					
0.02	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					31,674	0	0	0	0					
0.02	Base Rock (Limestone)	0.15	15	15	30	22.5					500,000	0	0	0	0					
0.02	SUBTOTAL	0.15							27.5			17,592	267	267	535	14,707	0.39	0.08	0.10	0.02

Segment No. CH-11-17 **Main Road to Sand/Clay Unloading**

Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights				Truck Trips		Truck Weight (Tons)	Material Net (Tons)	Material (Tons/Yr)	Material Trips (#/Yr)	Empty Mileage (Mi/Yr)	Loaded Mileage (Mi/Yr)	Total Mileage (Mi/Yr)	Weight x Mileage	TSP Emission Factor lb/VMT	PM10 Emission Factor lb/VMT	TSP Emissions (Tons/Yr)	PM10 Emissions (Tons/Yr)
			Empty (Tons)	Capacity (Tons)	Loaded (Tons)	Avgerage (Tons)	Empty	Loaded												
0.04	Cement	0.15	15	22	37	26					2,531,640	0	0	0	0					
0.04	Wet Flyash	0.15	15	25	40	27.5	X	X	27.5	25	352,562	14,106	533	533	1,066	29,327				
0.04	Sand/Clay	0.15	15	25	40	27.5	X	X	27.5	25	385,854	15,434	583	583	1,167	32,088				
0.04	Bauxite	0.15	15	25	40	27.5					352,662	0	0	0	0					
0.04	Steel Slag	0.15	15	25	40	27.5					87,128	0	0	0	0					
0.04	Coal/Fuels	0.15	15	25	40	27.5					211,160	0	0	0	0					
0.04	Gypsum/Limestone Shed	0.15	15	25	40	27.5					177,215	0	0	0	0					
0.04	Dry Fly Ash	0.15	15	25	40	27.5					278,437	0	0	0	0					
0.04	Employee Vehicles	0.15	1.75	0	1.75	1.75					34,675	0	0	0	0					
0.04	Front End Loader 3 Gypsum/Limestone	0.15	25	7.5	32.5	28.75					177,215	0	0	0	0					
0.04	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					31,674	0	0	0	0					
0.04	Base Rock (Limestone)	0.15	15	15	30	22.5					500,000	0	0	0	0					
0.04	SUBTOTAL	0.15							27.5			29,541	1,117	1,117	2,233	61,415	0.39	0.08	0.44	0.08

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Segment No. CH-11-18 **Sand/Clay Unloading Road**

Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights				Truck Trips		Truck Weight (Tons)	Material Net (Tons)	Material (Tons/Yr)	Material Trips (#/Yr)	Empty Mileage (Mi/Yr)	Loaded Mileage (Mi/Yr)	Total Mileage (Mi/Yr)	Weight x Mileage	TSP Emission Factor lb/VMT	PM10 Emission Factor lb/VMT	TSP Emissions (Tons/Yr)	PM10 Emissions (Tons/Yr)
			Empty (Tons)	Capacity (Tons)	Loaded (Tons)	Avgerage (Tons)	Empty	Loaded												
0.04	Cement	0.15	15	22	37	26					2,531,640	0	0	0	0					
0.04	Wet Flyash	0.15	15	25	40	27.5					352,662	0	0	0	0					
0.04	Sand/Clay	0.15	15	25	40	27.5	X	X	27.5	25	385,854	15,434	644	644	1,287	35,398				
0.04	Bauxite	0.15	15	25	40	27.5					352,662	0	0	0	0					
0.04	Steel Slag	0.15	15	25	40	27.5					87,128	0	0	0	0					
0.04	Coal/Fuels	0.15	15	25	40	27.5					211,160	0	0	0	0					
0.04	Gypsum/Limestone Shed	0.15	15	25	40	27.5					177,215	0	0	0	0					
0.04	Dry Fly Ash	0.15	15	25	40	27.5					278,437	0	0	0	0					
0.04	Employee Vehicles	0.15	1.75	0	1.75	1.75					34,675	0	0	0	0					
0.04	Front End Loader 3 Gypsum/Limestone	0.15	25	7.5	32.5	28.75					177,215	0	0	0	0					
0.04	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					31,674	0	0	0	0					
0.04	Base Rock (Limestone)	0.15	15	15	30	22.5					500,000	0	0	0	0					
0.04	SUBTOTAL	0.15							27.5			15,434	644	644	1,287	35,398	0.39	0.08	0.25	0.05

Segment No. CH-11-19 **Main Road to Wet Fly Ash Unloading**

Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights				Truck Trips		Truck Weight (Tons)	Material Net (Tons)	Material (Tons/Yr)	Material Trips (#/Yr)	Empty Mileage (Mi/Yr)	Loaded Mileage (Mi/Yr)	Total Mileage (Mi/Yr)	Weight x Mileage	TSP Emission Factor lb/VMT	PM10 Emission Factor lb/VMT	TSP Emissions (Tons/Yr)	PM10 Emissions (Tons/Yr)
			Empty (Tons)	Capacity (Tons)	Loaded (Tons)	Avgerage (Tons)	Empty	Loaded												
0.07	Cement	0.15	15	22	37	26					2,531,640	0	0	0	0					
0.07	Wet Flyash	0.15	15	25	40	27.5	X	X	27.5	25	352,662	14,106	931	931	1,862	51,207				
0.07	Sand/Clay	0.15	15	25	40	27.5					385,854	0	0	0	0					
0.07	Bauxite	0.15	15	25	40	27.5					352,662	0	0	0	0					
0.07	Steel Slag	0.15	15	25	40	27.5					87,128	0	0	0	0					
0.07	Coal/Fuels	0.15	15	25	40	27.5					211,160	0	0	0	0					
0.07	Gypsum/Limestone Shed	0.15	15	25	40	27.5					177,215	0	0	0	0					
0.07	Dry Fly Ash	0.15	15	25	40	27.5					278,437	0	0	0	0					
0.07	Employee Vehicles	0.15	1.75	0	1.75	1.75					34,675	0	0	0	0					
0.07	Front End Loader 3 Gypsum/Limestone	0.15	25	7.5	32.5	28.75					177,215	0	0	0	0					
0.07	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					31,674	0	0	0	0					
0.07	Base Rock (Limestone)	0.15	15	15	30	22.5					500,000	0	0	0	0					
0.07	SUBTOTAL	0.15							27.5			14,106	931	931	1,862	51,207	0.39	0.08	0.36	0.07

Segment No. CH-11-20 **Wet Fly Ash Unloading Road**

Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights				Truck Trips		Truck Weight (Tons)	Material Net (Tons)	Material (Tons/Yr)	Material Trips (#/Yr)	Empty Mileage (Mi/Yr)	Loaded Mileage (Mi/Yr)	Total Mileage (Mi/Yr)	Weight x Mileage	TSP Emission Factor lb/VMT	PM10 Emission Factor lb/VMT	TSP Emissions (Tons/Yr)	PM10 Emissions (Tons/Yr)
			Empty (Tons)	Capacity (Tons)	Loaded (Tons)	Avgerage (Tons)	Empty	Loaded												
0.04	Cement	0.15	15	22	37	26					2,531,640	0	0	0	0					
0.04	Wet Flyash	0.15	15	25	40	27.5	X	X	27.5	25	352,662	14,106	585	585	1,171	32,198				
0.04	Sand/Clay	0.15	15	25	40	27.5					385,854	0	0	0	0					
0.04	Bauxite	0.15	15	25	40	27.5					352,662	0	0	0	0					
0.04	Steel Slag	0.15	15	25	40	27.5					87,128	0	0	0	0					
0.04	Coal/Fuels	0.15	15	25	40	27.5					211,160	0	0	0	0					
0.04	Gypsum/Limestone Shed	0.15	15	25	40	27.5					177,215	0	0	0	0					
0.04	Dry Fly Ash	0.15	15	25	40	27.5					278,437	0	0	0	0					
0.04	Employee Vehicles	0.15	1.75	0	1.75	1.75					34,675	0	0	0	0					
0.04	Front End Loader 3 Gypsum/Limestone	0.15	25	7.5	32.5	28.75					177,215	0	0	0	0					
0.04	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					31,674	0	0	0	0					
0.04	Base Rock (Limestone)	0.15	15	15	30	22.5					500,000	0	0	0	0					
0.04	SUBTOTAL	0.15							27.5			14,106	585	585	1,171	32,198	0.39	0.08	0.23	0.04

TABLE A-9
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Segment No. CH-11-21 FEL - Gypsum/Limestone

Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights				Truck Trips		Truck Weight (Tons)	Material Net (Tons)	Material (Tons/Yr)	Material Trips (#/Yr)	Empty Mileage (Mi/Yr)	Loaded Mileage (Mi/Yr)	Total Mileage (Mi/Yr)	Weight x Mileage	TSP Emission Factor lb/VMT	PM10 Emission Factor lb/VMT	TSP Emissions (Tons/Yr)	PM10 Emissions (Tons/Yr)
			Empty (Tons)	Capacity (Tons)	Loaded (Tons)	Avgerage (Tons)	Empty	Loaded												
0.04	Cement	0.15	15	22	37	26					2,531,640	0	0	0	0					
0.04	Wet Flyash	0.15	15	25	40	27.5					352,662	0	0	0	0					
0.04	Sand/Clay	0.15	15	25	40	27.5					385,854	0	0	0	0					
0.04	Bauxite	0.15	15	25	40	27.5					352,662	0	0	0	0					
0.04	Steel Slag	0.15	15	25	40	27.5					87,128	0	0	0	0					
0.04	Coal/Fuels	0.15	15	25	40	27.5					211,160	0	0	0	0					
0.04	Gypsum/Limestone Shed	0.15	15	25	40	27.5					177,215	0	0	0	0					
0.04	Dry Fly Ash	0.15	15	25	40	27.5					278,437	0	0	0	0					
0.04	Employee Vehicles	0.15	1.75	0	1.75	1.75					34,675	0	0	0	0					
0.04	Front End Loader 3 Gypsum/Limestone	0.15	25	7.5	32.5	28.75	X	X	28.8	7.5	177,215	23,629	870	870	1,739	49,998				
0.04	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					31,674	0	0	0	0					
0.04	Base Rock (Limestone)	0.15	15	15	30	22.5					500,000	0	0	0	0					
0.04	SUBTOTAL	0.15							28.8			23,629	870	870	1,739	49,998	0.42	0.08	0.36	0.07

Segment No. CH-11-24 Main Road to Dry Fly Ash

Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights				Truck Trips		Truck Weight (Tons)	Material Net (Tons)	Material (Tons/Yr)	Material Trips (#/Yr)	Empty Mileage (Mi/Yr)	Loaded Mileage (Mi/Yr)	Total Mileage (Mi/Yr)	Weight x Mileage	TSP Emission Factor lb/VMT	PM10 Emission Factor lb/VMT	TSP Emissions (Tons/Yr)	PM10 Emissions (Tons/Yr)
			Empty (Tons)	Capacity (Tons)	Loaded (Tons)	Avgerage (Tons)	Empty	Loaded												
0.05	Cement	0.15	15	22	37	26					2,531,640	0	0	0	0					
0.05	Wet Flyash	0.15	15	25	40	27.5					352,662	0	0	0	0					
0.05	Sand/Clay	0.15	15	25	40	27.5					385,854	0	0	0	0					
0.05	Bauxite	0.15	15	25	40	27.5					352,662	0	0	0	0					
0.05	Steel Slag	0.15	15	25	40	27.5					87,128	0	0	0	0					
0.05	Coal/Fuels	0.15	15	25	40	27.5					211,160	0	0	0	0					
0.05	Gypsum/Limestone Shed	0.15	15	25	40	27.5					177,215	0	0	0	0					
0.05	Dry Fly Ash	0.15	15	25	40	27.5	X	X	27.5	25	278,437	11,137	564	564	1,127	30,996				
0.05	Employee Vehicles	0.15	1.75	0	1.75	1.75					34,675	0	0	0	0					
0.05	Front End Loader 3 Gypsum/Limestone	0.15	25	7.5	32.5	28.75					177,215	0	0	0	0					
0.05	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					31,674	0	0	0	0					
0.05	Base Rock (Limestone)	0.15	15	15	30	22.5	X	X	22.5	15	500,000	33,333	1,687	1,687	3,373	75,900				
0.05	SUBTOTAL	0.15							23.8			44,471	2,250	2,250	4,500	106,896	0.31	0.06	0.71	0.14

Segment No. CH-11-25A Main Entrance Road In

Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights				Truck Trips		Truck Weight (Tons)	Material Net (Tons)	Material (Tons/Yr)	Material Trips (#/Yr)	Empty Mileage (Mi/Yr)	Loaded Mileage (Mi/Yr)	Total Mileage (Mi/Yr)	Weight x Mileage	TSP Emission Factor lb/VMT	PM10 Emission Factor lb/VMT	TSP Emissions (Tons/Yr)	PM10 Emissions (Tons/Yr)
			Empty (Tons)	Capacity (Tons)	Loaded (Tons)	Avgerage (Tons)	Empty	Loaded												
0.62	Cement	0.15	15	22	37	26	X		26.0	22	2,531,640	115,075	70,788	0	70,788	1,840,491				
0.62	Wet Flyash	0.15	15	25	40	27.5		X	27.5	25	352,662	14,106	0	8,678	8,678	238,634				
0.62	Sand/Clay	0.15	15	25	40	27.5		X	27.5	25	385,854	15,434	0	9,494	9,494	261,094				
0.62	Bauxite	0.15	15	25	40	27.5		X	27.5	25	352,662	14,106	0	8,678	8,678	238,634				
0.62	Steel Slag	0.15	15	25	40	27.5		X	27.5	25	87,128	3,485	0	2,144	2,144	58,957				
0.62	Coal/Fuels	0.15	15	25	40	27.5		X	27.5	25	211,160	8,446	0	5,196	5,196	142,885				
0.62	Gypsum/Limestone Shed	0.15	15	25	40	27.5		X	27.5	25	177,215	7,089	0	4,361	4,361	119,915				
0.62	Dry Fly Ash	0.15	15	25	40	27.5		X	27.5	25	278,437	11,137	0	6,851	6,851	188,409				
0.62	Employee Vehicles	0.15	1.75	0	1.75	1.75	X		1.8	0	34,675	34,675	21,330	0	21,330	37,328				
0.62	Front End Loader 3 Gypsum/Limestone	0.15	25	7.5	32.5	28.75					177,215	0	0	0	0					
0.62	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					31,674	0	0	0	0					
0.62	Base Rock (Limestone)	0.15	15	15	30	22.5	X		22.5	15	500,000	33,333	20,505	0	20,505	461,363				
0.62	SUBTOTAL	0.15							22.7			256,888	112,623	45,401	158,024	3,587,708	0.29	0.06	23.21	4.50

TABLE A-9
Paved Roads Emission Worksheet

Segment No. CH-11-25B **Main Entrance Road In - Gate**

Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights				Truck Trips		Truck Weight (Tons)	Material Net (Tons)	Material (Tons/Yr)	Material Trips (#/Yr)	Empty Mileage (Mi/Yr)	Loaded Mileage (Mi/Yr)	Total Mileage (Mi/Yr)	Weight x Mileage	TSP Emission Factor lb/VMT	PM10 Emission Factor lb/VMT	TSP Emissions (Tons/Yr)	PM10 Emissions (Tons/Yr)
			Empty (Tons)	Capacity (Tons)	Loaded (Tons)	Avgerage (Tons)	Empty	Loaded												
0.04	Cement	0.15	15	22	37	26	X		26.0	22	2,531,640	115,075	5,006	0	5,006	130,149				
0.04	Wet Flyash	0.15	15	25	40	27.5		X	27.5	25	352,662	14,106	0	614	614	16,875				
0.04	Sand/Clay	0.15	15	25	40	27.5		X	27.5	25	385,854	15,434	0	671	671	18,463				
0.04	Bauxite	0.15	15	25	40	27.5		X	27.5	25	352,662	14,106	0	614	614	16,875				
0.04	Steel Slag	0.15	15	25	40	27.5		X	27.5	25	87,128	3,485	0	152	152	4,169				
0.04	Coal/Fuels	0.15	15	25	40	27.5		X	27.5	25	211,150	8,446	0	367	367	10,104				
0.04	Gypsum/Limestone Shed	0.15	15	25	40	27.5		X	27.5	25	177,215	7,089	0	308	308	8,480				
0.04	Dry Fly Ash	0.15	15	25	40	27.5		X	27.5	25	278,437	11,137	0	484	484	13,323				
0.04	Employee Vehicles	0.15	1.75	0	1.75	1.75	X		1.8	0	34,675	34,675	1,508	0	1,508	2,640				
0.04	Front End Loader 3 Gypsum/Limestone	0.15	25	7.5	32.5	28.75					177,215	0	0	0	0					
0.04	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					31,674	0	0	0	0					
0.04	Base Rock (Limestone)	0.15	15	15	30	22.5	X		22.5	15	500,000	33,333	1,450	0	1,450	32,625				
0.04	SUBTOTAL	0.15							22.7			256,888	7,964	3,211	11,175	253,703	0.29	0.06	1.64	0.32
	GRAND TOTAL																		65.12	12.63

Notes

Emissions based on AP-42 Section 13.2.1 (12/03) Equation (2)

E = [k * (sL/2)^0.65 * (W/3)^1.5 - C] * (1 - P/4N)

where E = emission factor lb/VMT

k = particle size multiplier

sL = road surface silt loading, g/m^2

W = average vehicle weight tons

C = 1980's vehicle exhaust, brake & tire wear, lb/VMT

P = number of days with >= 0.01 in precipitation

N = number of days in the averaging period (365)

k (PM-30) = 0.082 lb/VMT

k (PM-10) = 0.016 lb/VMT

C (PM-30) = 0.00047 lb/VMT

C (PM-10) = 0.00047 lb/VMT

P = 105 days (Tampa average)

Silt loading of 0.15 g/m2 or less will be maintained by use of vacuum sweeping

TABLE A-10
Unpaved Roads Emission Worksheet

Segment No.	Material Hauled	Annual Material Throughput (tons)	Total Miles (Round Trip)	Average Load per Vehicle (tons)	Unloaded Vehicle Weight (tons)	Mean Vehicle Weight (tons) (W)	Surface Material Silt Content (%) (s)	VMT (miles/ year)	PM Emission Factor (lb/VMT)[1]	PM10 Emission Factor (lb/VMT)[1]	Control Efficiency (%)[2]	PM Emissions (tons/year)	PM10 Emissions (tons/year)
15	Front End Loader-Bauxite	352,662	0.03	7.5	25	28.75	8.3	1,556	7.46	2.12	95%	0.29	0.08
16	Front End Loaders-Steel Slag	87,128	0.03	7.5	25	28.75	8.3	395	7.46	2.12	95%	0.07	0.02
22	Front End Loaders-Limestone	3,798,428	0.03	7.5	25	28.75	8.3	16,359	7.46	2.12	95%	3.05	0.87
23	Front End Loader-Base Rock	500,000	0.03	15	15	22.5	8.3	940	6.68	1.90	95%	0.16	0.04
										Total Emissions		0.07	0.02

Notes:

$E = k * (s/12)^a * (W/3)^b * (365 - P)/365$ for industrial unpaved roads

where E = emission factor, lb/VMT
k = particle size multiplier
s = surface material silt content, %
W = average vehicle weight, tons
P = number of days with >= 0.01 in precipitation
a, b = constants for specific partical size

Constant	PM-30	PM-10
k	4.9	1.5
a	0.7	0.9
b	0.45	0.45

P = 105 days (Tampa average)

[1] Based on AP-42 Section 13.2.2 (12/03). Equations (1a) & (2). Silt content based on default stone quarrying haul road (Table 13.2.2-1).

[2] A control efficiency of 95% was used to account for high natural surface moisture in the quarry and/or watering at an equivalent moisture ratio of 5 (Figure 13.2.2-2). This control efficiency also reflects the slow travel speed of the loaders (<10 mph).

Assumes average round trip distance for limestone loader is 600 ft and for base rock loader is 400 ft.

TABLE A-11
Traffic Inputs for Paved and Unpaved Roads

Material	Amount of Material		Truck/Loader Weight (Empty)		Truck/Loader Capacity		Total Trips	Type of Road
Cement	2,531,640	tons/year	15	tons	22	tons	115,075	Paved
Fly Ash	352,662	tons/year	15	tons	25	tons	14,106	Paved
Sand/Clay	385,854	tons/year	15	tons	25	tons	15,434	Paved
Bauxite	352,662	tons/year	15	tons	25	tons	14,106	Paved
Steel Slag	87,128	tons/year	15	tons	25	tons	3,485	Paved
Coal	211,160	tons/year	15	tons	25	tons	8,446	Paved
Gypsum	177,215	tons/year	15	tons	25	tons	7,089	Paved
Dry Fly Ash	278,437	tons/year	15	tons	25	tons	11,137	Paved
Employee Traffic	95	employees/day	3,500	lbs	1	employee	34,675	Paved
Front End Loader 1 Steel Slag	87,128	tons/year	25	tons	7.5	tons	11,617	Unpaved (Packed Limestone)
Front End Loader 2 Bauxite	352,662	tons/year	25	tons	7.5	tons	47,022	Unpaved (Packed Limestone)
Front End Loader 3 Gypsum/Limestone	177,215	tons/year	25	tons	7.5	tons	23,629	Paved
Front End Loader 4 Coal/Petcoke (Note 1)	31,674	tons/year	25	tons	7.5	tons	4,223	Paved
Quarry								
Front End Loaders Limestone	3,798,428	tons/year	25	tons	7.5	tons	506,457	Unpaved
Front End Loaders Base Rock (Limestone)	500,000	tons/year	15	tons	15.0	tons	33,333	Unpaved
Base Rock (Limestone)	500,000	tons/year	15	tons	25.0	tons	20,000	Paved

Note 1 : Only 15% of Coal/Pet Coke is moved by front end loader, the remainer will be handled directly from the truck.

Attachment 6

Revised Modeling Report

SUMTER
COUNTY
CEMENT
CENTER HILL, FLORIDA, USA

Modeling Report For the Sumter Cement Company Center Hill, Florida

Submitted By:

Sumter Cement Company, LLC

P.O. Box 410

Branford, Florida 32008

Submitted To:

Florida Department of Environmental Protection
2600 Blair Stone Road MS# 5500
Tallahassee, Florida 32399-2400

October 2005

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1. INTRODUCTION

Sumter Cement Company, LLC Company (SCC) is proposing to build a new Portland cement plant in the town of Center Hill located in Sumter County, Florida. SCC will be operated by Votorantim Cementos. Votorantim Cementos also operates Suwannee American Cement (SAC) which has a cement plant in Branford, Florida. The operations of the new SCC Center Hill Plant (Plant) and the SAC Branford Plant will be both fully controlled by Votorantim Cementos. The two cement plants, although with different names, will share the valuable resources, information, and the vast experience and knowledge provided by Votorantim Cementos. The Plant will perform quarrying and crushing of raw materials and processing of these materials into Portland cement. The Plant will operate with a state-of-the-art in-line raw mill and preheater/precalciner (PH/PC) kiln system and include the latest technologies for emission controls.

The proposed project will be subject to the New Source Review (NSR) Prevention of Significant Deterioration (PSD) regulations because the proposed site of the SCC Plant is located in an attainment area for all applicable criteria air pollutants. Since the proposed SCC Plant is expected to have potential-to-emit (PTE) emissions greater than 100 tons per year of regulated NSR pollutants, it will be considered a major emission source under 40 CFR Part 52.21(2)(i). Therefore, for those regulated air pollutant emissions that exceed applicable significant net emission increase threshold levels, an air quality modeling impact analysis is required.

2. PROCESS AND FACILITY DESCRIPTIONS

SCC plans to construct a new dry process Portland cement plant capable of producing approximately 1.7 million short tons of clinker per year. The Plant will be located approximately one mile east of Center Hill, Florida. The Plant will perform quarrying and crushing of raw materials, and processing of these materials into Portland cement. The Plant will operate with a single cement production system which includes a preheater/precalciner kiln with an in-line raw mill. The components of this system are described in detail below and consist of equipment to quarry and crush limestone (Quarry Crushing), prepare raw material into pyro-process kiln feed (Raw Grinding), process kiln feed into clinker (Clinker Burning), cool the clinker (Clinker Cooling), process clinker into cement (Finish Grinding), cement load out (Cement Distribution), and prepare raw fuel for combustion (Fuel Grinding). SCC will use reasonable precautions to control unconfined emissions. For a listing of these precautions see Appendix A.

- **Quarry Crushing**

Limestone will be quarried on the Plant property; other raw materials, such as sand (or other silica sources), steel slag (or other iron sources), and fly ash (or other alumina sources) will be received from off-site sources and stored within the enclosed Raw Material Storage Building. The limestone will be processed by a primary crusher and then conveyed to a Limestone Storage Building.

- **Raw Grinding**

The raw materials will be conveyed from their storage areas mentioned above by completely enclosed conveyors to Pre-Blending Silos and then into an In-Line Raw Mill system, where the combined materials are dried and pulverized. The powdery material, referred to as kiln feed, will then be conveyed to a Blending Silo for temporary storage. Process air from the raw mill will be vented out through the main stack, which is also used by the preheater/precalciner kiln system.

- **Clinker Burning**

From the Blend Silo, the kiln feed will be conveyed into a dry process preheater/precalciner and rotary kiln for pyro-processing into cement clinker nodules. The kiln feed will then be introduced at the upper stages of the preheater and travel through the preheater and calciner, finally entering the end of the kiln where it will travel downhill via the kiln rotation and gravity. Fuel will be fired in the calciner and at the lower end of the kiln. The resulting combustion gases will travel countercurrent to the feed via an induced draft fan. Kiln gases will be vented to the main stack shared with the Raw Mill system.

Fuels to be used in the pyroprocessing system include fuel oil, natural gas, coal, petroleum coke, and whole or chipped tires. The system will also be designed to accommodate the use of non-hazardous liquids and non-hazardous solids in the future. The non-hazardous liquids (e.g., on-spec used oil; up to 50 percent of total heat input) will be burned in the kiln and/or precalciner. Non-hazardous solids (e.g., plastic, filter fluff, wood waste; up to 50 percent of total heat input) will be burned in the precalciner. The Plant may include a whole tire system and a tire gasification system that will use heat from the pyroprocessing system to decompose tires to gas, coke, and wire, which will be used in the kiln and pyroprocessing system in an enclosed process.

As the kiln feed is gravity-conveyed through the preheater and calciner it will be progressively heated and undergo calcination. As the kiln feed enters the kiln it will travel through the sintering zone of the process. When the material reaches the hot end of the kiln it will have completed its chemical transformation into Portland cement clinker nodules, typically sized between ½-inch and 2-inches in diameter. The clinker nodules will be deposited directly from the hot-end of the kiln into the Clinker Cooler system. The kiln system will have a preliminary capacity of 353.2 tons/hour of material fed to the preheater (dry basis) and 208.3 tons/hour of clinker production.

- **Clinker Cooling**

Clinker discharged from the kiln passes to a Clinker Cooler system, which will vent to the main stack used by the Kiln and Raw Mill systems. The cooled clinker will be conveyed to Clinker Storage Silos that will feed the Finish Grinding process.

- **Finish Grinding**

In the Finish Grinding process, gypsum and limestone will be inter-ground with clinker to produce cement. The gypsum and limestone will be received at the plant by truck and stored in a Gypsum/Limestone Storage Building. The gypsum and limestone will then be conveyed by enclosed conveyors to separate storage silos. Clinker, gypsum, and limestone extracted from their respective storage silos, will be fed in predetermined amounts into one of two Finish Mills. The Finish Mills will have a combined preliminary capacity of 340 tons/hour of Portland cement production. The ground clinker, gypsum, and limestone particles mix, or Portland cement, produced by the Finish Mills will then be conveyed to Cement Storage Silos.

- **Cement Distribution**

All cement produced at the plant will be distributed by truck. The Cement Storage Silos will feed the Portland cement to one of three truck load outs or to a packaging plant. The packaging plant will also distribute cement by truck. SCC will have no access to rail at the Plant, and since the vast majority of SCC's potential customers can only receive cement via bulk trucks there will be no rail load out.

- **Fuel Grinding**

The Plant will also include a coal processing operation that will crush approximately 211,160 tons of coal and petroleum coke annually. The coal/coke will be delivered by truck and stored in a Coal Storage Building and fed by front end loaders and enclosed conveyors to the Coal Mill for drying and grinding. The Coal Mill will use cooler gas for the drying process and will not be a source of combustion. Ground fuel will be stored in the Pulverized Coal Storage Silos and conveyed from there to the Kiln system.

Emissions units addressed by this permitting action are:

Table 2-1
SCC Emission Units

EU ID	Description
CH-1	Primary Crushing and Associated Conveyors
CH-2	Raw Material Conveying – conveyor transfer points
CH-3	Raw Material Processing and Storage – controlled by baghouses
CH-4	Kiln System with In-Line Raw Mill and Clinker Cooler
CH-5	Clinker Storage and Conveying – controlled by baghouses
CH-6	Finish Mills and Cement Processing – controlled by baghouses
CH-7	Coal Mill System
CH-8	Coal Conveying – conveyor transfer points
CH-10	Storage Piles
CH-11	Paved and Unpaved Roads

Additionally, there will be a diesel emergency generator (CH-9). The total amount of diesel fuel to be burned in the new emergency generator will not exceed 32,000 gal/yr and thus it is exempt from permitting pursuant to F.A.C 62-210.300(3)(a)20.

Preliminary flow diagrams are included in the application in Appendix F. However, the vendors for the new equipment have not yet been selected, so the application does not include information on process and control equipment manufacturers or continuous emission monitoring systems (CEMS). To the extent requested by the FDEP, this information will be provided to the FDEP once the equipment bids have been approved. The CEMS and stack sampling facilities will meet all the applicable requirements in 40 CFR Parts 60 and 63.

2.1 FACILITY LOCATION

The Plant is located approximately 1 mile southeast of Center Hill, Florida, and is situated on an approximately 1,473-acre parcel of land. The location of the Plant is shown in Figure 2-1. The geographic coordinates for the new precalciner kiln system stack are approximately:

- Longitude: 81° 58’ 49” W   Latitude: 28° 37’ 50” N
- UTM Easting: 404,171 meters   Northing: 3,167,472 meters
- UTM Zone: 17

(UTM = Universal Traverse Mercator)   WGS-84 Ellipsoid

The proposed project is located in a region which is classified as in attainment of the NAAQS for all criteria pollutants.

The topography of the area surrounding the proposed project site is generally flat. There are no major distinctive terrain features in the surrounding area. Since the highest terrain in the vicinity of the plant site does not exceed the elevation of the projected main kiln stack elevation, the air dispersion modeling analysis will not include terrain elevations.

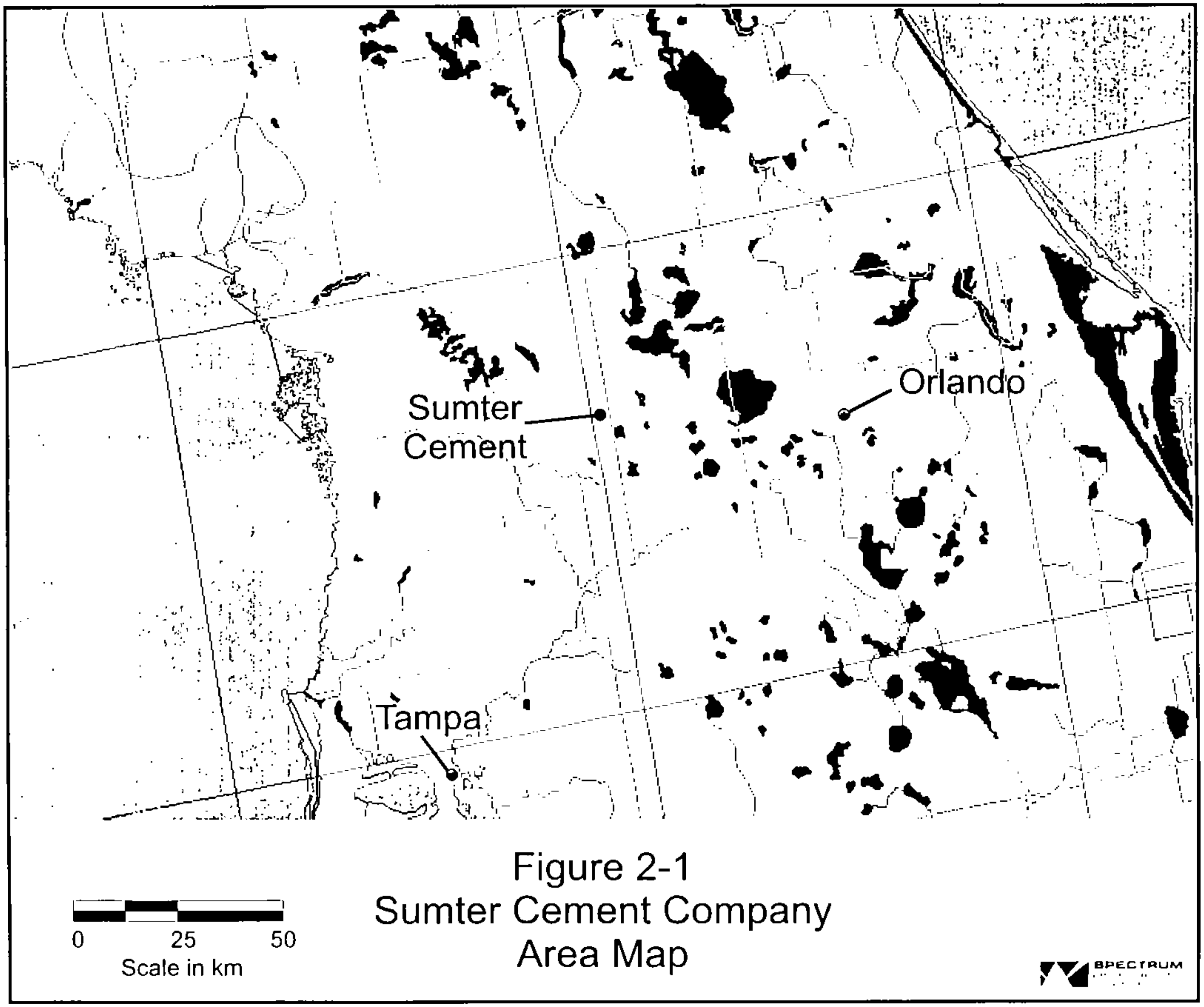


Figure 2-1
Sumter Cement Company
Area Map

3. FACILITY EMISSION INVENTORY

Appendix A, PTE Air Emissions Inventory, of this Permit Application describes the potential-to-emit (PTE) emission inventory associated with the PM_{10}, TSP, SO_2, NO_x, CO, and VOC emissions sources at the Plant.

As shown by Table 5-1 in the Application, "Facility-Wide New Source Review Applicability Analysis", there will be an expected significant net emission increase of PM_{10}, TSP, SO_2, NO_x, CO, and VOC. Therefore, these pollutants will require major source PSD review and including the conduct of applicable air quality impact analyses.

4. AIR QUALITY MODEL SELECTION AND INPUT DATA

The dispersion models used for the air quality modeling analysis of the SCC Plant are U.S. EPA approved air quality dispersion models. The procedures used in conducting the modeling analysis follow the requirements outlined in 40 CFR Part 51 Appendix W "Guideline on Air Quality Models" (U.S. EPA 1999) and other applicable EPA and FLM guidance.

4.1 AIR DISPERSION MODEL SELECTION

The air quality modeling analysis uses air dispersion models to predict ambient air impacts from the proposed project. The Industrial Source Complex Short-Term 3 (ISCST3) model has been used for refined modeling. The CALPUFF air dispersion model has been used in a screening mode (CALPUFF-Lite) to evaluate the potential for long-range transport air quality and visibility impairment impacts at the surrounding Federal Class I areas within 300 kilometers of the SCC Plant. Descriptions of these models are provided in the following subsections.

4.1.1 Industrial Source Complex Model

The U.S. EPA ISCST3 (ISCST3, Version 02035) air dispersion model has been used to demonstrate compliance with applicable Florida AAQS and PSD Class II increments. The ISCST3 model can predict short-term and long-term concentrations from multiple stacks in rural or urban areas. The ISCST3 air dispersion model can also account for the effects of aerodynamic downwash of a stack's plume by nearby structures. The ISCST3 air dispersion model accepts hourly meteorological data to define the conditions for plume rise, transport, and dispersion. The model estimates the concentration for each source and receptor combination for each hour.

The ISCST3 air dispersion model has various options to simulate a variety of dispersion conditions for emissions from a stack or non-stack source. The U.S. EPA has recommended various default options to be used in dispersion modeling for regulatory purposes. These recommended regulatory default options have been used in the air quality impact analysis as follows:

- Stack-tip downwash,

- Final plume rise,
- Buoyancy-induced dispersion (BID),
- Vertical potential temperature gradients of 0.0, 0.0, 0.0, 0.0, 0.02 and 0.035 for stability classes A through F, respectively,
- Automatic treatment of calms,
- Wind profile exponents of 0.07, 0.07, 0.10, 0.15, 0.35, and 0.55 for stability classes A through F, respectively,
- Infinite pollutant half-life,
- Upper bound value for "supersquat" buildings,
- Missing data processing not used.

4.1.2 CALPUFF Model

The CALPUFF air dispersion modeling system (Version 5.76) was used to predict the air quality impacts at four Federal Class I areas located within 300 kilometers of the SCC Plant. The CALPUFF model has been used in a screening mode (known as CALPUFF Lite) in a manner that is consistent with the guidance contained in the "Inter-Agency Workgroup on Air Quality Modeling (IWAQM) Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts" (U.S. EPA 1998) and the Federal Land Managers' Air Quality Related Values Workgroup (FLAG), Phase I Report (U.S. FS, NPS, U.S. FWS, 2000). The CALPUFF model is a non-steady state puff dispersion model. The CALPOST program post-processes the CALPUFF model outputs, calculating and summarizing visibility impacts, concentration levels, and deposition amounts. Given the nature of terrain in Florida, the flat terrain option has been used. Other specific CALPUFF model options have been selected in accordance with regulatory guidance (U.S. EPA 1998).

All stipulated CALPUFF "regulatory default" options were chosen. However, SCC has utilized the following CALPUFF modeling options:

- Based on recent guidance from the "Initial Draft of the BART Modeling Protocol for VISTAS," dated January 31, 2005, a Rayleigh scattering coefficient of 12 Mm^{-1} for clean air was selected for use instead of the default value of 10 Mm^{-1}. This 12 Mm^{-1} value was chosen because the default value is appropriate for an elevation of 1,600 meters (approximately

5,000 feet). The corrected value at sea level, representative of the elevation of the SCC Plant (approximately 100 feet above sea level) is about 12 Mm^{-1}. The default value could never be realized at a low altitude site and the relative impact of a source on haze would be overstated using the default Rayleigh value.

- Hourly ozone for 2004 from the EPA SLAMS ozone monitor located in Pasco County was obtained from the EPA. These data were post-processed into monthly average ozone values and used as input to the CALPUFF model. The ozone data from this monitoring site is the closest and most representative of existing ambient ozone concentrations in the vicinity of the SCC Plant. These data were used in lieu of the CALPUFF monthly default value of 80 ppb.
- An Ammonia background of 0.5 ppb was selected for use in the Class I modeling analyses since it represents forested areas per the IWAQM/FLAG and Earth Tech guidance. The land use classification from the SCC Plant to, and including the four Class I areas, is most representative of a forested area, as opposed to the default CALPUFF value of 10 ppb for Ammonia which represent grasslands.

4.2 EMISSION CHARACTERISTICS

The stack characteristics for the SCC Plant sources that have been used as inputs to all dispersion models are those reflecting the final engineering design of the SCC Plant.

Per guidance provided by the National Stone, Sand and Gravel Association, SCC has used the height of the haul trucks as the release height, which was four meters for the calculation of fugitive emissions. The actual dimensions of the haul trucks range from 3.5 to 4.75 meters and from 75 to 100 feet in length.

4.3 LAND USE

The land use classification for the area was based on a quantitative review of land use patterns surrounding the SCC Plant. For the quantitative review, 1:250,000 scale USGS Level 2 digital land use data were used. The land use analysis followed the procedures recommended by the U.S. EPA (U.S. EPA 1999) and the typing scheme developed by Auer (Auer 1978). The Auer technique established four primary land use types: industrial, commercial, residential, and agricultural. Industrial, commercial, and compact residential areas are classified as urban, while agricultural and common residential areas are considered rural. For air quality modeling purposes, an area is defined as urban if more than 50 percent of the surface within three kilometers of the source falls under an urban land use type. Otherwise, the area is determined to be rural.

As shown in Figures 4-1 through 4-4, the quantitative land use analysis indicated that the area surrounding the SCC Plant is largely rural. The residential areas shown in Figure 4-1 are classified as urban according to the Level 2 gridded digital land use data. Figure 4-2 hows the rural land use of the surrounding area using aerial photography. Figure 4-3 is an aerial out view of the surround area consistent with forested areas. Figure 4-4 provides an aerial view of the surround area in relation to Class I Areas. Based on the rural land use designation, rural dispersion coefficients will be used to predict the ambient air concentrations due to emissions from the stacks.

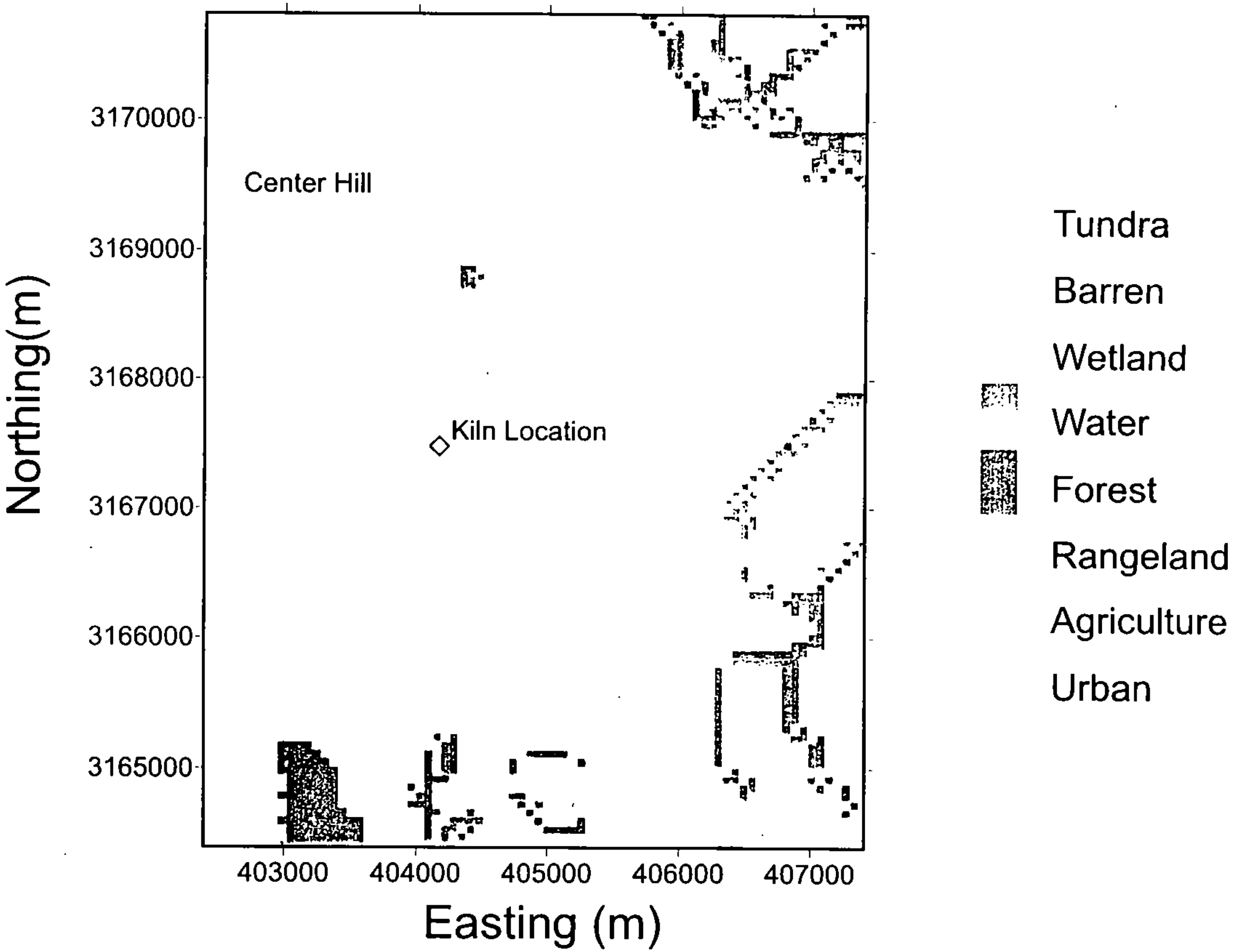


Figure 4-1 Land Use Analysis

Figure 4-2 Aerial photograph depicting surrounding land use in the immediate vicinity of SCC

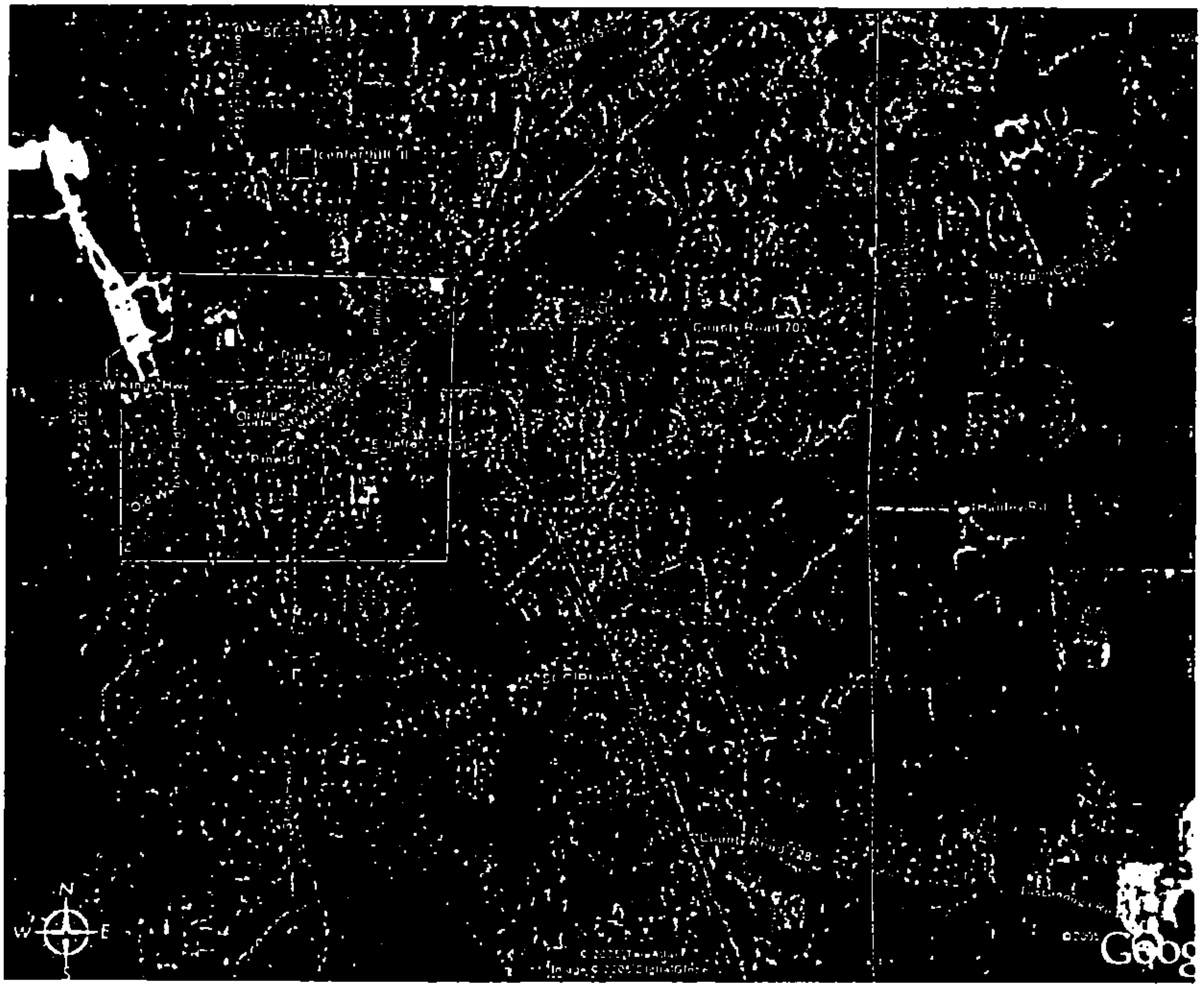


Figure 4-3 Zoomed out view of aerial photograph depicting surrounding land use in the vicinity of SCC - *(consistent with forested areas)*

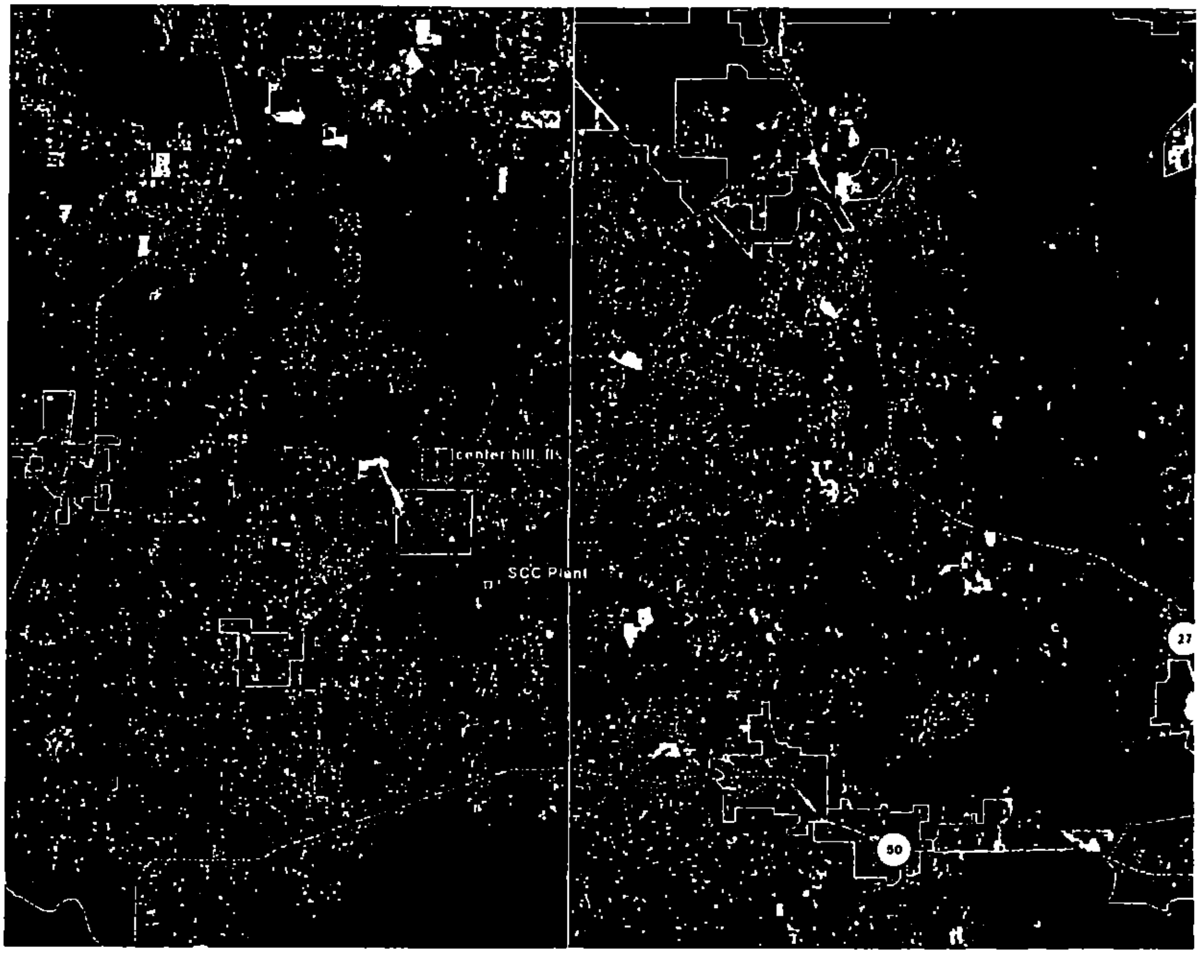
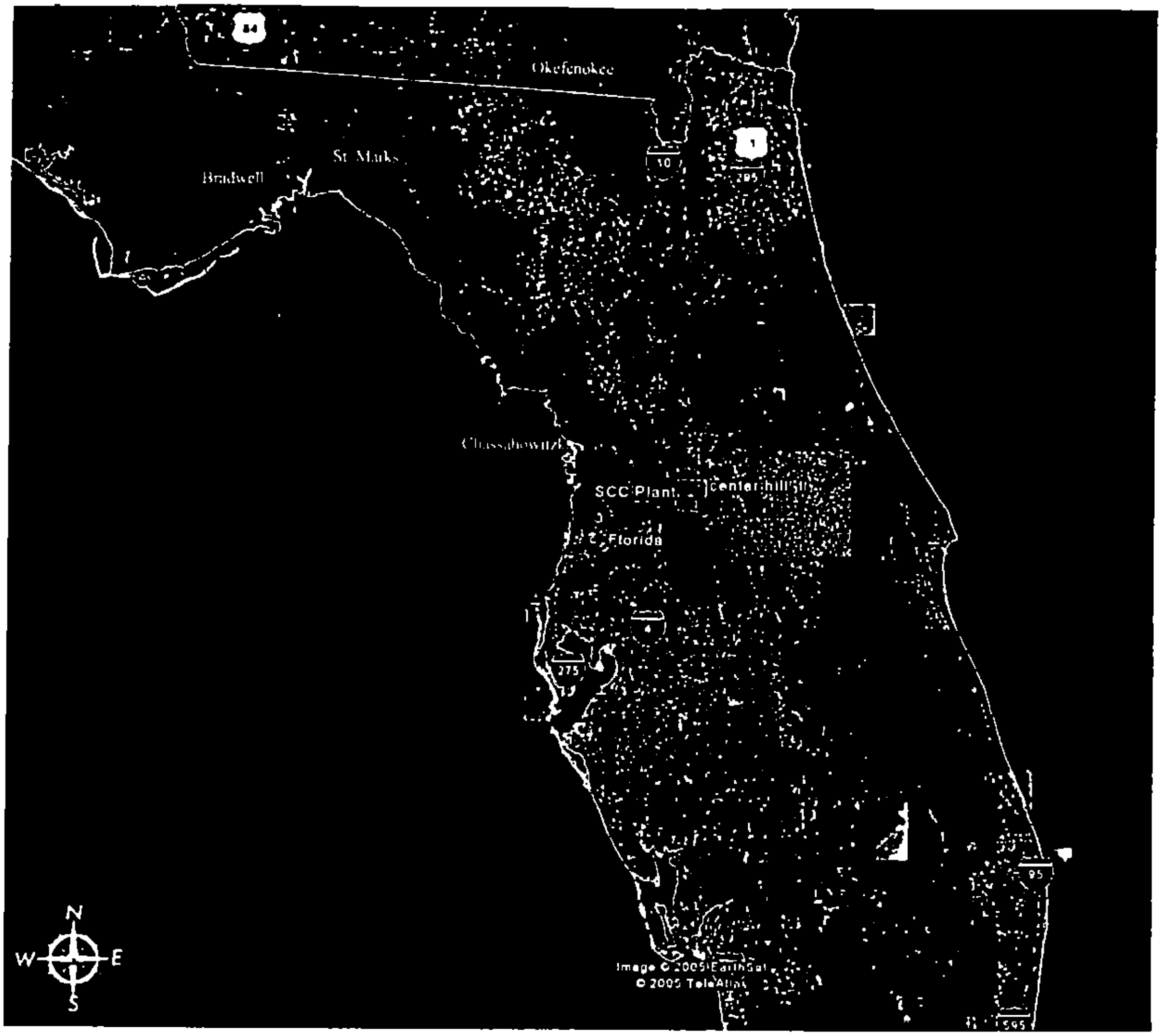


Figure 4-4 Aerial photograph showing predominant land use between SCC and Class I Areas - *(consistent with forested areas)*



4.4 RECEPTOR GRID

4.4.1 ISCST3 Model Receptors

The receptor network for the ISCST3 analysis, at a minimum, covers a square region 20 kilometer on a side, centered on the SCC Plant. All receptors have been referenced to the UTM coordinate system (Zone 17), using the WGS-84 Ellipsoid. A rectangular Cartesian coordinate receptor grid has been used as the main receptor grid. The main receptor grid has been centered on the new kiln stack (origin). The following grid spacing has been used:

- 100 meters from the origin out to 2 kilometers (km)
- 500 meters from 2 km out to 5 km; and
- 1,000 meters from 5 km out to 10 km.

In addition to the rectangular Cartesian coordinate receptor grid, a set of property line receptors have been prepared to represent the boundary of the SCC Plant property. The property line receptors have been placed at 25 meter intervals along the boundary. Cartesian receptors that are inside the facility property have been excluded from the full receptor grid. Figure 4-2 shows an approximation of the inner portion of the full Cartesian grid, with the receptor spacing. Also, if at any receptors which are not part of the 100-meter grid spacing results in a predicted concentration that is within 10 percent of the predicted maximum value for that pollutant and averaging time, a 100 meter receptor grid have been utilized around that predicted concentration to identify the highest predicted concentration with the 100-meter receptor grid.

Terrain elevations have not been assigned to receptors included in the ISCST3 air dispersion modeling analysis. Flat terrain has been assumed.

Figure 4-5
Inner Portion of Receptor Grid

4.4.2 CALPUFF Model Receptors

For CALPUFF run in the screening mode, FLM guidance recommends that a polar grid receptor network be used. As a result, a polar grid with distances from the SCC Plant that match the closest and furthest distances from the SCC Plant to the four surrounding Federal Class I areas has been used. This has resulted in eight rings of receptors at downwind distances of 61, 72, 216, 252, 272, 289, 298, and 309 kilometers. These eight rings have a receptor located at every degree resulting in 360 receptors per ring. Per FLM guidance using CALPUFF in the screening mode, the maximum impact on any given ring has been evaluated, regardless of direction.

4.5 METEOROLOGICAL DATA

4.5.1 ISCST3 Model

The hourly meteorological data for the ISCST3 analysis consists of five years (1991-1995) of surface data from the National Weather Service (NWS) station located at the Tampa International Airport (Station No. 12842). The source of the five years of upper air data (1991-1995) to be used in mixing height calculations is from the National Weather Service (NWS) station at Tampa International Airport, Florida (Station No. 72210). Tampa is the nearest upper air station to the SCC Plant. The surface meteorological data has been combined with coincident mixing heights derived by merging surface temperatures with the concurrent twice-daily rawinsonde data obtained from the Tampa International Airport.

Missing wind speed or wind direction data has been replaced with calm data (i.e., 1 meter/second wind speed and the same wind direction as the preceding hour). Missing temperature data has been replaced with an average of the previous valid hour and the next, non-missing hour. Multiple hours of missing temperature data has been replaced by climatological average daily temperatures. A single missing mixing height has been replaced with an average of the preceding and subsequent hours. Multiple hours of missing twice-daily mixing heights has been replaced with the monthly average mixing height. The use of the monthly average mixing height helps to incorporate into the meteorological database any monthly pattern that might exist.

4.5.2 CALPUFF Model

The hourly meteorological data for the CALPUFF run in the screening mode analysis consists of five years (1986-1990) of surface data from the National Weather Service (NWS) station located at the Tampa International Airport. The source of the five years of upper air data (1986-1990) to be used in mixing height calculations is also from the National Weather Service (NWS) station at Tampa International Airport, with the addition of the parameters necessary for CALPUFF to perform deposition calculations: surface roughness, friction velocity, and Monin-Obukhov length.

5. AIR QUALITY IMPACTS ANALYSIS

5.1 SIGNIFICANT IMPACT AREA ANALYSIS

The significant impact area (SIA) is the geographical area in which a "significant" ambient impact is predicted to occur associated with the PTE emissions of SO_2, NO_x, CO, TSP, and PM_{10} emitted from the operation of the SCC Plant. Each of these pollutants, for each applicable averaging time, has been assessed to determine if a SIA exists. The SIA modeling for the SCC Plant was conducted using the ISCST3 and CALPUFF models.

Table 5-1 presents the established significance impact levels (SILs) of air quality impacts on PSD Class I areas are those proposed by EPA on July 23, 1996 at 61 FR 38292. Table 5-2 presents the established SILs of air quality impacts on PSD Class II areas as presented in the U.S. EPA New Source Review Workshop Manual, Draft, October 1990.

Table 5-1
Significance Levels for Air Quality Impacts in Class I Areas
(μg/m^3)

POLLUTANT	ANNUAL	24-HOUR	3-HOUR
SO_2	0.1	0.2	1.0
TSP	-	-	-
PM_{10}	0.2	0.3	-
NO_X	0.1	-	-
CO	-	-	-

Table 5-2
Significance Levels for Air Quality Impacts in Class II Areas
($\mu g/m^3$)

POLLUTANT	ANNUAL	24-HOUR	8-HOUR	3-HOUR	1-HOUR
SO_2	1	5	-	25	-
TSP	1	5	-	-	-
PM_{10}	1	5	-	-	-
NO_X	1	-	-	-	-
CO	-	-	500	-	2,000
O_3	-	-	-	-	See Note

NOTE:
NO SIGNIFICANT AMBIENT IMPACT CONCENTRATION HAS BEEN ESTABLISHED.

5.1.1 Class I Areas

A Class I significant impact analysis assessing potential-to-emit (PTE) emissions from the SCC Plant was conducted using the CALPUFF model run in the screening mode. Tables 5-3 presents the highest predicted impacts over the five years assessed that occurred at the Chassahowitzka Class I area located within 61 kilometers of the SCC Plant. All other predicted impacts at the other three Class I areas were less than those reported in Table 5-3 for the Chassahowitzka Class I area. Specifically, Tables 5-3 provides an analysis of the 3-hour, 24-hour, and annual averaging periods, respectively. As shown by Table 5-3, the maximum predicted impacts for all applicable pollutants and averaging times are all less than their applicable SILs and no further Class I PSD increment modeling is required.

Table 5-3
Class I SIA Analysis
($\mu g/m^3$)

3-HOUR CLASS I SIA ANALYSIS			
POLLUTANT	**CALPUFF 3-HOUR**	**SIGNIFICANCE LEVEL 3- HOUR**	**SIGNIFICANCE LEVEL EXCEEDED?**
CO	N/A	NO SIGNIFICANCE LEVEL	N/A
SO_2	0.36	1.0	NO
NO_x	N/A	NO SIGNIFICANCE LEVEL	N/A
PM_{10}	N/A	NO SIGNIFICANCE LEVEL	N/A

24-HOUR CLASS I SIA ANALYSIS			
POLLUTANT	**CALPUFF 24-HOUR**	**SIGNIFICANCE LEVEL 24- HOUR**	**SIGNIFICANCE LEVEL EXCEEDED?**
CO	N/A	NO SIGNIFICANCE LEVEL	N/A
SO_2	0.16	0.2	NO
NO_x	N/A	NO SIGNIFICANCE LEVEL	N/A
PM_{10}	0.23	0.3	NO

ANNUAL CLASS I SIA ANALYSIS			
POLLUTANT	**CALPUFF ANNUAL**	**SIGNIFICANCE LEVEL ANNUAL**	**SIGNIFICANCE LEVEL EXCEEDED?**
CO	N/A	NO SIGNIFICANCE LEVEL	N/A
SO_2	0.009	0.1	NO
NO_x	0.06	0.1	NO
PM_{10}	0.02	0.2	NO

5.2 CLASS II AREAS

Table 5-4 presents a summary of the Class II SIA analysis performed for the SCC Plant.

Table 5-4
Class II SIA Analysis
(μg/m^3)

1-HOUR CLASS II SIA ANALYSIS			
POLLUTANT	**ISCST3 1-HOUR**	**SIGNIFICANCE LEVEL 1- HOUR**	**SIGNIFICANCE LEVEL EXCEEDED?**
CO	95.75	2,000	NO
SO_2	N/A	NO SIGNIFICANCE LEVEL	N/A
NO_x	N/A	NO SIGNIFICANCE LEVEL	N/A
PM_{10}	N/A	NO SIGNIFICANCE LEVEL	N/A
TSP	N/A	NO SIGNIFICANCE LEVEL	N/A

3-HOUR CLASS II SIA ANALYSIS			
POLLUTANT	**ISCST3 3-HOUR**	**SIGNIFICANCE LEVEL 3- HOUR**	**SIGNIFICANCE LEVEL EXCEEDED?**
CO	N/A	NO SIGNIFICANCE LEVEL	N/A
SO_2	3.08	25	NO
NO_x	N/A	NO SIGNIFICANCE LEVEL	N/A
PM_{10}	N/A	NO SIGNIFICANCE LEVEL	N/A
TSP	N/A	NO SIGNIFICANCE LEVEL	N/A

8-HOUR CLASS II SIA ANALYSIS			
POLLUTANT	**ISCST3 8-HOUR**	**SIGNIFICANCE LEVEL 8- HOUR**	**SIGNIFICANCE LEVEL EXCEEDED?**
CO	21.64	500	NO
SO_2	N/A	NO SIGNIFICANCE LEVEL	N/A
NO_x	N/A	NO SIGNIFICANCE LEVEL	N/A
PM_{10}	N/A	NO SIGNIFICANCE LEVEL	N/A
TSP	N/A	NO SIGNIFICANCE LEVEL	N/A

24-HOUR CLASS II SIA ANALYSIS			
POLLUTANT	**ISCST3 24-HOUR**	**SIGNIFICANCE EVEL 24- HOUR**	**SIGNIFICANCE LEVEL EXCEEDED?**
CO	N/A	NO SIGNIFICANCE LEVEL	N/A
SO_2	0.71	5	NO
NO_x	N/A	NO SIGNIFICANCE LEVEL	N/A
PM_{10}	62.07	5	YES
TSP	135.05	5	YES

ANNUAL CLASS II SIA ANALYSIS			
POLLUTANT	ISCST3 ANNUAL	SIGNIFICANCE LEVEL ANNUAL	SIGNIFICANCE LEVEL EXCEEDED?
CO	N/A	NO SIGNIFICANCE LEVEL	N/A
SO_2	0.05	1	NO
NO_x	0.35	1	NO
PM_{10}	13.00	1	YES
TSP	40.74	1	YES

As shown by Table 5-4, PM_{10} and TSP were the only pollutants to have a predicted highest concentration greater than the established corresponding significance level. A maximum annual PM_{10} concentration of 13.00 $\mu g/m^3$ was predicted to occur at a distance of one kilometer from the SCC Plant. It should be noted that this maximum value occurred within the SCC Plant boundary and does not represent the maximum predicted offsite concentration which is discussed in later sections. The annual PM_{10} concentration did not fall below the annual PM_{10} significance level of 1.0 $\mu g/m^3$ until a distance of approximately 4 kilometers was reached from the SCC Plant. A maximum annual TSP concentration of 40.74 $\mu g/m^3$was predicted to occur at a distance of 1 kilometer from the SCC Plant. The annual TSP concentration did not fall below the annual TSP significance level of 1.0 $\mu g/m^3$ until a distance of approximately 7 kilometers was reached from the SCC Plant.

A maximum 24-hour PM_{10} concentration of 62.07 $\mu g/m^3$ was predicted to occur at a distance of one kilometer from the SCC Plant. It should be noted that this maximum value occurred within the SCC Plant boundary and does not represent the maximum predicted offsite concentration which is discussed in later sections. The 24-hour PM_{10} concentration did not fall below the 24-hour PM_{10} significance level of 5.0 $\mu g/m^3$ until a distance of approximately 5.5 kilometers was reached from the SCC Plant. A maximum 24-hour TSP concentration of 135.05 $\mu g/m^3$was predicted to occur at a distance of 1 kilometer from the SCC Plant. The 24-hour TSP concentration did not fall below the 24-hour TSP significance level of 5.0 $\mu g/m^3$ until a distance of approximately 10 kilometers was reached from the SCC Plant. As shown by Table 5-4, all other modeled pollutants (NO_x, SO_2, and CO) were below their corresponding SILs.

To determine the NAAQS and PSD Class II increment modeling domain for PM_{10} and TSP, 50 kilometers was added to the maximum PM_{10} and TSP SIA distance of 10 kilometers per U.S. EPA guidance. Therefore, a 60 kilometer SIA or modeling domain was calculated to represent the modeling domain for both PM_{10} and TSP.

Since TSP is no longer a regulated air pollutant in Florida, only PM_{10} will need to undergo a refined modeling analysis. The results of the refined modeling for PM_{10} are presented in later sections of this report.

5.3 PRE-CONSTRUCTION MONITORING ANALYSIS

The results of Table 5-4 were used to assess whether the SCC Plant would be subject to pre-construction monitoring requirements. Table C-3 of the New Source Review Workshop Manual, Draft 1990, was used to determine significant monitoring concentrations. Specifically, for SO_2, the maximum 24-hour concentration was predicted to be 0.71 $\mu g/m^3$ which is less than the EPA and FDEP significant 24-hour monitoring concentration of 13 $\mu g/m^3$. For PM_{10} the maximum modeled 24-hour concentration was 29.77 $\mu g/m^3$. This value is greater than the EPA and FDEP significant 24-hour monitoring concentration of 10 $\mu g/m^3$ for PM_{10}. For NO_x, the maximum annual concentration was predicted to be 0.35 $\mu g/m^3$ which is less than the EPA and FDEP significant annual monitoring concentration of 14 $\mu g/m^3$. For CO, the maximum modeled 8-hour CO concentration was predicted to be 21.64 $\mu g/m^3$ which is less than the EPA and FDEP significant 8-hour monitoring concentration of 575 $\mu g/m^3$.

Only PM_{10} exceeded the significant monitoring concentrations. Only PM_{10} would be potentially subject to pre-construction monitoring requirements if the 24-hour background PM_{10} concentration was also above the monitoring de minimus 24-hour value of 10 $\mu g/m^3$. A summary of background PM_{10} data is provided in Table 5-5. As shown by Table 5-5, the 24-hour PM_{10} background value used in the NAAQS analysis presented in Section 5.3 is 50.4 $\mu g/m^3$

which is above the 10 μg/m^3 24-hour significant monitoring concentration. As a result, PM_{10} pre-construction monitoring is expected by SCC to be potentially required by the FDEP.

5.4 NAAQS COMPLIANCE ANALYSIS

The NSR regulations require that a NAAQS Compliance demonstration be provided. The demonstration requires that the PTE PM_{10} SCC Plant emissions when modeled with other applicable PM_{10} sources in the SIA and then adding a representative background concentration to the predicted modeling results do not exceed the 24-hour and annual PM_{10} NAAQS. For other applicable sources, PM_{10} PTE air emission inventories were provided by Florida DEP for the 13 counties surrounding the SCC Plant. The air emission sources contained in the PM_{10} SIA were then screened using the FDEP approved "*20D Rule*". Each "source" defined in the PM_{10} NAAQS inventory was assessed using a facility-wide summary of emissions from all of the individual facility air emission sources. If the facility total annual PTE PM_{10} emissions were greater than 20 times the distance in kilometers from the facility to the SCC Plant, the total facility emissions were included as part of the NAAQS modeling emissions inventory.

Representative background PM_{10} data was obtained from the Florida Air Monitoring Report – 2003. Five years (1999 – 2003) of PM_{10} ambient monitoring data collected within the 13 counties surrounding the SCC Plant were used to develop a 24-hour PM_{10} background value of 50.4 μg/m^3 and an annual PM_{10} background value of 23.1 μg/m^3. These data are presented in Table 5-5 on the following page.

Table 5-5
Summary of Representative PM$_{10}$ Ambient Air Quality Monitoring Data

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m^3)	
						24-HOUR[1]	ANNUAL[2]
PM$_{10}$	HILLSBOROUGH	TAMPA	057-0030	URBAN	2003	25.0	20.0
					2002	32.0	20.0
					2001	45.0	24.0
					2000	44.0	24.0
					1999	45.0	24.0
AVERAGE						**38.2**	**22.4**

1 REPRESENT THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENT THE HIGHEST ANNUAL AVERAGE CONCENTRATION

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m^3)	
						24-HOUR[1]	ANNUAL[2]
PM$_{10}$	HILLSBOROUGH	GIBSONTON	057-0066	NEIGHBORHOOD	2003	64.0	27.0
					2002	55.0	25.0
					2001	59.0	30.0
					2000	73.0	33.0
					1999	81.0	35.0
AVERAGE						**66.4**	**30.0**

1 REPRESENT THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENT TH HIGHEST ANNUAL AVERAGE CONCENTRATION

Table 5-5 continued
Summary of Representative PM_{10} Ambient Air Quality Monitoring Data

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m^3)	
						24-HOUR[1]	ANNUAL[2]
PM_{10}	HILLSBOROUGH	NO CITY	057-0083	MIDDLE	2003	58.0	25.0
					2002	38.0	22.0
					2001	44.0	25.0
					2000	38.0	25.0
					1999	39.0	24.0
AVERAGE						**43.4**	**24.2**

1 REPRESENT THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENT THE HIGHEST ANNUAL AVERAGE CONCENTRATION

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m^3)	
						24-HOUR[1]	ANNUAL[2]
PM_{10}	HILLSBOROUGH	NO CITY	057-0085	NEIGHBORHOOD	2003	37.0	20.0
					2002	33.0	19.0
					2001	53.0	24.0
					2000	35.0	23.0
					1999	35.0	20.0
AVERAGE						**38.6**	**21.2**

1. REPRESENT THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENT THE HIGHEST ANNUAL AVERAGE CONCENTRATION

Table 5-5 continued
Summary of Representative PM_{10} Ambient Air Quality Monitoring Data

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m^3)	
						24-HOUR[1]	ANNUAL[2]
PM_{10}	HILLSBOROUGH	GANNON	057-0095	NEIGHBORHOOD	2003	61.0	26.0
					2002	39.0	22.0
					2001	45.0	26.0
					2000	44.0	27.0
					1999	49.0	27.0
AVERAGE						**47.6**	**25.6**

1. REPRESENT THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENT THE HIGHEST ANNUAL AVERAGE CONCENTRATION

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m^3)	
						24-HOUR[1]	ANNUAL[2]
PM_{10}	HILLSBOROUGH	TAMPA	057-1002	NEIGHBORHOOD	2003	44.0	25.0
					2002	40.0	24.0
					2001	56.0	29.0
					2000	145.0	29.0
					1999	47.0	26.0
AVERAGE						**66.4**	**26.6**

1 REPRESENT THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENT THE HIGHEST ANNUAL AVERAGE CONCENTRATION

Table 5-5 continued
Summary of Representative PM$_{10}$ Ambient Air Quality Monitoring Data

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m^3)	
						24-HOUR[1]	ANNUAL[2]
PM$_{10}$	HILLSBOROUGH	TAMPA	057-1035	NEIGHBORHOOD	2003	52.0	23.0
					2002	56.0	24.0
					2001	52.0	25.0
					2000	66.0	26.0
					1999	51.0	25.0
AVERAGE						**55.4**	**24.6**

1. REPRESENT THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENT THE HIGHEST ANNUAL AVERAGE CONCENTRATION

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m^3)	
						24-HOUR[1]	ANNUAL[2]
PM$_{10}$	HILLSBOROUGH	TAMPA	057-1068	NEIGHBORHOOD	2003	19.0	15.0
					2002	29.0	17.0
					2001	40.0	20.0
					2000	32.0	20.0
					1999	39.0	20.0
AVERAGE						**31.8**	**18.4**

1. REPRESENT THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENT THE HIGHEST ANNUAL AVERAGE CONCENTRATION

Table 5-5 continued
Summary of Representative PM$_{10}$ Ambient Air Quality Monitoring Data

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m^3)	
						24-HOUR[1]	**ANNUAL[2]**
PM$_{10}$	HILLSBOROUGH	TAMPA	057-1069	NEIGHBORHOOD	2003	42.0	23.0
					2002	38.0	22.0
					2001	54.0	28.0
					2000	47.0	28.0
					1999	51.0	28.0
AVERAGE						**46.4**	**25.8**

1. REPRESENT THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENT THE HIGHEST ANNUAL AVERAGE CONCENTRATION

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m^3)	
						24-HOUR[1]	**ANNUAL[2]**
PM$_{10}$	HILLSBOROUGH	TAMPA	057-1070	MIDDLE	2003	56.0	27.0
					2002	47.0	27.0
					2001	59.0	28.0
					2000	50.0	30.0
					1999	47.0	28.0
AVERAGE						**51.8**	**28.0**

1. REPRESENT THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENT THE HIGHEST ANNUAL AVERAGE CONCENTRATION

Table 5-5 continued
Summary of Representative PM_{10} Ambient Air Quality Monitoring Data

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m³)	
						24-HOUR[1]	ANNUAL[2]
PM_{10}	HILLSBOROUGH	BRANDON	057-2002	NEIGHBORHOOD	2003	41.0	22.0
					2002	35.0	20.0
					2001	103.0	29.0
					2000	43.0	25.0
					1999	37.0	22.0
AVERAGE						51.8	23.6

1. REPRESENT THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENT THE HIGHEST ANNUAL AVERAGE CONCENTRATION

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m³)	
						24-HOUR[1]	ANNUAL[2]
PM_{10}	LAKE	ASTOR PARK	069-0001	URBAN	2003	39.0	17.0
					2002	33.0	16.0
					2001	57.0	18.0
					2000	53.0	20.0
					1999	49.0	19.0
AVERAGE						46.2	18.0

1. REPRESENT THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENT THE HIGHEST ANNUAL AVERAGE CONCENTRATION

Table 5-5 continued
Summary of Representative PM_{10} Ambient Air Quality Monitoring Data

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m³)	
						24-HOUR[1]	ANNUAL[2]
PM_{10}	POLK	MULBERRY	105-0010	NEIGHBORHOOD	2003	42.0	20.0
					2002	38.0	18.0
					2001	121.0	23.0
					2000	121.0	22.0
					1999	42.0	22.0
AVERAGE						**72.8**	**21.0**

1. REPRESENT THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION

2 REPRESENT THE HIGHEST ANNUAL AVERAGE CONCENTRATION

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION (µg/m³)	
						24-HOUR[1]	ANNUAL[2]
PM_{10}	POLK	MULBERRY	105-2006	NEIGHBORHOOD	2003	49.0	20.0
					2002	78.0	21.0
					2001	59.0	21.0
					2000	45.0	23.0
					1999	50.0	22.0
AVERAGE						**56.2**	**21.4**

1 REPRESENT THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2 REPRESENT THE HIGHEST ANNUAL AVERAGE CONCENTRATION

Table 5-5 continued
Summary of Representative PM_{10} Ambient Air Quality Monitoring Data

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION ($\mu g/m^3$)	
						24-HOUR[1]	ANNUAL[2]
PM_{10}	SEMINOLE	SANFORD	117-1002	NEIGHBORHOOD	2003	47.0	18.0
					2002	38.0	18.0
					2001	52.0	20.0
					2000	32.0	18.0
					1999	34.0	18.0
AVERAGE						40.6	18.4

1 REPRESENT THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2. REPRESENT THE HIGHEST ANNUAL AVERAGE CONCENTRATION

POLLUTANT	COUNTY	MONITOR LOCATION	MONITOR NAME	MONITOR TYPE	YEAR	CONCENTRATION ($\mu g/m^3$)	
						24-HOUR[1]	ANNUAL[2]
PM_{10}	VOLUSIA	DAYTONA BEACH	127-5002	NEIGHBORHOOD	2003	53.0	19.0
					2002	39.0	18.0
					2001	67.0	22.0
					2000	53.0	21.0
					1999	54.0	21.0
AVERAGE						53.2	20.2

1. REPRESENT THE HIGHEST 2ND HIGHEST 24-HOUR AVERAGE CONCENTRATION
2 REPRESENT THE HIGHEST ANNUAL AVERAGE CONCENTRATION

TOTAL PM_{10} AVERAGE FROM ALL MONITORING LOCATIONS	50.4	23.1

Table 5-6 shows a summary of the highest annual and highest second-highest 24-hour impacts combined with the background concentrations for PM_{10}. As shown by Table 5-6, the predicted impacts for each applicable averaging period for PM_{10} are less than the applicable NAAQS. Therefore, it is concluded that compliance with the 24-hour and annual PM_{10} NAAQS is demonstrated.

Table 5-6
PM_{10} NAAQS Analysis ($\mu g/m^3$)

Averaging Period	ISCST3 Results	Background	Total (Results + Background)	PM_{10} NAAQS	PM_{10} NAAQS Exceeded?
Annual – 1991	6.29	23.10	29.39	50.0	No
Annual – 1992	6.81	23.10	29.91	50.0	No
Annual – 1993	6.91	23.10	30.01	50.0	No
Annual – 1994	6.47	23.10	29.57	50.0	No
Annual – 1995	7.02	23.10	30.12	50.0	No
24 hour – 1991	24.77	50.40	75.17	150.0	No
24 hour – 1992	29.69	50.40	80.09	150.0	No
24 hour – 1993	29.77	50.40	80.17	150.0	No
24 hour – 1994	24.89	50.40	75.29	150.0	No
24 hour – 1995	25.53	50.40	75.93	150.0	No

5.5 PSD INCREMENT ANALYSIS

ISCST3 was used to model near field (within 50 kilometers of the SCC Plant) and CALPUFF in the screening mode was used to model for distances greater than 50 kilometers of the SCC Plant. To be conservative, the same PM_{10} emission sources used in the NAAQS analysis was used in the PSD PM_{10} increment analysis.

5.5.1 CLASS I AREAS

As shown by Table 5-3, the impacts from the PTE emissions of the SCC Plant are less than the applicable proposed EPA SILs and thus, no further Class I PSD increment modeling is required.

5.5.2 CLASS II AREAS

This analysis included all SCC Plant PM_{10} emission and those PM_{10} increment consuming emission sources identified in the 20D analysis used for the PM_{10} NAAQS analysis. By using the PM_{10} NAAQS 20D emissions inventory, the PM_{10} increment analysis is considered conservative in nature.

The increment analysis was performed using the modeling techniques of the ISCST3 Model described earlier in this report. Table 5-7 presents the Class II PM_{10} increment analysis for each applicable averaging period at the highest annual and the highest second-highest 24-hour concentrations for each year of meteorological data. As shown by Table 5-7, the SCC Plant has demonstrated compliance with meeting the PSD PM_{10} Class II increment requirements.

Table 5-7
PSD Class II Increment PM_{10} Analysis ($\mu g/m^3$)

Averaging Period	ISCST3 Results	PSD Class II Increment	PSD Class II Increment Exceeded?	Location in UTM (km)
Annual – 1991	6.29	17.00	No	404.589, 3167.572
Annual – 1992	6.81	17.00	No	404.589, 3167.572
Annual – 1993	6.91	17.00	No	404.589, 3167.572
Annual – 1994	6.47	17.00	No	404.589, 3167.572
Annual – 1995	7.02	17.00	No	404.589, 3167.572
24 hour – 1991	24.77	30.00	No	404.575, 3167.547
24 hour – 1992	29.69	30.00	No	404.575, 3167.547
24 hour – 1993	29.77	30.00	No	404.814, 3167.727
24 hour – 1994	24.89	30.00	No	404.575, 3167.522
24 hour – 1995	25.53	30.00	No	402.626, 3166.636

5.6 VISIBILITY IMPACT ANALYSIS

An assessment of potential project impacts on visibility and other air quality related values (AQRV) in Federal Class I areas is a requirement for PSD projects. Air quality impacts at Federal Class I areas must be assessed under recent FLM guidance if they are within 300 kilometers of the PSD source.

The Federal Class I area closest to the SCC Plant is the Chassahowitzka National Wildlife Refuge located approximately 61 km to the west of the SCC Plant. Three other Federal Class I areas are within 300 kilometers of the SCC Plant. These include the Okefenokee National Wildlife Refuge (NWR) (219 km), Saint Marks NWR (250 km), and the Bradwell Bay Wilderness Area (297 km). The location of these four areas relative to the SCC Plant is depicted in Figure 5-1. As shown in Figure 5-1, there are no other Class I areas within 300 kilometers of the SCC Plant.

Additionally, a change of extinction (delta b_{ext}) of five percent is proposed to be used as a threshold value to determine whether the SCC Plant (modeled as a single source using CALPUFF-Lite) has a significant impact to visibility impairment at the four surrounding Class I areas. The five percent change of extinction value is consistent with recent FLM reviews of major source permit-to-construct applications from other cement plants projects located in Florida and Arizona.

Table 5-8 presents the results of the visibility analysis performed for the SCC Plant on the four Class I areas within 300 kilometers of the SCC Plant. As shown by Table 5-8, the SCC is predicted to produce a change in extinction coefficient (i.e., visibility impairment) of less than five percent over a 24-hour period for each year of the five years modeled at each of the four Class I areas assessed. As a result, the proposed SCC Plant is predicted to have an acceptable level of visibility impairment to the surrounding four Class I areas.

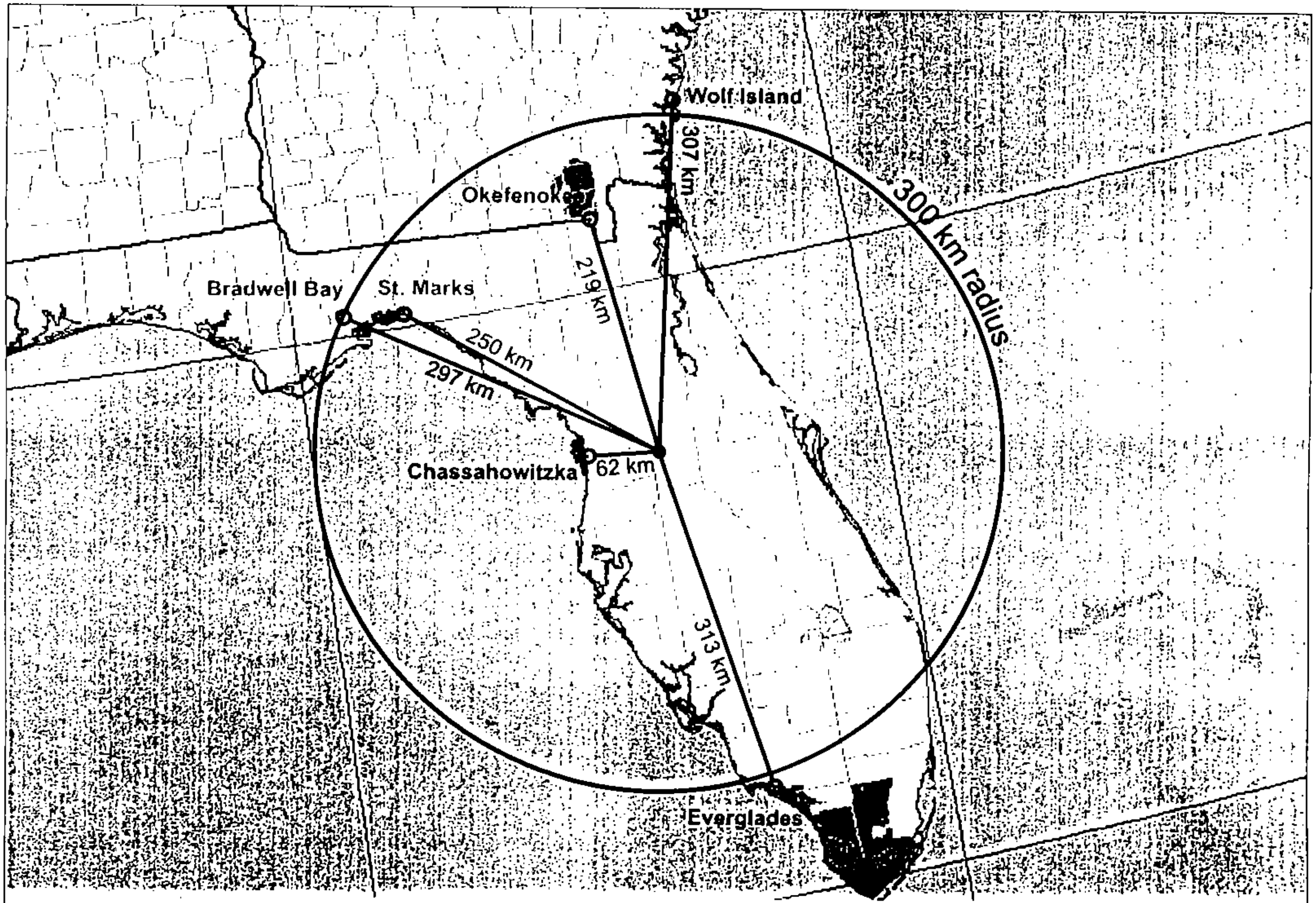


Figure 5-1
Surrounding Class I Areas

Table 5-8
Class I Area Visibility Impairment Analysis – Maximum Percent Change in Extinction Coefficient

Class I Area	Year of Meteorological Data				
	1986	1987	1988	1989	1990
Bradwell Bay	1.47%	1.23%	2.17%	1.07%	1.26%
Chasshowitka	4.05%	2.07%	3.26%	4.10%	2.08%
Okefenokee	2.71%	1.21%	2.59%	1.61%	1.35%
St. Marks	2.09%	2.53%	2.53%	1.72%	1.27%
Recommended Maximum Extinction Change	5%	5%	5%	5%	5%

5.7 SULFATE/NITRATE DEPOSITION ANALYSIS

For the sulfate/nitrate deposition analysis, modeling was performed for the Class I areas following using the CALPUFF model run in the screening mode. Table 5-9 presents the annual deposition values for each Class I area compared to the Deposition Analysis Threshold (DAT) for sulfur and nitrogen deposition as specified in a letter from the National Park Service and the U.S. Fish & Wildlife Service (to Mr. S. Becker. Executive Director of STAPPA/ALAPCO, January 2, 2002) and as presented in the associated *Guidance on Nitrogen And Sulfur Deposition Analysis Thresholds* (downloaded from the FLM website at www2.nature.nps.gov/air/permits/flag/flaginfo.index.htm). The DAT that was proposed in the Guidance is 0.01kg/ha/yr for both sulfur and nitrogen. These DAT values are only a guideline and not a regulatory standard. Therefore, estimates of deposition above the DAT indicate further consideration by the FLM may be warranted within the context of other influences at a particular Class I area. Estimates above the DAT do not necessarily mean that the source has failed the deposition analysis. If all deposition from the SCC Plant is less than the applicable DAT, the FLM would likely determine that the SCC Plant would not have an adverse impact on the Class I areas. The DAT was deemed applicable to all Class I areas east of the Mississippi River and thus, to each of the four Class I areas included in this analysis.

As shown by Table 5-9, the deposition rates for all years of analysis were less than the DAT for sulfur for the all four Class I areas assessed. For nitrogen, all deposition rates were less than the DAT for all Class I areas except for the Chasshowitka Class I area. The maximum nitrogen deposition rate occurred in 1990 with a corresponding rate of 0.026 kg/ha/yr.

Table 5-9
Sulfate/Nitrate Deposition Analysis

Class I Area	Pollutant	Deposition Rate by Year of Meteorological Data (kg/ha/yr)					East U.S. DAT (kg/ha/yr)
		1986	1987	1988	1989	1990	
Bradwell Bay	Sulfur	8.30E-04	9.11E-04	8.36E-04	9.04E-04	9.83E-04	0.01
	Nitrogen	2.21E-03	2.51E-03	2.43E-03	2.24E-03	2.97E-03	0.01
Chas.	Sulfur	6.70E-03	8.04E-03	6.97E-03	7.35E-03	8.36E-03	0.01
	Nitrogen	1.85E-02	2.41-E02	2.14E-02	1.92E-02	2.60E-02	0.01
Oke.	Sulfur	1.14E-03	1.24E-03	1.19E-03	1.20E-03	1.33E-03	0.01
	Nitrogen	3.08E-03	3.70E-03	2.54E-03	2.98E-03	4.08E-03	0.01
St. Marks	Sulfur	1.48E-03	1.58E-03	1.49E-03	1.51E-03	1.81E-03	0.01
	Nitrogen	3.86E-03	4.72E-03	4.44E-03	3.69E-03	5.52E-03	0.01

5.8 MERCURY DEPOSITION ANALYSIS

As discussed in a response to the Florida DEP by Florida Rock Industries on this issue, there are several forms of mercury detected in the emissions from cement kilns. Primarily, these include elemental mercury [Hg(O)] and reactive mercury [Hg(II)]. The two types of mercury species are expected to behave quite differently once emitted from the stack. Hg(O), due to its high vapor pressure and low water solubility, is not expected to deposit close to the facility. Hg(II), because of differences in these properties., is expected to deposit closer to the emission source. Most of the mercury an the atmosphere is elemental mercury vapor, which circulates in the atmosphere for up to a year, and hence can be widely dispersed and transported thousands of miles from likely sources of emission. The reactive form of mercury, when either bound to airborne particles or in a gaseous form, is removed from the atmosphere by precipitation and is also dry deposited.

The National Atmospheric Deposition Program/National Trends Network (NADP/NTN) is a nationwide network of precipitation monitoring sites. The network is a cooperative effort, between many different groups, including the State Agricultural Experiment Stations, U.S. Geological Survey, U.S. Department of Agriculture, and numerous other governmental and private entities. The purpose of the network is to collect data on the chemistry of precipitation for monitoring of geographical and temporal long-term trends. The precipitation at each station is collected weekly according to strict clean-handling procedures. It is then sent to the Central Analytical Laboratory where it is analyzed.

The National Atmospheric Deposition Program has expanded its sampling to include the Mercury Deposition Network (MDN), which was formed in 1995 to collect weekly samples of precipitation which are analyzed by Frontier Geosciences for total mercury. The objective of the MDN is to monitor the amount of mercury in precipitation on a regional basis. The nearest NADP/MDN Monitoring Location is Station FL05 at the Chassahowitzka National Wildlife Refuge in Citrus County, Florida. This station is approximately 61 kilometers from the SCC plant. The monitoring station has been in operation from 7/1/1991- present (see http://nadp.sws.uniuc.edu/nadpoverview.asp).

Data from this station were used to estimate the background wet and dry deposition of mercury in the vicinity of the SCC Plant. The annualized weekly average total mercury deposition for the period of record is 20 $\mu g/m^2/yr$.

The program used to model the transport and deposition of mercury was the ISCST3 Model, used in a similar manner to other Class II analyses in this report except that it considered deposition. The model has a gas dry deposition component as well as a gas wet deposition component and both wet and dry particle deposition components.

Hg(II) was considered in the air dispersion modeling. At the point of stack emission and during atmospheric transport, the contaminant is partitioned between two physical phases: vapor and particle-bound. These contaminants can be removed from the atmosphere by both wet deposition and dry deposition. For the present analysis, the speciation of emitted mercury was based on the Mercury Study Report to Congress RELMAP modeling. These data have speciation percentages for Portland cement manufacturing of 80 percent elemental mercury, and 10 percent each for vapor and particle Hg(II).

An aerosol particle size distribution based on data collected by Whitby (1978) was used. This distribution is split between two modes: accumulation and coarse particles. The geometric mean diameter of several hundred measurements indicates that the accumulation mode dominates particle size, and a representative particle diameter for this mode is 0.3 microns. The coarse particles are formed largely from mechanical processes that suspend dust and soil particles in the air. A representative diameter for coarse particles is 5.7 microns. The fraction of particle emissions assigned to each particle class is approximated based on the determination of the density of surface area of each representative particle size relative to total surface area of the aerosol mass. Using this method, approximately 93 percent and 7 percent of the total surface area is estimated to be in the 0.3 and 5.7 micron diameter particles, respectively. In this analysis, nitric acid vapor was used as a surrogate for Hg vapor based on their similar solubilities in water. In the ISCST3 Model, the dry deposition of divalent mercury vapor was modeled by calculating a dry deposition velocity for each hour using the assumptions made for nitric acid.

For wet deposition of vapor and particulate Hg(II), the ISCST3 wet deposition option was used. The same data on particle size distribution and particle density was used as in the dry particle deposition runs. For particles, the wet deposition scavenging ratios used were from Figure 4-4 in the EPA Mercury Report (0.8E-4 sec/mm/hr for the 0.3 micron size range and 3.8E-4 sec/mm/hr for the 5.7 micron size range). For vapor phase Hg(II) deposition, a scavenging coefficient of 1.6E-6 sec/mm/hr was also used (based on the nitric acid scavenging ratio as described in the EPA Mercury Report).

Based on the maximum proposed stack emissions of approximately 185 pounds per year of mercury for the new kiln, the maximum annual wet and dry deposition of mercury vapor and particles is 7.08 μg/m^2/yr, is 35 percent of the background deposition rate. A mercury deposition analysis was also conducted at the four Florida State Parks surrounding the SCC Plant. The results are as follows:

Park Name	**Distance (km)**	**Direction (Cardinal)**	**Predicted Total Hg Deposition (μg/m^2/yr)**
Dade Battlefield	16.37	W	0.274
Lake Griffin	29.03	NNE	0.177
Lake Louisa	51.37	SE	0.155
Fort Cooper	47.64	NW	0.133

The predicted maximum total (dry plus wet) deposition value of 0.274 μg/m^2/yr that occurred in the four Florida State Parks evaluated was 1.4 percent of the background deposition rate of the annualized weekly average total mercury deposition of 20 μg/m^2/yr.

5.9 OTHER SECONDARY IMPACTS

See Appendix C of the Permit-to-Construct Application for a discussion of other secondary air quality impacts including impact to soils, flora, fauna, including wildlife, and direct and indirect growth.

6. REFERENCES

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VISTAS Technical Advisor – "Initial Draft. BART Modeling Protocol for VISTAS", January 31, 2005. Includes contributions from Pat Brewer (VISTAS Technical Coordinator), Tom Rogers of the Florida Department of Environmental Protection, and Chris Arrington of the West Virginia Department of Environmental Protection.

Attachment 7

P.E. Certification

B. P. BARBER & ASSOCIATES, INC.

ENGINEERS – PLANNERS – SURVEYORS

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October 14, 2005

Mr. A.A. Linero
Bureau of Air Regulation
Department of Environmental Protection
2600 Blair Stone Road, MS # 5500
Tallahassee, Florida 32399-2400

RE: Response to Request for Additional Information
(RAI) dated October 7, 2005
Sumter Cement – Center Hill Plant
DEP File No. 1190041-001-AC (PSD-FL-358)
Proposed Portland Cement Plant in
Sumter County, Florida

Dear Mr. Linero:

I, the undersigned hereby certify that:

(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in the above referenced Application for Air Permit, and in this Response to the Request for Additional Information (RRAI) when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and

(2) To the best of my knowledge, any emission estimates reported or relied on in this application and RRAI are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, and RRAI based solely upon the materials, information and calculations submitted with this application and RRAI.

I further certify that the engineering features of each such emissions unit described in this application and RRAI have been designed or examined by me or individuals under my direction supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.

Should you have any questions, please feel free to contact the appropriate party.

Very truly yours,

B.P. BARBER & ASSOCIATES, INC.

Porter Rivers, III

Porter Rivers III, P.E.
Senior Project Manager