**Prevention of Significant Air Quality Deterioration Review**
**C-E Minerals, Inc.**
**Located in Sumter County, Georgia**

**PRELIMINARY DETERMINATION**
**SIP Permit Application No. 15447 and 15449**
**November 2004**


**State of Georgia**
**Department of Natural Resources**
**Environmental Protection Division**
**Air Protection Branch**


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| **Stationary Source Permitting Program (SSPP)** |
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## Attachments:

Appendix A Draft PSD Permit
Appendix B PSD Permit Application
Appendix C PSD Dispersion Modeling

## SUMMARY

The Environmental Protection Division (EPD) has reviewed the C-E Minerals, Inc. (C-E Minerals) application to re-permit the facility to remove restrictions on operating hours on the Bauxite Grinding Circuit located at Plant 1 (Emission Unit ID No. BG29) and the two Barmac Crushers (Emission Unit ID No. BC13 and IC40) and the Casting System (Emission Unit ID No. IC43) located at Plant 2. A PSD review is required to remove the avoidance limits according to the 40 CFR 52.21(r)(4).

C-E Minerals is located in Sumter County, which is classified "attainment" for $PM_{10}$, $SO_2$, NOx, CO and Ozone. C-E Minerals plant 1 and 2 are considered to be part of one major stationary source under the Prevention of Significant Deterioration (PSD) regulations (40 CFR 52.21) with the potential to emit greater than 250 tons per year of criteria pollutants due to kilns, crushers and associated equipment. The Bauxite Grinding Circuit located at Plant 1 (Emission Unit ID No. BG29) and the two Barmac Crushers (Emission Unit ID No. BC13 and IC40) and the Casting System (Emission Unit ID No. IC43) located at Plant 2 would have triggered PSD in December of 1989 had the facility not opted to take avoidance limits based on operating hours. Air Quality Permit 3295-129-8674 was issued on December 15, 1989 limiting the modification to below significant level.

The emission units will be subject to PSD review because the increased operating hours to 8,760 hours per year will require the removal of the avoidance limits. The potential annual emissions of Particulate Matter (PM) and $PM_{10}$ (particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers) are 26.00 tons. The PM and $PM_{10}$ significant modification thresholds are 25 and 15 tons per year respectively.

The EPD review of the data submitted by C-E Minerals related to the proposed modification indicates that the project will be in compliance with all applicable state and federal air quality regulations.

It is the preliminary determination of the EPD that baghouses will satisfy the Best Available Control Technology (BACT) requirements for the control of $PM_{10}$ in accordance with regulation 40 CFR 52.21(j).

It has been determined through approved modeling techniques that the estimated emissions will not have a significant ambient impact, either in the area surrounding the facility or nearby Class I area. It has further been determined that the proposal will not cause impairment of visibility or detrimental effects on soils or vegetation. Any air quality impacts produced by project-related growth should be inconsequential.

The Preliminary Determination shows that Air Quality Permits for C-E Minerals should be amended to remove operating hour limitations on the Bauxite Grinding Circuit located at Plant 1 (Emission Unit ID No. BG29), the two Barmac Crushers (Emission Unit ID No. BC13 and IC40), and the Casting System (Emission Unit ID No. IC43) located at Plant 2. Various conditions will be added to the current permits to ensure compliance with all applicable air quality regulations. A copy of the draft permit amendments are included in Appendix A.

## 1.0 INTRODUCTION

On June 29, 2004, C-E Minerals submitted applications for air quality permits to remove operating hour limitations on the Bauxite Grinding Circuit located at Plant 1 (Emission Unit ID No. BG29) and the two Barmac Crushers (Emission Unit ID No. BC13 and IC40) and the Casting System (Emission Unit ID No. IC43) located at Plant 2. Plant 1 is located at Highway 49 and Plant 2 is located at Highway 195, both in Andersonville (Sumter County), Georgia.

Plant 1, Plant 2 and another plant at C-E Minerals (Plant 6) are considered to be part of the same site, which is a major source under PSD because its potential emissions of PM, $PM_{10}$, NOx, and $SO_2$ are greater than 250 tpy (it is not one of the 28 named source categories under PSD). The C-E Minerals has had one PSD review, which was in 1989.

Based on the proposed project, the potential increases of regulated pollutants from the C-E Minerals are listed in Table 1.

**Table 1**
**Emissions Increases from the Emission Unit ID Nos. BG29, BC13, IC40, and IC43**

| Pollutant | Potential Emissions Increase (tpy) | PSD Significant Emission Rate (tpy) | Subject to PSD Review |
|---|---|---|---|
| PM-10 | 26.0 | 15 | Yes |
| PM | 26.0 | 25 | Yes |
| $SO_2$ | 0.0 | 40 | No |
| $NO_x$ | 0.0 | 40 | No |
| CO | 0.0 | 100 | No |
| VOC | 0.0 | 40 | No |
| Pb | 0.0 | 0.6 | No |
| $H_2SO_4$ | 0.0 | 7 | No |

The Potential increases were calculated by multiplying the maximum flow rates for each emission unit by the allowable emission rate of 0.016 gr/dscf. The emissions calculations for these modifications can be found in detail in the C-E Minerals' PSD submittal (see the Section 3.3 of PSD Submittal, Application Nos. 15447 and 15449). These calculations have been reviewed and approved by EPD. C-E Minerals is not taking any creditable reductions for these modifications and the emission units were newly installed at the time they were permitted. Therefore, the only emissions associated with these projects are the increase due to removal of operating hour limitations of Bauxite Grinding Circuit located at Plant 1 (Emission Unit ID No. BG29) and the two Barmac Crushers (Emission Unit ID No. BC13 and IC40) and the Casting System (Emission Unit ID No. IC43) located at Plant 2.

Based on the information in Table 1, C-E Minerals' proposed modifications as specified per Georgia Air Quality Application Nos. 15447 and 15449 are classified as major modifications under PSD because potential emissions of $PM_{10}$ equal or exceeds 15 tons per year and potential emissions of PM equal or exceeds 25 tons per year.

Through its new source review procedure, EPD has evaluated C-E Minerals proposal for compliance with State and Federal requirements. The findings of EPD have been assembled in this Preliminary Determination.

## 2.0 PROCESS DESCRIPTION

Kaolin ore is shipped to the processing facility via truck from off-site mine locations. The material is mixed, fed directly into extruders and mills, and then dried. Emissions are vented to fabric filter (baghouse) air pollution control systems.

Raw material is also extruded into pellets that are transported via conveyors to dryers that dry only surface water to ensure the pellets do not stick together in storage silos before being transported. Some of the pellets from the storage silos are fed to higher temperature kilns, then to kiln coolers and ultimately to a product storage building where it can be forwarded to any processing system for crushing, grinding, milling, and screening depending on customer requirements. Scrubbers and/or baghouses control emissions from the kilns and crushing/grinding operations.

The exhaust gas from the Bauxite Grinding Circuit (Emission Unit ID No. BG29) and the two Barmac Crushers (Emission Unit ID No. BC13 and IC40) and the Casting System (Emission Unit ID No. IC43) will be routed through baghouses shown below:

| Emission Unit | Baghouse ID | Satck Height (feet) |
|---|---|---|
| Barmac Crusher BC13 | BH13 | 30 |
| Barmac Crusher IC40 | BH40 | 97 |
| Casting System IC43 | BH43 | 97 |
| Bauxite Grinding Circuit BG29 | BH29 | 63 |

C-E Minerals permit applications and supporting data are included in Appendix B.

## 3.0 REVIEW OF APPLICABLE RULES AND REGULATIONS

State Rules

Georgia Rule for Air Quality Control (Georgia Rule) 391-3-1-.03(1) requires that any person prior to beginning the construction or modification of any facility which may result in the pollution shall obtain a permit for the construction or modification of such facility from the Director upon a determination by the Director that the facility can reasonably be expected to comply with all the provisions of the Act and the rules and regulations promulgated thereunder. Georgia Rules 391-3-1-.03(8)(b) continues that no permit to construct a new stationary source or modify an existing stationary source shall be issued unless such proposed source meets all the requirements for review and for obtaining a permit prescribed in Title I, Part C of the Federal Act [i.e., Prevention of Significant Deterioration of Air Quality (PSD)], and Section 391-3-1-.02(7) of the Georgia Rules (i.e., PSD).

Georgia Rule (b) [391-3-1-.02(2)(b)] and Georgia Rule (p) [391-3-1-.02(2)(p)] are general rules limiting the opacity and PM emissions from Kaolin and Fuller's Earth Processes.

Georgia Rule (b) limits the opacity to 40%.

Georgia Rule (p), commonly known as the process weight rule, limits PM emissions from Kaolin and Fuller's Earth processes based on the following equations:

For sources constructed after January 1, 1972

$P < 30$ ton/hr,
$E = 3.59\ P^{0.62}$
For $P > 30$ ton/hr
$E = 17.31\ P^{0.16}$

Federal Rule - PSD

PSD requires that any new major source or modification of an existing major source be reviewed to determine the potential emissions of all pollutants subject to regulations under the Clean Air Act. The PSD review requirements apply for any new or modified source which belongs to one of 28 specific source categories having potential emissions of 100 tons per year or more of any regulated pollutant, or all other sources having potential emissions of 250 tons per year or more of any regulated pollutant; or modification of a major stationary source which results in a significant net emission increase of any regulated pollutant.

The PSD regulations require that any major stationary source or major modification subject to the regulations meet the following requirements:

- Application of Best Available Control Technology (BACT) for each regulated pollutant that would be emitted in significant amounts.
- Analysis of the ambient air impact.
- Analysis of the impact on soils, vegetation, and visibility
- Analysis of the impact on Class I areas
- Public notification of the proposed plant in a newspaper of general circulation.

Federal Rule – 40 CFR 60 Subpart OOO

40 CRF 60 Subpart OOO (Standards of Performance for Non-Metallic Mineral Processing Plants) applies to nonmetallic mineral processing plants constructed after August 31, 1983. For such systems, stack opacity is limited to 7% and PM emissions are limited to 0.022 grains/dscf.

Bauxite Grinding Circuit (Emission Unit ID No. BG29) and the two Barmac Crushers (Emission Unit ID No. BC13 and IC40) and the Casting System (Emission Unit ID No. IC43)) were constructed and installed after August 31, 1983. The process involves crushing and milling of bauxitic clay, which is most closely described as kaolin within the context of listed non-metallic mineral. The term Bauxite is no longer reflective of the material processed in the Baxuite Grinding Circuit.

## 4.0 CONTROL TECHNOLOGY REVIEW

Definition of BACT

The PSD regulation requires that BACT be applied to all regulated air pollutants emitted in significant amounts. Section 169 of the Clean Air Act defines BACT as an emission limitation reflecting the maximum degree of reduction, which the permitting authority on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such a modification through application of production processes and available methods, systems, and techniques. In all cases BACT must establish emission limitations or specific design characteristics at least as stringent as applicable New Source Performance Standards (NSPSs). In addition, if EPD determines there is no economically reasonable or technologically feasible way to measure the emissions to enforce an emission standard, it may require the source to use a design, equipment, work practice or operations standard or combination thereof, to reduce emissions of the pollutant to the maximum extent practicable.

EPD used the top down BACT analysis approach as described in the Draft New Source Review Workshop Manual (Manual), dated October 1990 from the United States Environmental Protection Agency (US EPA). One critical step in the BACT analysis is to determine if a control option is technically feasible. If a control is determined to be infeasible, it is eliminated from further consideration. The Manual applies several criteria for determining technical feasibility. The first is straightforward. If the control has been installed and operated by the type of source under review, it is demonstrated and technically feasible.

For controls not demonstrated using this straightforward approach, the Manual applies a more complex approach that involves two concepts for determining technical feasibility: availability and applicability. A technology is considered available if it can be obtained through commercial channels. An available control is applicable if it can be reasonably installed and operated on the source type under consideration. A technology that is available and applicable is technically feasible.

The Manual provides some guidance for determining availability. For example, a control is generally considered available if it has reached the licensing and commercial sales stages of development. However, the Manual further provides that a source would not be required to experience extended time delays or resource penalties to allow research to be conducted on new technologies. In addition, the applicant is not expected to experience extended trials learning how to apply a technology on a totally new and dissimilar source type. Consequently, technologies in the pilot scale testing stages of development are not considered available for BACT.

The Manual also requires available technologies to be applicable to the source type under consideration before a control is considered technically feasible. For example, deployment of the control technology on the existing source with similar gas stream characteristics is generally sufficient basis for concluding technical feasibility. However, even in this instance, the Manual would allow an applicant to make a demonstration to the contrary. For example, the applicant could show that unresolved technical difficulties with applying a control to the source under consideration (e.g., size of the unit, location of the proposed

site and operating problems related to the specific circumstances of the source) make a control technically infeasible. A demonstration of technical infeasibility is ultimately based on a technical assessment considering physical, chemical and engineering principles, and/or imperial data showing that the technology would not work on the emissions unit under review, or that unresolvable technical difficulties would preclude the successful deployment of the technique.

According to the Environmental Appeals Board (See In re Kawaihae Cogeneration Project, 7 E.A.D. 107 at page 1996, EAB 1997), the section on "collateral environmental impacts" of a proposed technology has been interpreted to mean that "if application of a control system results directly in the release (or removal) of pollutants that are not currently regulated under the Act, the net environmental impact of such emissions is eligible for consideration in making the BACT determination." The Appeals Board continues, "The Administrator has explained that the primary purpose of the collateral impacts clause 'is...to temper the stringency of the technology requirements whenever one or more of the specified collateral impacts – energy, environmental or economic - renders the use of the most effective technology inappropriate." Lastly, the Appeals Board states, "Unless it is demonstrated to the satisfaction of the permit issuer that such unusual circumstances exist, then the permit applicant must use the most effective technology."

The five steps of a top-down BACT review procedure as identified by United States Environmental Protection Agency per BACT guidelines are listed below:

| | |
|---|---|
| Step 1: | Identify all control technologies |
| Step 2: | Eliminate technically infeasible options |
| Step 3: | Rank remaining control technologies by control effectiveness |
| Step 4: | Evaluate most effective controls and document results |
| Step 5: | Select BACT |

Now that the PSD BACT standards have been defined, the next step is to review the remaining applicable requirements. This step will aid in citing the appropriate legal authority for each requirement in the Title V permit. This analysis will show that the PSD BACT standards represent the most stringent limit.

**BACT for Barmac Crushers, Casting System, and Grinding Circuit**

PM and $PM_{10}$ emissions are generated from the Bauxite Grinding circuit (BG-29), the two Barmac crushers (BC-13, IC-40) and the Casting system (IC-43). Particulate matter emissions from the units consist primarily of fine to medium clay particles. No other regulated pollutants will be emitted from the Bauxite Grinding circuit (BG-29), the two Barmac crushers (BC-13, IC-40) and the Casting system (IC-43). A BACT limit for particulate matter emissions will be set at:

| Emission Unit | $PM_{10}$ (gr/dscf) | $PM_{10}$ (lbs/hr) |
|---|---|---|
| Barmac Crusher BC13 | 0.0160 | 1.42 |
| Barmac Crusher IC40 | 0.0160 | 1.84 |
| Casting System IC43 | 0.0160 | 1.30 |
| Bauxite Grinding Circuit BG29 | 0.0160 | 1.36 |

0.0160 grains per dry standard cubic foot of exhaust air is below the applicable New Source Performance Standards (40 CFR Part 60 Subpart OOO).

C-E Minerals is utilizing pulse-type baghouses to meet the proposed particulate matter emission limit. The collection and control efficiency has been demonstrated to be at least 99.9%.

Step 1: Identify all control technologies

In reviewing the BACT alternatives to control emissions of PM from the above specified unit operations, C-E Minerals considered the use of baghouses, electrostatic precipitators and wet dust suppression systems (wet scrubbers):

| | |
|---|---|
| Option 1: | Baghouses |
| Option 2: | Electrostatic Precipitators |
| Option 3: | Wet Scrubbers |

Step 2: Eliminate Technically infeasible options

All three control technology options are being considered for evaluation.

Step 3: Rank remaining technologies by control effectiveness

Table 2: Ranking of Control Technology

| Control Technology Ranking | Control Technology | Control Efficiency |
|---|---|---|
| 1 | Baghouses | 99 + percent |
| 2 | Electrostatic Precipitators | 99 percent |
| 3 | Wet Scrubbers | 90 percent |

Step 4: Evaluate most effective controls and document results

Option 1 – Baghouse

Baghouses have been used extensively during the last twenty-five years in the non-metallic mineral industry because they are efficient at dust collection achieving collection/removal efficiencies above 99.9 percent, even for particles in the 0.05 to 1.0 micron range.

Baghouses are based on the operating principle that particles and flue gas are separated in tube-shaped filter bags arranged in parallel flow paths. The particulates are collected either on the outside (dirty gas flow from outside-to-inside) or the inside (dirty gas flow from inside-to-outside) of the bag. The main differences among the various types of fabric filter technologies are related to the type of bag cleaning method: reverse-gas, shake-deflate, pulsed-jet, and sonic cleaning. The baghouses proposed as being implemented in this review are pulsed-jet.

Electrostatic Precipitators (ESPs)

There is no indication that ESPs have ever been utilized for controlling particulate matter emissions from crushing and/or grinding of bauxitic or kaolin clays. However, ESPs are commercially available and have proven success in controlling particulate matter. ESPs are most prevalent for high volumetric flow applications as found at Power Plants and Portland Cement Plants.

Option 2 – Wet Scrubbers System

Wet scrubbers are primarily used to control PM, including $PM_{10}$ and high solubility gases with collection/removal efficiencies in range from 70 percent to greater than 90+ percent, depending upon the application. Collection efficiencies are generally higher for PM with aerodynamic diameters of approximately 0.5 to 5 um. Wet scrubbers have been applied to control PM emissions from non-metallic mineral processes.

Typically, wet scrubbers are applied where it is necessary to obtain high collection efficiencies/removal for fine PM and at the same time utilize the reject heat (as thermal energy for further use) from the waste gas stream of the process. For this reason and potentially lower removal efficiencies (as compared to baghouses), wet scrubbers are typically not the first choice for controlling PM emissions from ambient temperature processes such as grinding and crushing.

Step 5: Select BACT

Conclusion – PM Control

The use of a baghouse with an emissions limitation as listed below represents the highest control efficiency and best utility for the grinding and crushing process units subject to this review and is thereby proposed as BACT. In order to ensure that the baghouses installed for these operations do not exceed the significant impact levels, outlet PM concentrations will be limited as follows:

Particulate Matter emissions limitation

| Emission Unit | PM (gr/dscf) | PM (lbs/hr) |
|---|---|---|
| Barmac Crusher BC13 | 0.0160 | 1.42 |
| Barmac Crusher IC40 | 0.0160 | 1.84 |
| Casting System IC43 | 0.0160 | 1.30 |
| Bauxite Grinding Circuit BG29 | 0.0160 | 1.36 |

Summary – Control Technology Review

Table 3: BACT Determinations for Grinding/Crushing Operations

| Company Name | Location | Database | Permit Date | Facility Description | PM Control/ Limitations | Control Type |
|---|---|---|---|---|---|---|
| Continental Cement CO. | Hannibal, Missouri | RBLC | 9/24/2002 | Roller Mill Crushing | Use of a baghouse | BACT |
| D.W.L. # 2 | Atkins, Virginia | RBLC | 1/08/1989 | Crusher, Barmac | Use of wet suppression system | BACT |
| Excel Minerals | Kern County, | RBLC | 9/15/1988 | Non-metallic mineral | Use of a fabric filter | BACT |

Table 3: BACT Determinations for Grinding/Crushing Operations

| Company Name | Location | Database | Permit Date | Facility Description | PM Control/ Limitations | Control Type |
|---|---|---|---|---|---|---|
| | California | | | Processing | | |
| Adams Construction | Wytheville, Virginia | RBLC | 5/27/1988 | Crusher | Use of wet suppression system with enclosure | BACT |
| Thiele Sandersville Facility | Sandersville, Georgia | GA EPD Public Files | 8/95 | Conveyor systems and bins | Use of a Baghouse, PM limit of 0.02 gr/dscf | BACT |
| Engelhard Minerals | McIntyre, Georgia | GA EPD Public Files | 8/16/1996 | Bulk Loading and Product Bins | Use of a baghouse, PM limit of 0.02 gr/dscf | BACT |

## 5.0 TESTING AND MONITORING REQUIREMENTS

Baghouses for Emission Unit ID Nos. BG29, BC13, IC40, and IC43

Testing Requirements:

C-E Minerals will not be required to undergo initial performance testing for opacity, particulate mater, or $PM_{10}$ emissions from the Bauxite Grinding Circuit (BG-29), the two Barmac Crushers (BC-13, IC-40) and the Casting System (IC-43). C-E Minerals has already performed testing on the baghouses per the requirements of 40 CFR Subpart OOO. Emissions were well below the allowable PSD emission limitations as shown below:

| Emission Unit | Allowable PM Emission | | Actual PM Emission as tested | |
|---|---|---|---|---|
| | PM (gr/dscf) | PM (lbs/hr) | PM (gr/dscf) | PM (lbs/hr) |
| Barmac Crusher BC13 | 0.0160 | 1.42 | 0.0024 | 0.21 |
| Barmac Crusher IC40 | 0.0160 | 1.84 | 0.0040 | 0.46 |
| Casting System IC43 | 0.0160 | 1.30 | 0.0062 | 0.50 |
| Bauxite Grinding Circuit BG29 | 0.0160 | 1.36 | 0.0114 | 1.02 |

Monitoring Requirements:

C-E Minerals utilizes baghouses for controlling emissions from the Bauxite Grinding Circuit (BG-29), the two Barmac Crushers (BC-13, IC-40) and the Casting System (IC-43). These sources are subject to the PM and Visible emissions (opacity) limitations of Georgia Rules (p) and (b) and 40 CFR Part 60 Subpart OOO. The processes are subject to the monitoring requirements to reasonably assure compliance with applicable emissions limitations. To reasonably assure compliance with applicable PM limitations, a Visible Emissions (VE) check is required each day of operation of the emission units controlled by a baghouse. Corrective actions are required for visible emissions or for visible emissions, which exceed a specified opacity action level. In addition, a Preventive Maintenance Program is required on these baghouses. The program requires weekly monitoring of baghouse pressure drop and the performance of operation and maintenance checks on the baghouses. All VE and Preventative Maintenance Program information is retained by the Permittee and submitted to the EPD upon request. Excursions and other record-keeping requirements, to be reported semiannually, are specified.

Compliance Assurance Monitoring (CAM) Applicability

For C-E Minerals to be subject to CAM outside the Title V permit renewal, controlled emissions must be in excess of the major source threshold. The Bauxite Grinding Circuit (BG-29), the two Barmac Crushers (BC-13, IC-40) and the Casting System (IC-43) are not subject to the requirements of CAM as specified in 40 CFR Part 64. The emission units do not emit emissions in an amount greater than the major source threshold. Combined controlled PM emissions of 26.0 tpy are well below 100 tpy threshold and is therefore, not subject to the requirements of CAM.

## 6.0 AMBIENT AIR QUALITY REVIEW

Introduction to Ambient Impact

An air quality analysis is required of the ambient impacts associated with the construction and operation of the proposed modification. The main purpose of the air quality analysis is to demonstrate that emissions emitted from the proposed new major stationary source, in conjunction with other applicable emissions from existing sources (including secondary emissions from growth associated with the new project), will not cause or contribute to a violation of any applicable National Ambient Air Quality Standard (NAAQS) or PSD increment in a Class I or Class II area. NAAQS exist for $NO_2$, CO, $PM_{10}$, $SO_2$, Ozone ($O_3$), and lead ($P_b$). PSD increments exist for $SO_2$, $NO_2$, and $PM_{10}$.

A separate air quality analysis is required for each of these pollutants emitted in a significant amount over the PSD significant threshold. As shown in Table 1, $PM_{10}$ is to be emitted in amounts over the PSD significant thresholds. Thus an air quality analysis must only be performed for $PM_{10}$.

Compliance with any NAAQS is based upon the total estimated air quality impact from all possible sources, which is the sum of the ambient estimates resulting from existing sources of air pollution (modeled source impacts plus measured background concentrations) and the modeled ambient impact caused by the applicant's proposed emission increase and associated growth. It is important to note that the air quality cannot deteriorate beyond the concentration allowed by the applicable NAAQS, even if not all of the PSD increment is consumed.

Modeling

In general, EPD assesses the ambient impact of a source through the use of mathematical dispersion models. The models are based upon the assumption that the dispersion of pollutants is primarily a function of: wind speed and direction; atmospheric stability conditions; and the characteristics of the effective point discharge of the exhaust plume. To predict ambient air concentrations, the models simulate the plume exhausting from the stack, rising a certain distance in the atmosphere, leveling off, and continuing downwind over relatively flat terrain. The concentrations of pollutants are assumed to have Gaussian distribution about the downwind axis centerline of the plume.

In analyzing the air quality impact of these modifications, the U.S. EPA Industrial Source Complex Short-Term Version 3 (ISCST3) model was used for all modeling results presented in the preliminary determination. ISCST3 is a Gaussian plume dispersion model that estimates hour-by-hour ground-level concentrations of emissions from an elevated source. The model provides maximum 24-hour and annual average concentrations for receptors located on many grid types around the source for various downwind distances. The model also takes into account the effect of downwash caused by nearby buildings and structures.

Emissions of $PM_{10}$ were modeled to assess impact on Class II area, and to assess compliance with PSD Significant Impact Level (SIL). The dispersion of $PM_{10}$ was modeled using the Industrial Source Complex Short-Term air dispersion model (ISCST3 Version 02035). The ISCST3 air dispersion model was used in a refined mode with five

years of representative meteorological data to determine the maximum predicted impact concentrations for the Ambient Air Quality Impact Analysis (AAQIA).

The ISCST3 air dispersion model requires hourly input of specific surface and upper-air meteorological data. These data include the wind flow vector, wind speed, ambient temperature, stability category, and the mixing height. Five years (1974-1978) of surface meteorological data from Macon, Georgia and upper air from Centerville, Alabama was obtained from the EPD website. This meteorological data is representative of the facility location and was used in the ISCST3 air dispersion model with anemometer height of 23 feet.

In performing the modeling, the stack height input may not exceed "good engineering practice" (GEP) stack height. This constraint is based on United States Environmental Protection Agency's (USEPA) policy of restricting dispersion enhancement credit where stacks exceed GEP. GEP is defined as the greater of 65 meters, or: HG = H + 1.5L

Where: HG = Good engineering practice stack height
H = Height of nearby structure
L = Lesser of dimension (height or width) of nearby structure.

A total of 19 structure, including buildings and similar structures, were analyzed by C-E Minerals. The dimensions and relative locations of each structure were entered into the US EPA's Building Profile Input Program (BPIP) to produce an ISCST3 input file with the proper Huber-Snyder or Schulman-Scire direction specific building downwash parameters. The same program also determined a GEP stack height for the modeled stacks.

Increment Consumption

The PSD regulations establish specific maximum allowable increases in ambient concentrations (or increments) for $PM_{10}$, $NO_x$, $SO_2$, and CO for all areas in compliance with the NAAQS. All areas of the country are categorized as a function of overall use. The regulations were designed to prevent significant air quality deterioration by specifying allowable incremental changes in $PM_{10}$, $NO_X$, $SO_2$ and CO concentrations within each area category. The area categories are defined below:

Class I – Those areas where almost any deterioration of current air quality is undesirable, and little or no industrial development would be allowed (e.g., national parks, wilderness areas).

Class II – Those areas where moderate, well-controlled energy or industrial growth is desired without air quality deterioration up to the national standards (all attainment areas not categorized as Class I was initially designated Class II).

Class III – Those areas where substantial energy or industrial development is intended, and where modest increases in ambient concentrations above Class II increments, but below national standards, would be allowed (designation to Class III must follow strict redesignation procedures).

The Sumter County area and all other attainment areas in Georgia, not designated as Class I areas, are Class II areas. The nearest Class I area is the Okefenokee Wilderness area. Over 250 Kilometers (Km) from the facility.

Significant Impact Analysis

The first step in the air quality analysis was to determine whether the incremental ambient impacts due to new emissions from the project were greater than US EPA-prescribed Modeling Significance Levels. This "significance analysis" is used to determine if C-E Minerals could forgo a full-scale impact analysis to demonstrate compliance with the NAAQS and PSD Class II Increments.

The plume dispersion modeling and AAQIA were performed by following the applicable US EPA and EPD guidelines. The ISCST3 Plume Dispersion Model was used to predict the ambient air concentrations of $PM_{10}$ outside the property line. Ambient air concentrations were calculated by the model for 24-hr and annual averaging periods. Modeling grid was set to a distance of 7 kilometers outward from the property line. The predicted ambient air concentrations of $PM_{10}$ were lower than the PSD Significant Impact Levels as shown in Table 4. Thus, NAAQS and Class II PSD increment modeling is not required.

**Table 4:** Plume Dispersion Modeling Results Relative to Significant Impact Levels

| Applicable Threshold | Pollutant | PSD Limits and Modeling Results ($ug/m^3$) | | | | Below threshold? |
|---|---|---|---|---|---|---|
| | | 24-hr | | Annual | | |
| | | Limit | Result | Limit | Result | |
| PSD Class II Significant Impact Threshold | $PM_{10}$ | 5 | 4.96 | 1 | 0.45 | Yes |

Preconstruction Monitoring

The PSD regulations require that continuous preconstruction monitoring of regulated pollutants emitted in significant amounts be conducted to establish existing air quality concentrations in the vicinity of the proposed source or modification. However, no preconstruction monitoring data are required if the ambient air quality or the projected impact from the source is below certain *de minimus* concentrations.

The predicted maximum 24-hour $PM_{10}$ concentration from the proposed project was approximately 5 µg/m3 or below the $PM_{10}$ de minimus level of 10 µg/m3. Thus, preconstruction monitoring for $PM_{10}$.was not required.

## 7.0 ADDITIONAL IMPACT ANALYSES

PSD requires an analysis of impairment to visibility, soils, and vegetation that will occur as a result of the emissions from Emission Unit ID Nos. BC13, BG29, IC43, and IC40 and an analysis of the air quality impact projected for the area as a result of general commercial, residential, industrial, and other growth associated with this project. Other impact analysis requirements may also be required (such as Georgia's Toxic Guidelines).

Air Toxics

No Hazardous Air Pollutants are emitted from the emission units considered in this plume modeling. Air toxics impact analysis is not required because the emissions act as a particulate only with no additional toxic affect.

Class I Visibility Analysis

The nearest PSD Class I area, Okefenokee Wilderness area, is over 250 km from the Andersonville facility. Therefore, a Class I area significant impact assessment is not required.

Visibility

Visibility impairment is any perceptible change in visibility (visual range, contrast, atmospheric color, etc.) from that which would have existed under natural conditions. Poor visibility is caused when fine solid or liquid particles, usually in the form of volatile organics, nitrogen oxides, or sulfur oxides, absorb or scatter light. This light scattering or absorption actually reduces the amount of light received from viewed objects and scatters ambient light in the line of sight. This scattered ambient light appears as haze.

Another form of visibility impairment in the form of plume blight occurs when particles and light-absorbing gases are confined to a single elevated haze layer or coherent plume. Plume blight, a white, gray, or brown plume clearly visible against a background sky or other dark object, usually can be traced to a single source such as a smoke stack.

The applicant submitted detailed Level I and Level II visibility screening analyses conducted from several points of perspective. No significant adverse impacts on visibility are expected to result from the emissions from The Bauxite Grinding circuit (BG-29), the two Barmac crushers (BC-13, IC-40) and the Casting system (IC-43).

Soils and Vegetation

No sensitive soil or vegetation types are known to exist within the impact area of the project.

Growth

Considering the results of the plume dispersion modeling in conjunction with the rural characteristics of the vicinity of the C-E Minerals facility, the effects to ambient air quality due to growth associated with the modeled sources are expected to be insignificant. Therefore, commercial, residential and industrial growth impact analysis was not performed.

## 8.0 EXPLANATION OF DRAFT PERMIT CONDITIONS

The permit requirements for this proposed modification are included in draft Permit Amendment No. 3255-261-0003-V-01-2 for Plant 1 and draft Permit Amendment No. 3255-261-0047-V-04-2 for Plant 2.

Plant No. 1

Section 1.0 Facility Description

EPD has included a description of the project.

Section 3.0 Requirements for Emission Units

Condition No. 3.2.1 is deleted because the Bauxite Grinding Circuit (Emission Unit ID No. BG29) no longer needs a PDS avoidance limit.

Condition No. 3.2.3 is added to incorporate the BACT limitation for the Bauxite Grinding Circuit of 1.36 pounds per hour (0.016 gr/dscf).

Section 6.0 Other Record Keeping and Reporting Requirements

Condition No. 6.2.3 is deleted because this condition requires record keeping for the PSD avoidance limit which has been deleted.

Plant No. 2

Section 1.0 Facility Description

EPD has included a description of the project.

Section 3.0 Requirements for Emission Units

Condition No. 3.2.2 is modified because the Casting System (Emission Unit ID No. IC43) and two Barmacs (Emission Unit ID Nos. BC13 and IC40) no longer need a PSD avoidance limit.

Condition No. 3.2.6 is added to incorporate the BACT limitation for the Barmac Crusher (Source Code BC13), Casting System (Source Code IC43), and Barmac Crusher (Source Code IC40) of 1.42, 1.30 and 1.84 pounds per hour respectively (0.016 grains/dscf each).

Section 6.0 Other Record Keeping and Reporting Requirements

Condition No. 6.1.7 is being modified to delete references to the PSD avoidance limits (Condition No. 3.2.2) for Emission Unit ID Nos. BC13, IC40, and IC43.

Condition No. 6.2.3 is modified to delete references to the PSD avoidance limits (Condition No. 3.2.2) for Emission Unit ID Nos. BC13, IC40, and IC43.

# APPENDIX A

Draft PSD Permit
C-E Minerals, Inc. – Andersonville (Sumter County), Georgia

# APPENDIX B

PSD Permit Application and Supporting Data
C-E Minerals, Inc. – Andersonville (Sumter County), Georgia

Contents include:

1. PSD permit application nos. 15447 and 15449 dated June 21, 2004

# Appendix C

# PSD Dispersion Modeling