MEMORANDUM

May 2, 2008

To: Steven Neadow**,** Hamid Yavari
Thru: Jim Boylan
From: Pete Courtney
Subject: **CE Minerals, Inc., Sumter County –** Modeling Analysis of Proposed New Kiln 6 Emissions

Air dispersion modeling was conducted by CE Minerals' consultant, Smith Aldridge, Inc., to assess conformance of the proposed emissions to ambient air from new coal-fired kaolin kiln #6 with current PSD Increments and NAAQS. The proposed NOx and PM10 emission limits have been reviewed for BACT and PSD purposes. In addition to the emissions of the new kiln, several contemporaneous sources of both NOx and PM10 were modeled as part of the proposed PSD modification

INPUT DATA

1_ **Meteorological Data** – Hourly pre-processed meteorological data from the Macon, GA NWS surface station and the Centreville, AL NWS upper air station for the period 1987-91 were used to evaluate the proposed emission rates for conformance with applicable NO2 and PM10 NAAQS and PSD Increments. These data were pre-processed through the AERMET processor (version 06341) and provided by GA EPD. Smith-Aldridge provided a comparison of the similarities of the Macon Regional Airport surface characteristics with surface characteristics surrounding the CE Minerals site.

2_ **Source data –** Stack emissions parameters, emission rates, and boundary and gridded model receptors were provided by Smith Aldridge, Inc. Tables indicating the emission rates and the emission parameters for the CE Minerals sources and offsite sources are located in the Smith Aldridge, Inc. report. Regional inventory sources were screened using the 20-D technique, as indicated in that report.

All NO_2 modeling employed the 0.75 Ambient Ratio Method conversion factor to reported NOx emission rates. Fugitive road emission sources were modeled in the Significance PM10 model (estimated using Kiln 6 production rates), with increased emissions in the Increment PM10 model (estimated using production rates of Kilns 4, 5, & 6) and with increased emissions (using the production rates of the Plant 2 Kilns 1, 2, & 3) on previously modeled road segments, plus fugitive road emissions sources in the vicinity of Plant 1 (Kilns 1 & 2) for PM10 NAAQS assessment.

PM2.5 emissions are estimated to be above the proposed significant emission rate threshold of 10 tons per year (tpy). As EPA has not promulgated sufficient information to facilitate the dispersion modeled assessment of even direct PM2.5 emissions, PM10 project and offsite emissions were modeled against PM10 standards, and are used as a surrogate for PM2.5 modeling. This approach is in accordance with relevant EPA guidance pertaining to PM2.5 evaluations.

3_ **Receptors –** Model receptors were placed offsite at 100-meter intervals along the facility boundary, and on 100-meter centers on a square grid extending 2 km from the main project source. Receptors were located on a square grid on 500-meter centers out to approximately 5

km offsite, and on 1-km centers out to approximately 10 km from the main project emission source. Terrain elevations were estimated for these receptors (and modeled sources) using the EPA-developed AERMAP (version 06341) utility for processing Digital Elevation Model data provided by four USGS 7.5 minute quadrangle data files surrounding the facility. Model receptors were added along GA Hwy 49, and along a rail line cutting across the site.

4_ **Downwash –** The Building Profile Input Program (version 04274) was used to assess building downwash dimensions of 19 buildings and Good Engineering Practice (GEP) stack heights of 7 (Significance), 18 (Increment), and 32 (NAAQS) stacks on site. GEP heights ranged from 46-82.5 m, while actual stack heights ranged from 7.3-39m. Thus, since no stack was built to its GEP height, each modeled stack was required to be evaluated for downwash effects on ambient concentrations. The Prime algorithm was implemented to be compatible with the AERMOD (version 07026) dispersion model used in the PSD and State air toxics modeled assessments.

5_ **Class I Area Considerations –** There are no Class I Areas within 200 km of the facility. The maximum ratio of visibility-affecting emissions (tpy) to distance-to-Class I area (km) is approximately 3, considerably less than the threshold value of 10, at or above which the Federal Land Managers have proposed to require Air Quality Related Value Assessments of Class I areas. For those reasons, no Class I Area impacts were assessed.

6_ **Class II Visibility Issues -** There are no potentially sensitive receptors within the maximum Significant Impact Area, therefore there is no evaluation necessary.

RESULTS OF MODELING

The results of the modeling evaluation are presented in the attached Model Request Form tables. Significance modeling was conducted for NOx and PM10 which resolved significant 24-hour, and annual, averaged concentrations within 1 (for NOx) and 3 (for PM10) km of the main project stack. A screening impact area was assigned a radius of 53 km from the facility on that basis. Only PM10 exceeded it's Significant Monitoring *de minimis* concentration, and the GA EPD ambient monitoring program has sufficient contemporaneous and representative data to allow the development of adequate estimates of background ambient concentrations.

The modeled concentrations of PM10 and NOx were found to comply with all applicable PSD increments and NAAQS. The air toxics impacts assessment was indicated to conform to the applicable Acceptable Ambient Concentrations for HCl and HF. Thus the facility is found to comply with all applicable modeling requirements.