South Carolina Department of Health and Environmental Control
Bureau of Air Quality

Response to Comments
Public Notice #11-086-PSD-N-H
PyraMax Ceramics, LLC Construction Permit
Allendale, Allendale County, South Carolina
Permit No. 0160-0023-CA

The following is the SC Department of Health and Environmental Control's (DHEC) Bureau of Air Quality (Department) response to the comments made and issues raised during the formal comment period held December 15, 2011 – January 26, 2012 and the public hearing held on January 19, 2012, regarding the draft construction permit for PyraMax Ceramics, LLC (PyraMax or "facility") at 2636 Augusta Highway in Allendale, Allendale County. The written comments received regarding the draft permit are available for viewing at the SC DHEC Columbia office located at 2600 Bull Street, Columbia, SC 29201, or on the SC DHEC webpage http://www.scdhec.gov/environment/baq/PermittingDecisions, or hardcopies can be requested by contacting our Freedom of Information Office at (803) 898-3817.

1. **General Opposition and Support** - The Department received general comments both supporting and opposing the issuance of a permit for this facility. Title 48 of the SC Code of Laws, Section 48-1-100, states that "If, after appropriate public comment procedures, as defined by Department regulations, the Department finds that the discharge from the proposed outlet or source will not be in contravention of provisions of this chapter, a permit to construct and a permit to discharge must be issued to the applicant." The Department cannot make permitting decisions based on community approval or disapproval of the company/facility. The Department does not make permit decisions based on the number of individuals or groups that support or oppose a project. The Department's decision is based on the Department's technical review of an applicant's application and the regulatory requirements in place at the time of the Department's review. The Department welcomes and appreciates all comments made regarding the PyraMax facility.

2. **Land Use/Zoning** – There were comments concerning the location of facility relative to residential areas and personal property. There were also comments based on how the proposed property is presently zoned. All zoning decisions are made at the local level by a city or county zoning authority. The Department cannot dictate where a facility locates. Please contact your local city or county council representatives for more information on how to get involved in local zoning and planning issues.

3. **Property Ownership –** A comment pointed out an apparent contradiction in regards to property ownership. Condition 5.C.1 of the PyraMax draft construction permit included a

statement that, "PyraMax has purchased sufficient property and will maintain a boundary layer of vegetation/wetlands to minimize the amount of dust that is transported off-property." The construction permit condition 5.C.1 has been modified to delete the portion of the final bullet point dealing with the purchase of property and reworded to state that PyraMax will maintain a boundary layer of vegetation/wetlands to minimize the amount of dust that is transported off-property.

4. **Facility Location -** One commenter indicated that PyraMax chose not to locate the proposed facility in the vicinity of existing emission sources because they could not comply with the standards if the facility was too near those other sources. The Department has no information on whether or not the facility could meet the ambient air quality standards in a location other than the one that has been proposed. The permit decision takes into account only whether the facility will or will not cause or contribute to a violation of state and federal air standards when operating at the proposed location. Please see response number 2 addressing zoning and land use.

5. **Noise** – Comments were received regarding noise created by the facility. The Department does not have any noise regulations and therefore cannot regulate noise levels. Allendale County does not have a noise ordinance in place at this time. We have asked the facility how they plan to address noise issues. In their response, PyraMax stated that they have visited existing ceramic proppant facilities and did not experience noise levels that would raise concern from community members. They also stated that the PyraMax property will be approximately 160 acres. The facility footprint is approximately 20 acres and will be located in the central part of the property. The nearest distance from the process equipment to the property line will be more than 800 feet. The facility intends to keep the natural landscape buffer in place at the edges of the property (i.e., the entire property will not be clear cut). Due to the central location, distance from the plant to the property, and maintaining the natural landscape buffer, noise from the plant will be minimized. The facility noted that the majority of the process equipment is to be located indoors. In addition, there will be sound enclosures around fans and the facility will employ good manufacturing practices to reduce the noise generated from the facility.

6. **Odor** – A comment was received regarding potential odor from the proposed facility. There are no state or federal odor regulations. However, the Department's regional offices investigate citizen complaints, including odor complaints. The presence of odor does not necessarily signal the presence of dangerous air pollution. Many air pollutants have an odor threshold far below the level that would cause harm.

7. **Permit Material was Difficult to Understand** – The Department recognizes that the air permitting process is complex and complicated. When holding a hearing, it is even harder to keep information short and to the point because we are discussing all information pertaining to the air permit. We encourage stakeholder input and suggestions for improving our presentation methods. If our materials and presentations are not in plain language, we value your constructive feedback to improve them. We will strive to explain the concepts of this very complex and complicated program to citizens in more simplistic and basic terms. If you have any suggestions on improving the presentations or improving the public

meeting and hearing process, please feel free to contact Lawra Boyce, Public Participation Coordinator for the Bureau of Air Quality, at (803) 898-4585 or boycelc@dhec.sc.gov.

8. **Health Impacts** – There were several comments regarding the impact on human health. In order to receive an air permit, the facility must demonstrate that they are in compliance with air quality standards set by the Environmental Protection Agency (EPA) and DHEC. The Clean Air Act requires the EPA to set National Ambient Air Quality Standards for pollutants considered harmful to public health and the environment. The Clean Air Act established two types of national ambient air quality standards. Primary standards set limits to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. The EPA has set these National Ambient Air Quality Standards (NAAQS) for six principal pollutants, which are called "criteria" pollutants: particulate matter, nitrogen dioxide, sulfur dioxide, ozone, carbon monoxide and lead. The NAAQS are reviewed every 5 years and updated as necessary so that concerns regarding the health of sensitive individuals and protection of welfare are incorporated into air quality standards. PyraMax has demonstrated through air dispersion computer modeling that the maximum pollutant concentrations are below these standards. The permit requires stack testing, monitoring of pollution control devices, fuel restrictions, continuous opacity monitoring, and recordkeeping and reporting to ensure the facility will meet the regulatory requirements.

9. **Air Quality Impacts** – Comments were received concerning the air quality impacts from this facility. The Clean Air Act is designed to protect local air quality from potential pollution impacts from large sources through the Prevention of Significant Deterioration (PSD) permitting process. In order to receive a PSD permit, a facility must apply Best Available Control Technology (BACT) to its equipment and the facility must conduct an air quality analysis to demonstrate it will not cause or contribute to an exceedance of an air quality standard or other protective levels set by the EPA. The air quality model takes into account the maximum emissions from the proposed facility and the pollutant impacts from other facilities in the area. The model demonstrated compliance.

    a. Predicted Exceedances of the Air Quality Standards - One commenter questioned the predicted exceedance inside the property boundary of an existing facility. The modeling showed that there are no exceedances of any standard caused by the PyraMax facility. The modeling did show that PyraMax contributions were above significant impact levels on the property of an existing facility. However, the existing facility is causing the exceedances on their own property. Air quality regulations address impacts to *ambient* air quality. Ambient air is air outside of facility boundaries; therefore, there was no exceedance of the standards.

    Updates to the air quality analysis: As presented at the public hearing, the air quality model has been updated since the notice of the draft permit. As stated in the preliminary determination, the modeling analysis did show predicted exceedances of the 1-hour sulfur dioxide ambient air quality standard, the 1-hour nitrogen dioxide ambient air quality standard and the 24-hour course and fine particulate matter ambient

standard, not from PyraMax, but from existing facilities. The Department reviewed the emission data submitted by PyraMax and, after removing inaccuracies and also further refining emissions determined there were no predicted exceedances from any existing facilities. The air quality analysis for the PyraMax facility indicates there are, in fact, no predicted exceedances of any standard in the ambient air. Please refer to the final determination for a more detailed explanation of the modeling changes.

b. Omission of Sources in the Air Quality Model – One commenter indicated that all polluting sources should be included in the modeling. EPA guidance allows off-site sources to be excluded from the modeling based on considerations such as the amount of the emissions and the distance from the existing facility to the significant impact area. Some of these considerations are based on the limits on the effective range of the model, which is 50 kilometers; therefore, sources outside that range were excluded. EPA also recognizes that some off-site sources contributions would be insignificant or would be accounted for in the background concentrations that are added to the model. These exclusions are based on the level of an off-site source's emissions combined with the distance an off-site source's emissions would travel to reach the permitted facility. This EPA guidance was appropriately applied to exclude those off-site sources that were not included in the PyraMax modeling. In addition, appropriately conservative background concentrations were added to the concentrations predicted by the modeling that more than compensates for those excluded sources.

Omission of Truck Traffic. The number of trucks traveling from the mine to the proposed facility is estimated to be 175 trucks per day. The primary road traveled in Allendale County between the mine site and the proposed location will be route 278. PyraMax reviewed information from the South Carolina Department of Transportation, located at http://www.scdot.org/getting/aadt.asp, for the annual average daily traffic for route 278 from the Barnwell County line to Concord Church Road (SR-53) for the last five years of available data. That data showed that the average daily traffic for that route is 3,400 vehicles per day. That means the increase in daily traffic at maximum continuous operation (a conservative assumption) would be approximately 5%. The increase in truck traffic was determined to be minimal compared to the historical traffic patterns in the area and therefore, the corresponding increase in emissions would also be considered minimal and was excluded. Also, according to the EPA guidance, a facility is not required to include the growth of vehicle emissions in their modeling for the National Ambient Air Quality Standards. However, the Department does take into account vehicle emissions when conducting the regional models for the State, usually every five years.

Omission of SRE Allendale. The projected emissions for SRE Allendale were included in the modeling analysis. Table 23 of the preliminary determination inadvertently left that information out of the listing. The final determination will include that information.

Omission of Sources in the State of Georgia. The PyraMax application included an inventory of major and minor source facilities in Georgia to be considered for

inclusion in the modeling. As stated earlier, EPA guidance allows exclusion of sources outside 50 kilometers from the significant impact area; therefore Georgia facilities outside the 50-kilometer area were excluded. EPA guidance also allows for exclusions within the 50-kilometer range. This approved process of excluded sources is called "screening." To be screened, emissions from the off-site source must be less than 20 times the distance from the Georgia facility to the significant impact area. Eight Georgia facilities met this screening criteria and were excluded from the model. One commenter identified a proposed ceramic facility in Millen, Georgia that was not included in the PyraMax modeling. Because the proposed location for this facility is within 50 kilometers of the PyraMax significant impact area it should have been included in the model and therefore, the Department requested PyraMax to update the model. The facility performed and submitted the requested modeling. The results of this updated modeling analysis show that the construction and operation of the new PyraMax facility will not cause or contribute to the exceedance any state or federal ambient air quality Standard. Please refer to the final determination for a detailed discussion of the modeling.

c. Impacts to Soils and Vegetation - There was a comment regarding the impact of the PyraMax facility to the soils and vegetation in the area. The operation of the proposed project does cause dry particles and gaseous vapors to be formed. These particles and vapors are frequently called pollutants or pollution. The Department places permit limits on the amount and type of emissions a facility is allowed to emit to ensure Federal and State air quality pollution standards can be met. In order to receive an air quality permit, the facility must demonstrate that they will not cause or contribute to a violation of any air quality standard. Secondary standards (as discussed in the Health Impacts response above) set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. The air dispersion modeling shows that the proposed facility will meet all ambient air quality standards. Under PSD requirements, PyraMax also conducted a soil and vegetation modeling analysis. The EPA has set screening levels to determine if there is any potential harm to soil and vegetation at the facility fence line and beyond into the community. The results of the modeling analysis were below the EPA screening levels indicating that operation of the proposed facility is not expected to cause harm to the soil and vegetation.

10. **Best Available Control Technology Analysis** –The Clean Air Act is designed to protect local air quality from potential pollution impacts from large sources through the Prevention of Significant Deterioration (PSD) permitting process. In order to receive a PSD permit, a facility must apply Best Available Control Technology (BACT) to its equipment and the facility must conduct an air quality analysis to demonstrate it will not cause or contribute to an exceedance of an air quality standard or other protective levels set by the EPA. BACT is an emission limit and includes pollution control equipment or, a required modification of production processes or methods. If an emission limitation is infeasible, BACT can be a design, equipment, work practices or operational standards. BACT is determined on a case by case basis to obtain the maximum reduction in emissions achievable for the proposed source. In order to have national consistency on how to

determine BACT, the EPA recommends, and the Department uses, a five step process in which all possible control technologies are identified, ranked for effectiveness, and BACT determined. Control technologies can be eliminated from consideration because they are demonstrated to be technically infeasible, or have unacceptable energy, economic, or environmental impacts.

a. Cost effectiveness review did not take into account health and environment of Allendale citizens. In most cases in the PyraMax BACT analysis, the most effective control technology was chosen in determining the BACT emission limitation. In those instances where a control technology was eliminated from consideration the Department not only considered the economics, but also the additional energy and environmental impacts in that determination. For example, a regenerative thermal oxidizer (RTO) was eliminated as a control option for CO emissions from the kilns. Use of the RTO would require the combustion of additional natural gas to reheat the flue gas to the appropriate temperature for the RTO to function. This additional natural gas combustion would lead to additional pollutant emissions such as NO_x emissions and increased energy usage. The Department determined the RTO could be eliminated based on the additional NO_x emissions, increased energy usage and an economic cost of $21,200 per ton of CO reduced. The application of BACT will reduce emissions from the PyraMax facility and therefore, reduce risk to the citizens in Allendale. Additionally, the air quality analysis showed that emission impacts from the facility would not threaten ambient air quality standards. The commenter did not supply any information or data that would indicate at what cost a control device or other pollution reduction method would be considered economically infeasible.

b. Assumptions Based on Limited Data – One comment noted that too many assumptions were made due to the limited amount of information or limited number of similar sources. As part of the BACT analysis, similar sources in the United States are reviewed to determine what controls are "available," meaning they used in practice at a commercial level. The most comparable facilities found were CARBO Ceramics. As discussed in the preliminary determination, the two CARBO facilities in Georgia have no emission controls for nitrogen oxides on their kilns. PyraMax proposed to use a catalytic baghouse to control nitrogen oxides, sulfur oxides, particulate matter, hydrogen chloride and hydrogen fluoride on the kilns. This baghouse will result in a nitrogen oxide emission limit of 36.3 pounds per hour or better as compared to the facilities in Georgia that have emission limits of 121 pounds per hour (CARBO Toomsboro) and 82 pounds per hour (CARBO McIntyre). This is a reduction of 84.7 and 45.7 pounds per hour respectively from currently permitted facilities. The commenter did not supply any information on other similar sources or control technologies that should be considered in the BACT review.

c. BACT Considered the Low End of the Control Efficiency – The commenter did not provide the section they were referring to in the comment. We will assume they were quoting from page 29 of the preliminary determination, which referred to the sulfur dioxide BACT determination for the kiln. The determination states, "Because there

are only a few facilities similar to the proposed ceramic proppant facility that have been proposed or are in operation and because little experience with kiln FGD controls in such facilities is available, DHEC considers the low end of the control efficiency…" The remainder of that paragraph states, "…ranges to be more realistic." Vendor literature for the proposed catalytic baghouse indicated that sulfur dioxide control efficiencies of 90% was typical with up to 98% achieved in some applications. The vendor, with little experience on this particular gas stream for this type of control device could not reliably determine the greatest control effectiveness for this process. The applicant also reported that no documentation of a similar source using this control technology could be found. Due to the uncertainty in the control technology effectiveness in this application the Department believes it was appropriate to allow the use of the typical control efficiency of 90% when determining the BACT emission limit for SO_2. The BACT analysis also requires low sulfur clay for the process. This baghouse will result in a sulfur dioxide emission limit of 11.64 pounds per hour or better. This is a 22.61 pound per hour reduction from currently permitted similar facilities.

11. **DHEC Concerned with Only Out-of-Date Legal Standards**. The Department is committed to protecting the health and environment of all people in the State of South Carolina. NAAQS are reviewed every 5 years and updated as necessary so that concerns regarding the health of sensitive individuals and protection of welfare are incorporated into air quality standards. The PSD regulation requires large facilities to consider the impacts from other area sources as well as their own emissions in determining compliance with the NAAQS. The facility must take into account its maximum emissions and impacts from other sources when demonstrating compliance with the increment, an additional air quality "cap" to protect the air quality of the area. Because the Clean Air Act recognized that air quality protection and economic development must be in harmony, the BACT analysis allows for the consideration of costs in determining the feasibility of additional controls. The facility has demonstrated it can meet the requirements in the PSD regulation as well as other applicable State and Federal air quality regulations developed to be protective of health and the environment.

12. **Other Environmental Impacts** – There were several comments that the community should be informed about other environmental aspects of the proposed facility in addition to the air emissions. Whenever possible, the Bureaus of Air Quality, Water Quality and Land and Waste Management coordinate public participation efforts with permitting a facility. However, PyraMax has not filed for any other permits through SC DHEC at this time. We do expect that a stormwater construction permit, and possibly an industrial stormwater permit, may be required for this facility. It is the responsibility of the SC DHEC's Bureau of Water to review all water quality and discharge permit applications that may be required by the facility. While there is not typically a formal public notice process for these stormwater permits, SC DHEC is committed to notifying the Allendale community if we receive applications for this facility. Additionally, PyraMax has informed the Department that waste disposal options are currently being evaluated, and that the Appleton Landfill would be a possibility for some waste materials. It is the responsibility of the SC DHEC's Bureau of Land and Waste Management to review all waste disposal

applications that may be required by the facility. SC DHEC also commits to notifying the Allendale community when we receive any additional waste disposal permit applications for this facility.

Although other permits may be required for this facility, those permits are not required for the issuance of an air construction permit. The Department's Environmental Protection Fees regulation and the Expedited Review Program establish time schedules for timely action on permit applications for construction permits. Therefore, the Department may not hold a permit application indefinitely when a facility has submitted all the required information and the Department has reviewed such information and complied with the regulatory requirements for public participation. In accordance with Section 48-1-100(A) of South Carolina Pollution Control Act, the Department must issue a permit if an applicant submits an application that meets all applicable Department standards.

13. **Greenhouse Gas Emissions** – A comment was made concerning the PyraMax carbon emissions contribution to global climate change and potential damage to human health in South Carolina. Climate change is a global problem. The EPA has stated that there are no specific greenhouse gas emission sources that can be pinpointed as the dominate contributors to the problem and "the global problem is much more the result of numerous and varied sources each of which emit what might seem to be smaller percentage amounts when compared to the total." The EPA has not proposed or established a national ambient standard for greenhouse gases. However, PSD was established by Congress in the Clean Air Act to protect the environment; therefore applying Best Available Control Technology for GHG emissions to this facility is protective of human health and the environment. The EPA has emphasized energy efficiency as BACT for GHG sources. The BACT analysis for PyraMax concluded that energy efficient design, waste heat recovery and the use of a lower carbon fuel, natural gas was BACT. The waste heat recovery project is estimated to save over 10,000 tons per year of GHGs. The use of a catalytic baghouse over a separate control device for nitrogen oxides is estimated to save over 80,000 tons per year of GHGs. Natural gas emits fewer GHGs then fuel oil, wood or coal.

a. BACT Did Not Account for GHG Emissions Outside the Plant – One commenter stated that GHG emissions that could be generated elsewhere as a result of the operation of the plant, such as traffic to and from the plant and potential emissions from the use of the final products (proppant ceramic beads) by the oil and natural gas industry, should be accounted for. The BACT analysis is specific to the emission source, such as the calciner kilns and the pelletizers. Because it is source specific, BACT does not take into account GHG emissions from any emission sources that may be generated outside the plant itself.

b. Limited Information on Pelletizer Efficiency – There was a comment that the Department made too many assumptions with limited data on this analysis. As part of the BACT analysis for GHGs, process designs that reduce GHG emissions should be considered. In the case of the pelletizer, there was no available information to determine which pelletizer type is more efficient, thereby reducing GHGs. The BACT analysis for the pelletizer did focus on design and work practice standards that

would optimize the process and could reduce GHG emissions. BACT requires a waste heat recovery system (as discussed above) to preheat the combustion gas for the pelletizers and thus reduce the amount of natural gas used to heat the process. BACT requires energy efficient design and work practices that will include vendor requirements for installation, maintenance and operation and manufacturer updates to the purchased equipment; facility's response to stack test results, visual observations, or change in any process variables such as throughput, raw materials etc.; and methods for minimizing emissions during start-up, shut-down and malfunctions, while continuing to meet BACT limits. Please refer to the PyraMax application pages 5-78 and 5-79 for a detailed discussion of the energy efficient design. Additionally, an emission limit was developed for the pelletizer operation. The facility must demonstrate compliance with this limit through stack tests, recordkeeping and reporting.

14. **Monitoring Process Control Equipment** – A comment was received concerning proper process control and monitoring. All of the potential emissions from the facility were reviewed to determine what level of control was required in order to comply with state and federal regulations. A Best Available Control Technology or Maximum Achievable Control Technology review, a step by step process, was followed to identify the required control device and/or control technology.

Specific permit requirements were included to test emissions from the control device stacks and to monitor the controls to insure compliance with the emission limits. Initial and periodic stack tests are required to demonstrate compliance with the emission limits. The Department's stack testing regulation requires that the tests be conducted "while the source is operating at the maximum expected production rate or other production rate or operating parameter which would result in the highest emissions for the pollutants being tested." In addition to stack tests, each control device will be monitored regularly to insure proper operation and efficiency.

As an example, the calcining kilns' catalytic baghouses control particulate matter, nitrogen oxides, sulfur dioxides, hydrogen fluoride and hydrochloric acid. Each catalytic baghouse will be stack tested for pollutant emissions. The facility is required to install, calibrate, maintain, and operate a continuous opacity monitoring system (COMS) for measuring the opacity of emissions discharged to the atmosphere and record the output of the system. The opacity is measured continuously by the COMS. The permit requires the facility to monitor the flow of the sorbent and ammonia injection system during the stack test for and maintain that flow while operating to demonstrate compliance. If the facility desires to use less sorbent or less ammonia, PyraMax will be required to conduct a new stack test to demonstrate compliance with the emission limit using the new injection amount. Pressure drop readings will be recorded daily and pressure drop ranges will be established using manufacturer recommendations, stack test data, vendor certification, operational history and/or visual inspections. The permit contains emission limits, testing, control device monitoring, fuel sampling, recordkeeping and reporting to ensure the facility is meeting the emission limits.