June 2, 2006

Mr. J. Wick Havens
Chief, Division of Air Resource Management
PA Department of Environmental Protection
P. O. Box 8468
Harrisburg, PA 17105-8468

Re: Comments Regarding Control Measures Under Consideration by the OTC

Dear Mr. Havens:

Keystone Cement Company (Keystone) has been following the Pennsylvania Department of Environmental Protection (PADEP) proceedings relative to control measures currently under consideration by the Ozone Transport Commission (OTC) and the Mid-Atlantic/Northeast Visibility Union (MANE-VU). With this letter we are submitting comments regarding the proposed control measures for cement kilns that would potentially impact our company's Bath, PA facility. A Keystone representative attended a meeting regarding the proposed control measures with PADEP and other PA cement industry representatives on April 28th in Harrisburg, as well as the public meeting held in Norristown on May 25th. Our understanding of the potential control measures for the cement industry is based on information provided during these meetings as well as information obtained from the OTC website.

As has been explained to date, Keystone understands that PADEP will participate at an OTC meeting in early June to vote on a decision to develop a model rule for reducing NO_X from cement kilns in the Northeast ozone transport region. The model rule will likely be based on a proposed NO_X limit for cement kilns of 2.0 pounds per ton of clinker produced. The basis for the limit is the application of selective non-catalytic reduction (SNCR) control technology that has reportedly been demonstrated to achieve up to 80% NO_X reduction for the industry. Keystone has a number of concerns regarding the NO_X control measures under consideration for our industry. We are addressing specific concerns in this comment letter.

NO_X Emissions from Cement Kilns

The raw materials in a cement pyroprocessing system undergo four steps to produce clinker, i.e., drying, preheating, calcining and incipient fusion ("burning"). All cement pyroprocessing systems utilize a rotary kiln in which clinker is formed in the high-temperature "burning zone". The material temperature in the burning zone must be sufficient (approximately 2,700 F) to complete the chemical reactions between calcium oxide and the other components of the raw material mix.

There are four different pyroprocessing systems used in the cement industry today to achieve the first three steps of the pyroprocess.

- In a wet kiln system, the raw materials are introduced into the rotary kilns as aqueous slurry. The evaporation of the water in the slurry requires a significant amount of energy.

- In a long-dry kiln system, the raw materials are introduced into the rotary kiln as a dry powder. Absent the need to evaporate many tons of water each day, the dry process is more thermally efficient that the wet process.

- In the preheater system, dry raw material mix is fed to a series of vessels arranged vertically in a tower in which the drying and preheating of the raw mix is accomplished. Upon exiting the preheater tower, the raw materials are sufficiently heated so that calcination can commence immediately in the rotary kiln.

- In the precalciner kiln system, a vessel is inserted between the preheater tower and the rotary kiln in which fuel is burned in direct contact with raw material from the preheater tower that is ready for calcination. The raw materials then enter the rotary kiln almost completely calcined. Thermal energy efficiency is the greatest in the precalciner kiln system.

Understandably, the process temperature profiles of each of these pyroprocessing systems are different in ways that can affect the generation and emission of NO_X. Keystone therefore believes that one emission standard on all four kiln types is not realistic, regardless of the NO_X control technologies available because, as stated above, not all kilns are designed to produce clinker in the same manner, and raw materials and fuel inputs are site specific. All of these factors have a direct impact on NO_X generation.

Keystone also questions whether retrofitting existing plants with SCR or SNCR is physically possible given that each technology has specific space requirements and needs a specific temperature window to work effectively. In addition, the duration of the temperature window will affect the reduction efficiencies achievable for each of the control technologies.

Due to different process types, some plants will be required to achieve large reductions to achieve the proposed NO_X emission rate, while others will only require small reductions. Keystone also believes that the current control technologies may not provide reductions sufficient to reach the proposed NO_X emission rate. This issue, in conjunction with OTC's proposed timeline of 2009, gives Keystone considerable cause for concern.

SCR vs. SNCR for NO_X Reductions

Selective catalytic reduction (SCR) and Selective non-catalytic reduction (SNCR) both rely on ammonia injection to reduce NO_X to nitrogen and water. Both technologies require sufficient temperature windows (600-800 F for SCR, and 1600-2000 F for SNCR), time for the reactions to occur, and sufficient turbulence in the exhaust for mixing to occur. If ammonia is injected at temperatures above those recommended, additional NO_X can be formed. If ammonia is injected

below recommended temperatures, the ammonia will not react and be emitted as "ammonia slip." Ammonia slip has been shown to contribute to fine particulate ($PM_{2.5}$) emissions.

The OTC Cost Estimates are Questionable

The OTC suggests that installing SNCR, along with annualized costs, would be less than $2,500 per ton of NO_X controlled. Keystone believes that this cost estimation is based upon the following questionable assumptions:

- OTC suggests that all kiln types can achieve a 60% NOX reduction. As previously stated, SNCR reductions will vary greatly from plant to plant and process type.
- The cost estimate does not appear to consider the installation cost associated with SNCR.

For long wet process kilns such as Keystone's, there are limited options available to meet the temperature requirements for the SNCR system:

- End of pipe technology, similar to SCR. This would be cost prohibitive due to the high fuel cost to heat the gas stream to the appropriate range.
- Injecting packets of urea into the burning zone of the kiln
- Mid kiln injection

Injecting urea or ammonia to the burning zone or at mid kiln would be considered innovative technology and would require pilot testing to determine the feed rate for the urea or ammonia. Furthermore, injecting urea may result in inconsistent conditions within the kiln, thereby reducing the overall effectiveness of the system.

Our first major concern surrounds the lack of supporting documentation that the additional burden proposed to be placed on Keystone and the other PA cement plants will result in any demonstrable change relative to the underlying ozone attainment issue. As explained during the meetings mentioned above, the timing of the need to develop and implement the proposed new regulations apparently precludes the opportunity to perform additional modeling that specifically addresses our facility and our industry. Given the technological and economic impacts that such new regulations will impose on our industry we find this position ill advised. We believe that any decision to further regulate our industry should be fully supported by valid results and not based solely on the premise that since our industry remains viable and emits this pollutant, it should be mandated that additional reductions be obtained.

Conclusions

Keystone is concerned about the broad-based assumption that all of the cement plants that will be subject to the rule will be mandated to meet the same NO_X emission limit based on comparable control technology. The reality is that not only does the cement kiln technology

vary from facility to facility; the raw materials and fuels used are also vastly different. Each of these facility-specific aspects will impact the ability to apply NO_X control technology and will dictate the level of control achievable. Furthermore, the reductions required to achieve the target level will result in substantially different control cost effectiveness values for each facility. Keystone does not believe that the values identified by the OTC for the proposed SNCR technology are supportable as the basis for developing the proposed limit. Keystone, for example plans to be operating a new state-of-the-art preheater/precalciner kiln that is designed and permitted to achieve a long-term NO_X emission rate of 2.6 pounds per ton of clinker. The cost effectiveness for further reducing these emissions to 2.0 pounds per ton will be substantially higher for Keystone than for comparable systems emitting higher levels of NO_X per ton of clinker produced.

Keystone appreciates the opportunity to present these comments. We believe that it is premature for PA or any of the other OTC states to develop a proposed rule for cement kilns until additional data supporting the need for such a rule is made available for review and comment, and until the real control technology application and cost-effectiveness issues have been identified and substantiated. Keystone looks forward to the opportunity to work with PADEP to evaluate the need for such a rule, and if warranted, to help develop a realistic strategy that would benefit affected citizens, the OTC member states, and our affected industry.

If you have questions or comments concerning these comments please do not hesitate to contact me at 610-837-1881, extension 3213.

Sincerely,

Rocco Marinaro
Manager, Environmental Compliance

cc: Deputy Secretary Thomas Fidler, Harrisburg, PA
Mr. Dan Gundersen, Ex. Deputy Director – DCED

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