Votorantim Cimentos

St Marys Cement

March 5, 2019

Mr. Rob Dickman
Environmental Quality Analyst
Air Quality Division
Michigan Department of Environmental Quality
120 West Chapin Street
Cadillac, MI 49601

Re: Response to Violation Notice, dated February 12, 2019
St. Marys Cement, Inc. (SRN: B1559)
Charlevoix, Michigan

Dear Mr. Dickman:

St. Marys Cement, Inc. (SMC) has prepared this letter in response to the MDEQ Violation Notice (VN) dated February 12, 2019. The VN alleges that SMC violated the following Special Conditions (SC) related to permit to install (PTI) 140-15 for emission unit EUINLINEKILN:

Process Description	Rule/Permit Condition Violated	Comments
EUINLINEKILN	*PTI 140-15* *EUINLINEKILN, 1.2 & 1.3*	*PM10/2.5 emissions are limited to 57.5 pph from the Main and Bypass stacks combined. Reported emissions were 130.4 pph*
EUCLINKERCOOLER	*PTI 140-15* *EUCLINKERCOOLER, 1.3 & 1.4*	*PM10/2.5 emissions are limited to 5.0 pph from this process. Reported emissions were 6.5 pph*

As requested, this letter provides information regarding the referenced citations, including:

- the date the alleged violations occurred
- an explanation of the causes and duration of the alleged violation
- whether the violation is ongoing
- a summary of the actions that have been taken, and/or are proposed to be taken, to correct the violation
- the date(s) by which these actions will take place
- what steps are being taken to prevent a reoccurrence

EUINLINEKILN $PM_{10}/PM_{2.5}$ Exceedance

As described in our November 20, 2018 and January 16, 2019 letters, SMC encountered difficulties during the testing of $PM_{10}/PM_{2.5}$; therefore, we do not believe the test results to be representative of kiln operations. Issues with accurately measuring condensable $PM_{10}/PM_{2.5}$ emissions are well documented. In addition, because the plant had just come back online after an extended outage, the plant had not likely completed the necessary "shakedown activities" needed to complete the required emissions testing. This affected measured emissions.

As you are aware, the recent plant upgrade has taken considerably more time to start-up to address mechanical and control issues that have occurred due to tying in new equipment and systems to the existing plant. Like similar large projects, this project was also delayed because needed parts and supplies were delivered later than scheduled and contractor work took longer than anticipated. Continued plant performance issues have led to SMC's decision to take the plant into another extended outage, during the first quarter of 2019, to address outage activities which could not be performed with the plant online and which should have been completed during the previous shutdown. SMC will prepare a new test program after this extended outage and will submit this later this month. The new test program will address biases encountered during the initial testing.

Sources such as the EUINLINEKILN with acid gas emissions, especially those using ammonia for their control equipment, have trouble measuring condensable particulate matter due to salt formation in the collected water after sample collection. This is aggravated by sulfur dioxide and ammonia in the exhaust stream. SMC suspects that significant artifact formation took place in the Method 202 sampling train, as evidenced by the aqueous condensable material collected from the Main Stack. It should be noted that during September, SMC was mining in a pocket of material with an elevated sulfur content, causing the plant to have unusually high sulfur dioxide (SO_2) emissions. As you know, part of the recent plant upgrade included installation of a new selective non-catalytic reduction (SNCR) to control nitrogen oxides (NO_X) emissions. Until the SNCR system is optimized, excess ammonia may be present in the exhaust. This excess ammonia is absorbed by the impingers used in emissions testing, increasing the pH, which, in turn, increases oxidation of SO_2 forming sulfates in the sampling train. The resulting sulfates are then measured as condensable PM, even though the sulfates formed in the sampling train were not present in the exhaust. It should be noted that SO_2 emissions were higher than expected at the time of testing although not above the permit limit. To address the excess sulfur, SMC has purchased bauxite, which will be mixed in with the raw materials should SO_2 emissions increase in the future; SMC will continue to monitor SO_2 emissions and will mix in the bauxite or other low sulfur aluminum sources as needed. This will also help to prevent artifact formation when SMC retests PM_{10} and $PM_{2.5}$ following the upcoming outage.

Excess ammonia in the exhaust is also measured as condensable PM and can form other compounds, like ammonium chloride or ammonium sulfate, which will be picked up or formed in the sampling train. The recent stack testing suggests that additional SNCR optimization is needed. While the SNCR system is meeting SMC's NO_X reduction goals and NO_X emission limits, the use of aqueous ammonia was not optimized and ammonia as high as 225 parts per million(ppm) was estimated during the stack test program. The plant has added programing to allow *ammonia slip* to be monitored through the Fourier Transform Infrared Continuous Emissions Monitoring System (FTIR CEMS) and currently tries to keep ammonia levels low, yet achieving compliance with NOx emissions.

It should be noted that changes were made to Method 202 to address artifact formation from ammonia in the exhaust, though Method 202 no longer allows for an adjustment because of this bias. Revisions to Method 202 address this issue with a nitrogen purge, which will not completely remove the bias. In addition, the nitrogen purge is most effective when started immediately following completion of the test run. During SMC's recent testing, the technician delayed the purge until after delivery to the laboratory trailer and weighing the sample train, which contributed to higher bias as the high levels of ammonia in the exhaust were not identified until after the test data had been evaluated.

When all these factors are evaluated together, it seems obvious that the test data is questionable. A retest is planned which will demonstrate that emissions information included in our previous correspondence was not representative of kiln operations.

Going forward, the plant will continue to monitor and minimize ammonia slip. As previously described, the plant has ordered bauxite and will use the bauxite or other low sulfur aluminum sources to limit excess SO_2, which could form sulfate in the sampling train. The plant, working in conjunction with our stack testing team, will resubmit a new Stack Test Plan which will eliminate the testing bias. Following the extended outage in early 2019, the plant will retest $PM_{10}/PM_{2.5}$, and will submit the results in a timely manner.

EUCLINKERCOOLER $PM_{10}/PM_{2.5}$ Exceedance

According to the Portland Cement Association, clinker coolers are not a source of condensable particulate emissions. We believe the condensable emissions in the clinker cooler are associated with test issues, and without the condensable emissions the clinker cooler passes $PM_{2.5}/PM_{10}$ emission limits with a comfortable margin. In addition to the condensable emissions identified during the testing of Clinker Cooler, the Coal Mill also indicated the presence of both organic and inorganic condensable particulate matter. Neither was expected when testing these processes as there is not a source of condensable particulate from these processes[1]. In an ambient air process, the condensable emissions were likely the product of glassware contamination either in the field or the laboratory; therefore, an indication of an inconclusive test. Longer test runs would prove this theory.

In conclusion, it should be noted that difficulties encountered in using USEPA Method 202 are well-documented. Proposed retesting has been scheduled by SMC, including these additional efforts to eliminate contamination and artifact formation to ensure accurate test results. The testing will take place after the Spring plant outage. We believe we are in compliance; however, are currently are unable to demonstrate compliance due the biases.

As the MDEQ is aware, SMC is undertaking significant plant upgrades which will result in better efficiency and lower emissions. SMC is committed to working with the MDEQ to resolve these violations. If you have any questions or require additional information, please contact me at 231.237.1342.

Sincerely,

Matthew Simon

SMC-OM CHX

cc: Ms. Jenine Camilleri – MDEQ

Ms. Stephanie A. Jarrett, PE – FTCH

[1] Requiring the use of Proposed Method 202 for sources such as material handling operations, crushers, and bagging operations results in unnecessary expenses. Proposed Method 202 should not be required for sources that clearly do not generate condensable vapors. In the cement industry, sources such as clinker coolers and finish mills operate at elevated temperature but have no possible source of condensable vapors. Method 5, "Determination of Particulate Matter Emissions from Stationary Sources," provides an adequate measurement of total particulate matter emissions for these types of sources."
https://www3.epa.gov/ttn/emc/methods/comments201a202.pdf