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SO_2 Emissions Monitoring Plan EUINLINEKILN

St. Marys Cement
16000 Bells Bay Road
Charlevoix, Michigan

February 13, 2020
Project No. 190224

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List of Abbreviations/Acronyms

CEMS	continuous emissions monitoring system
lb/hr	pounds per hour
lb/ton	pounds per ton
SO_2	sulfur dioxide
ROP	renewable operating permit
SNCR	selective non-catalytic reduction

I. Background

The St. Marys Cement Plant in Charlevoix, Michigan is a Portland cement manufacturer. The in-line kiln/raw mill is subject to an SO_2 emission limit of 1,175 lb/hr, which is determined as the average of each calendar day's emissions over the time of operation. Compliance with the SO_2 emissions limit is determined using a CEMS.

A. Emission Unit

Description: The in-line kiln/raw mill system feed is calcined in the preheater tower, the source of heat for this reaction is generated in both the calciner and kiln, the kiln is the location where the feed is heated to a point where the calcined feed is melted and then cooled to start the formation of clinker. The calciner and kiln have been designed to use traditional solid and liquid fuels and various alternative fuels including asphalt flakes, plastic, and small quantities of cellulose fibers. Control equipment associated with in-line kiln system includes conditioning towers prior to downstream equipment (for modulating temperatures), SNCR, the main stack baghouse, bypass stack baghouse, and other smaller baghouses. A lime injection system will be installed in the 3rd quarter of 2020.

Identification: EUINLINEKILN

Facility: St. Marys Cement, Inc. (U.S.)
State Registration Number (SRN): B1559
16000 Bells Bay Road
Charlevoix, Michigan

B. Applicable Regulation, Emission Limit, Monitoring Requirements

Permit: MI-ROP-B1559; PTI 140-15

SO_2 Emission Limits:

Emission Unit ID	Applicable Emission Limits			Control Type
EUINLINEKILN	SO_2	7.5 lb/ton of clinker produced	12-month average	Hydrated Lime Injection System to be used as needed.
	SO_2	1,175 lb/hr	Hourly, as the average of each calendar day's emissions over the time of operation.	

Monitoring Requirement: CEMS is used to record the clinker production and determine the daily average SO_2 emission rate in lb/hr.

C. Control Technology

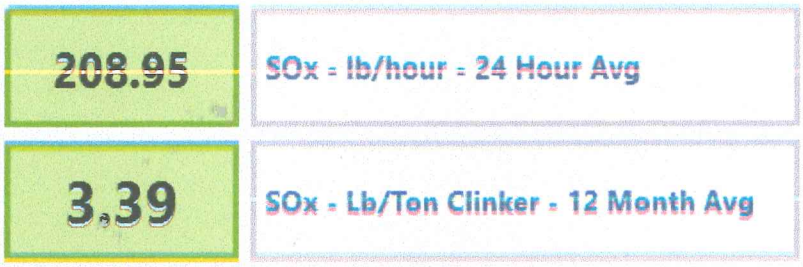
Lime Injection: A hydrated lime injection system will be used as needed to assure compliance with SO_2 emission limitations from the in-line kiln/raw mill while affording additional operational flexibility for process sulfur inputs. The injection system will be installed during the third quarter of 2020.

II. Monitoring Approach

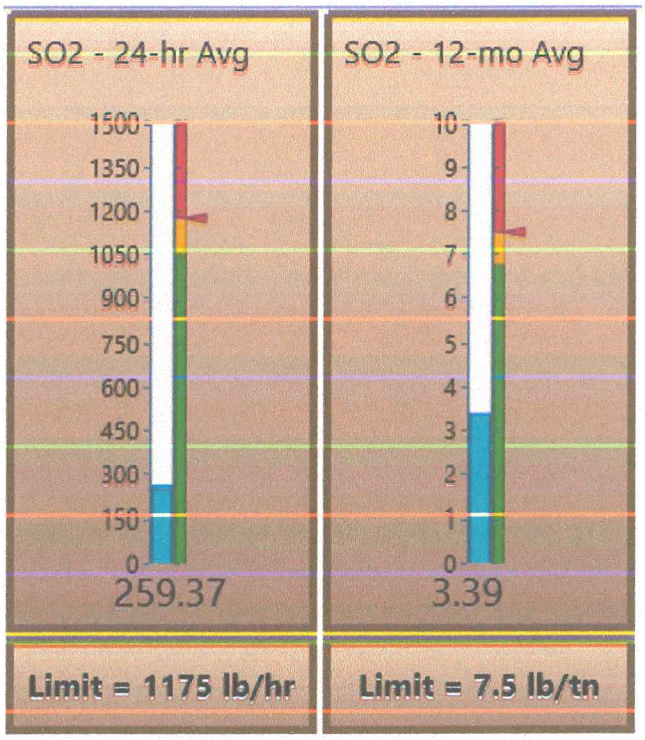
A. Indicators Monitored: SO_2 emissions

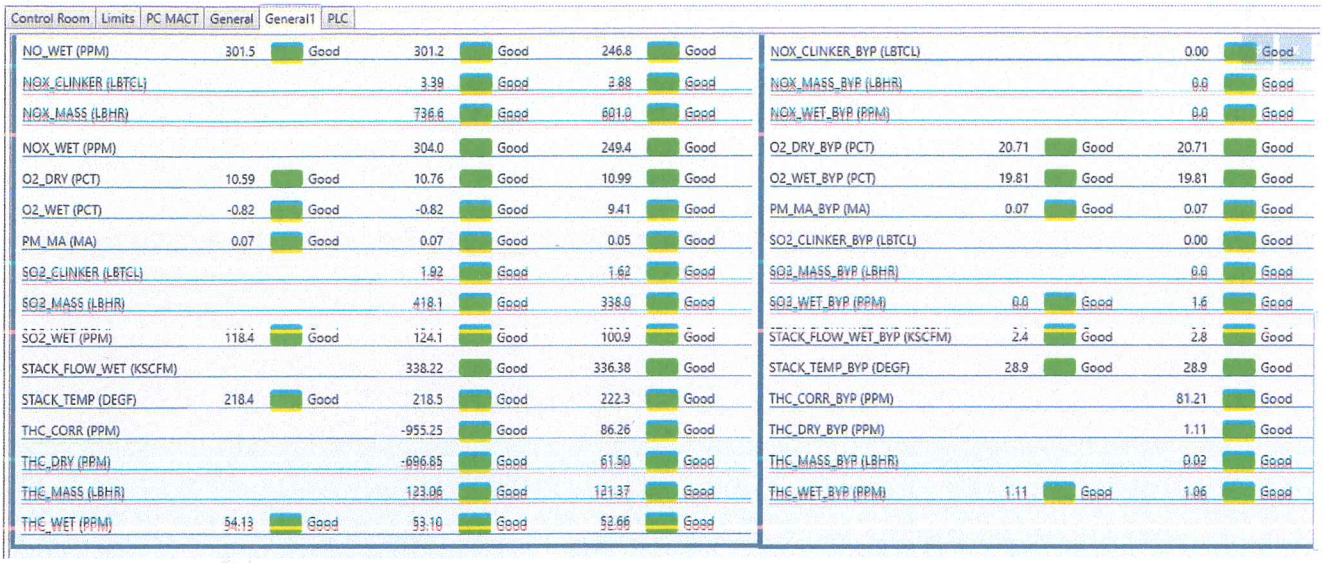
A. Indicator	SO_2 emissions are monitored continuously using a CEMS. The CEMS calculates the daily average SO_2 hourly emission rate.
B. Range	When SO_2 daily average emissions exceed 1,175 lb/hr after 12:00 noon, the plant will initiate corrective actions to ensure that the SO_2 emissions do not exceed the daily average emissions.
C. Monitoring	The control room monitors identify the current SO_2 daily average lb/hr emission rate and current 12 month rolling average.

Control Room Dashboard



Control Room Limits





Control Room | Limits | PC MACT | General | General1 | PLC

NO_WET (PPM)	301.5	Good	301.2	Good	246.8	Good	NOX_CLINKER_BYP (LBTCL)				0.00	Good
NOX_CLINKER (LBTCL)			3.39	Good	2.88	Good	NOX_MASS_BYP (LBHR)				0.0	Good
NOX_MASS (LBHR)			736.6	Good	601.0	Good	NOX_WET_BYP (PPM)				0.0	Good
NOX_WET (PPM)			304.0	Good	249.4	Good	O2_DRY_BYP (PCT)	20.71	Good		20.71	Good
O2_DRY (PCT)	10.59	Good	10.76	Good	10.99	Good	O2_WET_BYP (PCT)	19.81	Good		19.81	Good
O2_WET (PCT)	-0.82	Good	-0.82	Good	9.41	Good	PM_MA_BYP (MA)	0.07	Good		0.07	Good
PM_MA (MA)	0.07	Good	0.07	Good	0.05	Good	SO2_CLINKER_BYP (LBTCL)				0.00	Good
SO2_CLINKER (LBTCL)			1.92	Good	1.62	Good	SO2_MASS_BYP (LBHR)				0.0	Good
SO2_MASS (LBHR)			418.1	Good	338.0	Good	SO2_WET_BYP (PPM)	0.0	Good		1.6	Good
SO2_WET (PPM)	118.4	Good	124.1	Good	100.9	Good	STACK_FLOW_WET_BYP (KSCFM)	2.4	Good		2.8	Good
STACK_FLOW_WET (KSCFM)			338.22	Good	336.38	Good	STACK_TEMP_BYP (DEGF)	28.9	Good		28.9	Good
STACK_TEMP (DEGF)	218.4	Good	218.5	Good	222.3	Good	THC_CORR_BYP (PPM)				81.21	Good
THC_CORR (PPM)			-955.25	Good	86.26	Good	THC_DRY_BYP (PPM)				1.11	Good
THC_DRY (PPM)			-696.85	Good	61.50	Good	THC_MASS_BYP (LBHR)				0.02	Good
THC_MASS (LBHR)			123.06	Good	121.37	Good	THC_WET_BYP (PPM)	1.11	Good		1.06	Good
THC_WET (PPM)	54.13	Good	53.10	Good	52.66	Good						

B. Corrective Actions: SO_2 emissions

Corrective action will be initiated with adequate time to make adjustments to feed rate or initiate lime injection so that the daily average SO_2 emissions do not exceed 1,175 lb/hr. If the daily average emissions of SO_2 are greater than 1,175 lb/hr after 12:00 noon, corrective actions can include:

- Monitor SO_2 emissions to determine if the emission rate drops below 1,175 lb/hr. Monitoring will not exceed 4 hours, to ensure the plant has adequate time left in the calendar day to bring emissions into compliance with the daily average limit.
- Adjusting sulfur inputs to decrease SO_2 emissions
- Initiating (3rd Q 2020) the hydrated lime injection system to control SO_2 emissions and maintain compliance with SO_2 limits while affording operational flexibility for process sulfur inputs.

III. Justification

A. Rationale for Selection of Performance Indicators

St. Marys monitors SO_2 emissions using a CEMS, which provides real time data for comparison to the emission limit.

B. Rationale for Selection of Indicator Ranges

The SO_2 limit is a lb/hr limit based on a daily average of each calendar day's emissions over the time of operation. Monitoring the emissions and establishing a corrective action trigger point of 12:00 noon, followed by up to 4 hours of monitoring, gives the plant adequate time (8 hours minimum on a full day) to initiate corrective action(s) to ensure that the daily limit is not exceeded for the full calendar day operation. The control room monitors change color from green to yellow at 80% of the daily average limit, and from yellow to red at 100% of the daily average limit. The plant will adjust monitoring time and initiate corrective action earlier depending on what time during the calendar day that CEMS system exceeds the 1,175 lb/hr daily average.