1.0 EXECUTIVE SUMMARY

Mostardi Platt conducted a particulate test program for St Marys Cement on the Dust Collection System designated as EU-001 (Slag Dryer), EU-004 (Finish Mill #1 Separator), and EU-005 (Finish Mill #1 Discharge) in Detroit, Michigan. This report summarizes the results of the test program and test methods.

The purpose of the test program was to demonstrate the facility meets the requirements of Permit to Install No. 262-99A.

The test locations, operating conditions, test dates, test parameter, emission limit, and emission rate are summarized below.

Test Locations	Dates	Parameter	Emission Limit	Emission Rate
EU-001	12/1/21	FPM	≤0.60 lb/hr	0.30 lb/hr
			≤0.0218 lb/1000lb of exhaust Gas	0.0026 lb/1000lb of exhaust Gas
EU-004	12/2/21		≤0.48 lb/hr	0.06 lb/hr
			≤0.0114 lb/1000lb of exhaust Gas	0.0004 lb/1000lb of exhaust Gas
EU-005	12/2/21		≤0.08 lb/hr	0.06 lb/hr
			≤0.0122 lb/1000lb of exhaust Gas	0.0012 lb/1000lb of exhaust Gas

Source Operating Conditions (ton/hr, 3-run average)		
EU-001	**EU-004**	**EU-005**
105.9	45.1	44.6

The identifications of the individuals associated with the test program are summarized below.

TEST PERSONNEL INFORMATION		
Location	**Address**	**Contact**
Test Facility	St Marys Cement 9333 Dearborn Street Detroit, MI 48209	Mr. Eric Olson Safety Specialist P: 313-849-4574 E: eric.olson@vcimentos.com
Testing Company Supervisor	Mostardi Platt 888 Industrial Drive Elmhurst, Illinois 60126	Mr. Ryan K. Simon Project Manager 630-993-2100 (phone) rsimon@mp-mail.com

The test crew consisted of Messrs. J. Priesz, M. Friduss, and R. Simon.

2.0 PROCESS DESCRIPTION

SMC is permitted to operate cement manufacturing processes associated with the processing of slag. The units dry the slag (EU-001) and process (mill and separate) the slag (EU-004 and EU-005). The slag is run through the slag dryer (EU-001) on a conveyor and tumbler and is heated with natural gas. The slag dryer can process a maximum of 125 tons per hour. Finish Mill 1 (EU-005) and the Finish Mill 1 Separator (EU-004) are used for slag processing and consist of a ball mill containing steel balls to crush the slag into finer material. The slag processing equipment can process a maximum of 45 tons per hour. Exhaust gases from the Slag Dryer (EU-001), Mill #1 Separator (EU-004), and Mill #1 Discharge (EU-005) are directed to particulate matter (PM) emission control systems (dust collectors). The filtered process air from each of the three (3) emission units is exhausted through individual, vertical stacks to the atmosphere.

Testing was performed while the emission units were operating at or near maximum representative production rates.

3.0 TEST METHODOLOGY

Emission testing was conducted following the United States Environmental Protection Agency (USEPA) methods specified in 40CFR60, Appendix A in addition the Mostardi Platt Quality Manual. Operating data as provided by St Marys is included in Appendix A. Schematics of the test section diagrams and sampling trains used are included in Appendix B and C respectively. Calculation nomenclature are included in Appendix D. Laboratory analysis for each test run are included in Appendix E. The computerized reference method test data is included in Appendix F.

The following methodologies were used during the test program:

Method 1 Sample and Velocity Traverse Determination

Test measurement points were selected in accordance with USEPA Method 1, 40CFR60, Appendix A. The characteristics of the measurement location are summarized below.

TEST POINT INFORMATION							
Test Location	Stack Dimensions	No. of Ports	Port Length (Inches)	Upstream Diameters	Downstream Diameters	Test Parameter	Number of Sampling Points
EU-001	4.979'	2	4.25	8.8	6.4	FPM	16
EU-004	5.979'	2	4.50	6.3	2.8	FPM	24
EU-005	2.810'	2	6.75	3.6	4.3	FPM	24

Method 2 Volumetric Flow Rate Determination

Gas velocity was measured following USEPA Method 2, 40CFR60, Appendix A, for purposes of calculating stack gas volumetric flow rate and emission rates on a lb/hr basis. S-type pitot tubes, 0-10" differential pressure gauge, and K-type thermocouple and temperature readout were used to determine gas velocity at each sample point. All of the equipment used was calibrated in accordance with the specifications of the Method. Copies of field data sheets are included in Appendix G. Calibration data are presented in Appendix H. This testing met the performance specifications as outlined in the Method.

Method 3A Oxygen (O_2)/Carbon Dioxide (CO_2) Determination

Flue gas O_2 and CO_2 concentrations were determined in accordance with USEPA Method 3A at the EU-001 test location. An ECOM analyzer was used to determine the O_2 and CO_2 concentrations by connecting the analyzer to the exit of the dry gas meter. The O_2 instrument operates in the nominal range of 0% to 21% with the specific range determined by the high-level calibration gas. The CO_2 instrument operates in the nominal range of 0% to 20% with the specific range determined by the high-level calibration gas. High and mid-range calibrations were performed using USEPA Protocol gas. Zero nitrogen (a low ppm pollutant in balance nitrogen calibration gases) was introduced during other instrument calibrations to check instrument zero. Zero and mid-range calibrations were performed using USEPA Protocol gas after each test run. Copies of the gas cylinder certifications are found in Appendix I.

At the EU-004 and EU-005 test locations, flue gas O_2 and CO_2 concentrations were determined per section 8.6 of USEPA Method 2 – "for processes emitting essentially air, an analysis need not be conducted; use a dry molecular weight of 29.0" – the oxygen and carbon dioxide concentrations were assumed to be ambient.

Method 4 Moisture (H_2O) Determination

Stack gas moisture content was determined using a Method 4 sampling train as a component of the Method 5 sample train. In this technique, stack gas is drawn through a series of four impingers. The first two impingers were each charged with 100 mls of deionized, distilled water. Impinger three was left empty and impinger four was charged with clean, dried silica gel. The entire impinger train was measured before and after each test run to determine the mass of moisture condensed.

During testing, the sample train was operated in the manner specified in USEPA Method 4 and Method 5. All of the data specified in Method 4 (gas volume, delta H, impinger outlet well temperature, etc.) were recorded on field data sheets.

All of the equipment used were calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix H.

Method 5 Filterable Particulate Matter (FPM) Determination

Particulate matter was sampled in accordance with USEPA Method 5, 40CFR60, Appendix A. The particulate matter sampling train was manufactured by Environmental Supply Corporation and meets all specifications required by Method 5. Velocity pressures were determined simultaneously during sampling with an S-type pitot tube and inclined manometer. All temperatures will be measured using K-type thermocouples with calibrated digital temperature indicators. The probe and filter temperatures were maintained at 248°F $^{+}/_{-}$ 25°F throughout sampling.

The filter media are high purity quartz that meet all requirements of Method 5. All sample contact surfaces of the train were washed with HPLC reagent-grade acetone. These washes were placed in sealed and marked containers for analysis.

All sample recoveries were performed at the test site by the test crew. All final particulate sample analyses were performed by Mostardi Platt personnel at the laboratory in Elmhurst, Illinois.

Laboratory analysis data are found in Appendix E. Calibration data are presented in Appendix H.

4.0 TEST RESULT SUMMARIES

Client: St Marys Cement
Facility: Detroit Plant
Test Location: EU-001 Slag Dryer Stack
Test Method: 5

Source Condition	Normal	Normal	Normal	
Date	12/1/21	12/1/21	12/1/21	
Start Time	12:02	13:55	15:25	
End Time	13:29	15:02	16:32	
	Run 1	Run 2	Run 3	Average
Stack Conditions				
Average Gas Temperature, °F	179.2	242.9	244.8	222.3
Flue Gas Moisture, percent by volume	19.6%	17.6%	19.7%	19.0%
Average Flue Pressure, in. Hg	29.96	29.96	29.96	29.96
Gas Sample Volume, dscf	40.832	40.656	39.259	40.249
Average Gas Velocity, ft/sec	32.866	34.386	34.655	33.969
Gas Volumetric Flow Rate, acfm	38,397	40,173	40,487	39,686
Gas Volumetric Flow Rate, dscfm	25,549	24,912	24,393	24,951
Gas Volumetric Flow Rate, scfm	31,764	30,219	30,374	30,786
Average $\%CO_2$ by volume, dry basis	3.5	3.2	3.5	3.4
Average $\%O_2$ by volume, dry basis	14.3	14.6	14.0	14.3
Isokinetic Variance	99.1	101.2	99.8	100.0
Filterable Particulate Matter (Method 5)				
grams collected	0.00344	0.00328	0.00436	0.00369
mg/dscm	2.975	2.849	3.922	3.2487
mg/wscm	2.392	2.348	3.149	2.6297
lb/hr	0.29	0.27	0.36	0.30
lb/1000 lb of stack gas	0.0025	0.0024	0.0031	0.0026

Client: St Marys Cement
Facility: Detroit Plant
Test Location: EU-004 Mill #1 Separator Stack
Test Method: 5

Source Condition	Normal	Normal	Normal	
Date	12/2/21	12/2/21	12/2/21	
Start Time	7:50	9:07	10:38	
End Time	8:53	10:12	11:42	
	Run 1	Run 2	Run 3	Average
Stack Conditions				
Average Gas Temperature, °F	142.2	147.0	154.6	147.9
Flue Gas Moisture, percent by volume	2.8%	1.0%	1.4%	1.7%
Average Flue Pressure, in. Hg	28.79	28.79	28.79	28.79
Gas Sample Volume, dscf	46.884	45.739	45.149	45.924
Average Gas Velocity, ft/sec	26.025	25.668	25.771	25.821
Gas Volumetric Flow Rate, acfm	43,844	43,243	43,417	43,501
Gas Volumetric Flow Rate, dscfm	35,946	35,836	35,381	35,721
Gas Volumetric Flow Rate, scfm	36,986	36,186	35,883	36,352
Isokinetic Variance	102.8	100.6	100.6	101.3
Filterable Particulate Matter (Method 5)				
grams collected	0.00087	0.00040	0.00053	0.00060
mg/dscm	0.655	0.309	0.415	0.4596
mg/wscm	0.637	0.306	0.409	0.4505
lb/hr	0.09	0.04	0.06	0.06
lb/1000 lb of stack gas	0.0005	0.0003	0.0003	0.0004

Client: St Marys Cement
Facility: Detroit Plant
Test Location: EU-005 Mill #1 Discharge Stack
Test Method: 5

Source Condition	Normal	Normal	Normal	
Date	12/2/21	12/2/21	12/2/21	
Start Time	13:08	14:42	15:55	
End Time	14:15	15:45	16:57	
	Run 1	Run 2	Run 3	Average
Stack Conditions				
Average Gas Temperature, °F	250.8	251.5	252.3	251.5
Flue Gas Moisture, percent by volume	4.1%	4.4%	3.9%	4.1%
Average Flue Pressure, in. Hg	28.73	28.73	28.73	28.73
Gas Sample Volume, dscf	40.907	41.177	41.051	41.045
Average Gas Velocity, ft/sec	42.072	42.088	42.130	42.097
Gas Volumetric Flow Rate, acfm	15,655	15,661	15,676	15,664
Gas Volumetric Flow Rate, dscfm	10,704	10,674	10,731	10,703
Gas Volumetric Flow Rate, scfm	11,168	11,160	11,160	11,163
Isokinetic Variance	100.9	101.8	101.0	101.2
Filterable Particulate Matter (Method 5)				
grams collected	0.00328	0.00088	0.00084	0.00167
mg/dscm	2.832	0.755	0.723	1.4363
mg/wscm	2.715	0.722	0.694	1.3771
lb/hr	0.11	0.03	0.03	0.06
lb/1000 lb of stack gas	0.0024	0.0006	0.0006	0.0012

5.0 CERTIFICATION

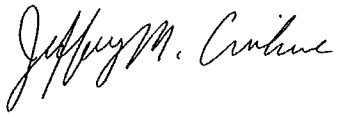
Mostardi Platt is pleased to have been of service to St Marys Cement. If you have any questions regarding this test report, please do not hesitate to contact us at 630-993-2100.

As the program manager, I hereby certify that this test report represents a true and accurate summary of emissions test results and the methodologies employed to obtain those results. The test program was performed in accordance with the test methods and the Mostardi Platt Quality Manual, as applicable.

MOSTARDI PLATT

Project Manager

Ryan K. Simon



Quality Assurance

Jeffrey M. Crivlare