Walker, Elizabeth (AIR)

From: DeVore, Christy
Sent: Friday, May 21, 2010 12:51 PM
To: Walker, Elizabeth (AIR)
Subject: FW: Emailing: 238-09
Attachments: Copy of shingle reports for PTI 238-09.pdf; 238-09.pdf

For file 1210465-020-AC.

Christy DeVore, P.E.
Bureau of Air Regulation
New Source Review
Telephone (850) 921-8968

From: Cole Krishna [mailto:krishnac@suwanneecement.com]
Sent: Friday, May 21, 2010 11:04 AM
To: DeVore, Christy
Cc: mlee@kooglerassociates.com; Koerner, Jeff; SCHMIDT CORTNEY; Messer Tom; Martini Celso
Subject: Emailing: 238-09

Christy,

Please find attached the intial test trial permit provided to Charlevoix - St Mary Cement Plant for shingles.

Also see a copy of the results of this testing.

Thank you,
Krishna Cole

St. Marys Cement, Inc. (U.S.)
Charlevoix Plant
P.O. Box 367
16000 Bells Bay Road
Charlevoix, MI 49720
Phone – 231-547-9971
Fax – 231-547-6202

ST MARYS

USPS Mail

December 8, 2009

C/O Andrew Drury
Michigan Department of Environmental Quality
Air Quality Division
P.O. Box 30260
Lansing, Michigan 48909-7760

Re: St Marys Cement Inc, Report to MDEQ on PTI 238-09

Dear Andrew:

The following letter represents St Marys Cement Inc, Charlevoix Michigan Plant (SMC) report to the MDEQ to meet the special conditions of the Permit To Install (PTI) 238-09. In October 2009, SMC obtained approximately 190 tons of processed shingles from:

Crutchall Resource recycling
200 32nd street
Wyoming, Michigan 49548

SMC's objective for the shingle trial was to determine if there were any obvious issues with the handling and consumption of shingles in the cement manufacturing process which would preclude further investigation of shingles as a possible alternative fuel. The trial consumption began at 1200 hrs on 11/09 and we had completely consumed the shingles by 1300 hrs on 11/11

SMC utilized an existing clinker reclaiming system to deliver the shingles into the kiln. The clinker reclaim system is fitted with a gravity tipping valve that would not work to our engineer's satisfaction under the weight of the shingles alone. To ensure safe operation and delivery of the shingles into the kiln system through this gravity tipping valve, the shingles were blended to a 50/50 mass mixture with an onsite source of clinker. Attached to this letter you will find the required PTI process data in tabular form. Table 1 is the normal operating data prior to the use of asphalt shingles. The following bullets will be helpful in understanding the tables:

- The "**preheater clinker reclaim scale**" data on tables 2, 3, and 4 represents the hourly tonnage of an approximately equal mass of clinker and shingles delivered to the kiln system. Divide the indicated tonnage by half to obtain the mass of shingles introduced into the kiln system.

- The **"kiln feed belt scale"** column in the provided tables represents the hourly average of raw feed entering the kiln system during the trial. A value of greater then 300 tons per hour is generally considered running at close to full production.

- The remained of the tables cover the hourly average values from the main and bypass COMs and CEMs units. Attached to the end of this report you will find the required lab data, covering samples of coal, pet coke and the shingles. These samples were collected as grab samples on the same day and sent to the same lab.

Results of trial:

SMC concludes that the shingles as fired did not appear to create any obvious issues with the quality of product produced.

Note: This was a very short trial, the intent of which was to investigate handling characteristics.

Note: Based on the mass of shingles consumed it would not have been expected to alter the quality.

It was determined that the shingles can become overly processed and create dust during the handling stages. Any long term permitted use of this product should take this into account. The location that the shingles were consumed in the process appears to have created a reduced oxygen condition as the gas flows entered the calciner. This reduced oxygen condition may have caused a reduction in nitric oxide emissions generated in the calciner and emitted at the main stack. We would investigate this further with a longer trial. The level of lead in the shingles was determined to be higher then the coal that it replaced so this would limit total fuel replacement as follows. When taking into account the BTU difference it appears that any substitution of shingle for coal will need to be less then 32.56 % based on the BTU value consumed in the process to avoid a PSD review caused by lead. This 32% value then becomes a theoretical maximum coal substitution rate.

Overall SMC was pleased with the results of this trial and would like to propose an additional trial be conducted January 1, 2010 to March 1, 2010. During this trial SMC would like to consume up to 3000 tons of shingles to make determinations on qualitative impacts on clinker emissions, and the process itself. Based on BTU's, this would equate to replace 1500 tons of coal which is approximately a 6 day trail at 100% substitution of coal in the calciner. More likely this would be a 15 to 20 day trial. If you need any additional information, please contact me at 231-237-1342.

Sincerely,

Cortney Schmidt
Environmental Manager - Charlevoix
Cc: File

TABLES

SMC-Table 1- TWO DAY DATA PRE SHINGLES

		Preheater Clinker Reclaim Scale	KILN FEED BELT SCALE	MAIN STACK OPACITY	BYPASS STACK OPACITY	MAIN STACK NOX (PRIMARY)	MAIN STACK SO2 (PRIMARY)	MAIN STACK CO	BYPASS STACK NOX	BYPASS STACK SO2	BYPASS STACK CO
Date	Hour	t/h	t/h	%	%	ppm	ppm	ppm	ppm	ppm	ppm
11/6/2009	00:00 - 01:00	8.25	309.8	4.31	0.97	253.3	539.6	2541.8	64.8	42.7	14.2
11/6/2009	01:00 - 02:00	5.75	303.5	4.09	0.91	318.6	407.0	1674.9	63.9	6.7	3.7
11/6/2009	02:00 - 03:00	7.54	299.7	4.12	0.96	348.9	301.0	1259.5	74.4	7.0	2.1
11/6/2009	03:00 - 04:00	8.27	299.9	4.19	1.00	343.0	334.7	1313.4	72.8	13.0	2.4
11/6/2009	04:00 - 05:00	9.64	304.4	4.25	0.98	340.9	382.1	1568.6	71.3	16.8	1.1
11/6/2009	05:00 - 06:00	9.34	309.0	4.16	0.95	372.4	468.5	1384.3	81.6	-0.3	0.2
11/6/2009	06:00 - 07:00	9.19	310.2	4.02	1.05	333.7	555.9	1720.2	72.5	-0.2	1.6
11/6/2009	07:00 - 08:00	7.68	310.1	4.05	1.06	294.2	495.8	1434.0	60.6	2.6	5.1
11/6/2009	08:00 - 09:00	8.96	309.9	5.51	2.51	304.6	547.3	1694.6	97.9	105.6	199.0
11/6/2009	09:00 - 10:00	9.28	310.1	3.44	0.83	385.3	615.2	1214.5	61.9	-0.3	1.7
11/6/2009	10:00 - 11:00	9.73	309.9	3.25	0.76	399.8	544.6	1308.9	64.6	-0.5	1.9
11/6/2009	11:00 - 12:00	8.42	310.4	4.03	0.79	318.2	500.4	1868.1	61.0	7.8	9.2
11/6/2009	12:00 - 13:00	7.96	309.7	3.95	0.78	347.7	519.7	1795.0	70.0	2.1	3.5
11/6/2009	13:00 - 14:00	9.13	310.0	3.83	0.75	328.5	586.0	1827.9	72.4	12.9	8.0
11/6/2009	14:00 - 15:00	10.01	310.0	3.96	0.72	302.3	590.5	2069.2	68.2	32.7	15.8
11/6/2009	15:00 - 16:00	9.99	310.1	4.46	0.70	314.5	581.0	2044.5	74.5	40.5	13.2
11/6/2009	16:00 - 17:00	8.72	309.7	4.53	0.68	301.9	613.1	2323.7	75.3	45.3	17.5
11/6/2009	17:00 - 18:00	8.77	310.3	3.85	0.69	365.7	592.3	1870.9	92.5	14.5	8.0
11/6/2009	18:00 - 19:00	6.10	310.3	3.62	0.72	406.1	545.1	1675.5	105.2	6.8	5.2
11/6/2009	19:00 - 20:00	7.59	309.8	3.80	0.75	436.4	509.0	1577.6	116.3	2.2	5.6
11/6/2009	20:00 - 21:00	6.68	309.8	3.73	0.72	428.4	501.1	1720.1	117.0	3.2	8.5
11/6/2009	21:00 - 22:00	9.15	309.9	3.83	0.69	426.3	501.0	1610.1	115.1	2.2	6.1
11/6/2009	22:00 - 23:00	5.13	310.1	3.79	0.70	459.1	451.6	1376.6	119.6	3.4	4.1
11/6/2009	23:00 - 00:00	5.13	309.3	3.15	1.70	493.3	789.8	1853.2	125.4	-1.0	2.2
11/7/2009	00:00 - 01:00	8.56	310.4	4.10	0.75	406.6	498.5	1611.1	94.0	-0.6	5.2
11/7/2009	01:00 - 02:00	8.70	310.6	4.03	0.78	426.1	464.0	1351.9	91.6	-0.9	6.0
11/7/2009	02:00 - 03:00	5.59	309.2	4.08	0.77	423.7	488.7	1399.4	91.5	-0.9	4.6
11/7/2009	03:00 - 04:00	8.34	310.5	4.11	0.76	396.8	494.9	1442.1	83.2	-0.9	6.3
11/7/2009	04:00 - 05:00	8.84	310.1	4.12	0.77	398.5	477.2	1454.5	81.9	-0.8	9.8

SMC-Table1 continue

		Preheater Clinker Reclaim Scale	KILN FEED BELT SCALE	MAIN STACK OPACITY	BYPASS STACK OPACITY	MAIN STACK NOX (PRIMARY)	MAIN STACK SO2 (PRIMARY)	MAIN STACK CO	BYPASS STACK NOX	BYPASS STACK SO2	BYPASS STACK CO
Date	Hour	t/h	t/h	%	%	ppm	ppm	ppm	ppm	ppm	ppm
11/7/2009	05:00 - 06:00	8.17	310.2	4.20	0.78	401.0	474.8	1554.6	87.9	-0.8	10.0
11/7/2009	06:00 - 07:00	9.50	310.1	4.03	0.83	432.8	482.5	1497.0	106.4	-1.1	7.4
11/7/2009	07:00 - 08:00	8.48	309.9	4.15	0.81	371.0	454.0	1299.8	93.9	-0.8	10.7
11/7/2009	08:00 - 09:00	8.07	309.4	5.71	2.29	413.2	489.0	1395.0	126.7	93.6	201.5
11/7/2009	09:00 - 10:00	10.09	310.3	4.34	0.76	413.1	504.3	1442.3	97.8	-0.9	10.7
11/7/2009	10:00 - 11:00	8.30	310.1	4.35	0.74	374.1	512.8	1509.8	82.3	0.1	11.9
11/7/2009	11:00 - 12:00	7.34	310.1	4.25	0.72	372.0	534.2	1527.8	81.3	-0.2	8.4
11/7/2009	12:00 - 13:00	8.12	309.9	4.30	0.75	355.5	501.6	1519.9	77.4	1.2	7.3
11/7/2009	13:00 - 14:00	9.08	310.0	4.42	0.77	349.2	470.5	1536.1	74.7	-0.3	7.5
11/7/2009	14:00 - 15:00	9.26	309.7	4.27	0.76	319.0	478.7	1685.5	61.5	1.1	10.1
11/7/2009	15:00 - 16:00	9.57	309.8	4.29	0.73	342.8	493.8	1585.3	70.5	1.1	8.3
11/7/2009	16:00 - 17:00	9.88	310.5	4.33	0.72	346.5	498.6	1506.3	72.2	1.1	7.1
11/7/2009	17:00 - 18:00	10.08	309.8	4.35	0.74	336.9	485.9	1464.0	64.5	0.2	7.5
11/7/2009	18:00 - 19:00	7.65	310.2	4.18	0.74	321.1	471.9	1558.2	54.6	0.1	9.2
11/7/2009	19:00 - 20:00	9.86	309.9	4.11	0.71	304.5	508.0	1712.5	52.2	3.7	13.5
11/7/2009	20:00 - 21:00	9.95	309.6	4.32	0.75	320.2	486.8	1403.2	54.8	-0.2	8.9
11/7/2009	21:00 - 22:00	9.83	310.0	4.47	0.92	277.6	470.8	1587.8	38.1	2.2	21.0
11/7/2009	22:00 - 23:00	4.68	310.3	4.38	0.72	306.6	488.9	1321.8	40.5	-0.8	2.5
11/7/2009	23:00 - 00:00	10.23	304.0	4.35	1.75	311.4	430.8	1450.2	43.7	-0.8	3.2

CEMS Units calbration included in average

100% Clinker feed rate

SMC Table 2- SHINGLE AT 3 TONS PER HOUR

		Preheater Clinker Reclaim Scale	KILN FEED BELT SCALE	MAIN STACK OPACITY	BYPASS STACK OPACITY	MAIN STACK NOX (PRIMARY)	MAIN STACK SO2 (PRIMARY)	MAIN STACK CO	BYPASS STACK NOX	BYPASS STACK SO2	BYPASS STACK CO
Date	Hour	t/h	t/h	%	%	ppm	ppm	ppm	ppm	ppm	ppm
11/9/2009	12:00 - 13:00	5.76	309.8	5.45	0.80	348.6	374.9	1257.5	50.9	-0.4	132.7
11/9/2009	13:00 - 14:00	5.72	309.5	5.38	0.82	363.4	376.6	1179.6	54.3	-0.6	110.1
11/9/2009	14:00 - 15:00	6.18	310.1	5.10	0.75	344.2	410.1	1120.3	49.3	-1.3	110.4
11/9/2009	15:00 - 16:00	6.39	310.7	5.01	0.76	340.5	411.2	1161.5	47.8	-1.1	99.1
11/9/2009	16:00 - 17:00	6.28	309.1	4.89	0.78	347.4	412.0	1113.9	48.6	-1.3	83.0
11/9/2009	17:00 - 18:00	6.00	310.0	4.79	0.78	342.5	425.8	1122.5	46.4	0.1	77.5
11/9/2009	18:00 - 19:00	6.12	310.3	4.84	0.78	343.7	414.5	1129.6	47.2	-0.4	77.1
11/9/2009	19:00 - 20:00	6.09	310.3	4.99	0.81	359.2	427.8	1141.5	50.6	-1.6	93.8
11/9/2009	20:00 - 21:00	5.98	310.1	5.03	0.83	352.7	417.1	1173.3	49.1	-0.2	109.9
11/9/2009	21:00 - 22:00	6.09	309.3	4.95	0.86	366.7	424.1	1138.9	55.3	-0.5	85.9
11/9/2009	22:00 - 23:00	5.93	310.7	4.95	0.85	353.1	426.1	1137.7	48.7	-0.9	116.2
11/9/2009	23:00 - 00:00	6.08	310.2	5.03	1.85	342.4	410.0	1106.3	44.2	-0.9	126.0
11/10/2009	00:00 - 01:00	6.68	309.5	5.08	0.78	348.2	416.6	1060.3	45.7	-1.5	98.4
11/10/2009	01:00 - 02:00	6.79	311.4	5.04	0.79	338.1	436.9	1111.1	42.1	-1.9	134.6
11/10/2009	02:00 - 03:00	6.35	309.0	5.00	0.84	310.5	436.7	1096.6	33.0	-1.6	169.5
11/10/2009	03:00 - 04:00	6.05	310.1	5.01	0.86	292.5	446.0	1095.7	25.7	1.5	180.7
11/10/2009	04:00 - 05:00	5.94	309.8	4.88	0.89	308.2	452.4	1089.5	31.2	-0.4	134.4
11/10/2009	05:00 - 06:00	5.74	310.0	5.10	0.97	303.2	455.2	1065.3	30.0	-1.5	130.8
11/10/2009	06:00 - 07:00	5.52	310.0	5.20	1.00	298.6	439.4	1191.0	30.6	6.9	145.0
11/10/2009	07:00 - 08:00	6.02	310.1	5.09	0.83	314.8	381.5	1015.4	41.9	4.5	95.6

50% Shingle and 50% clinker feed rate

SMC Table 3- SHINGLES AT 3.6 TONS PER HOUR

		Preheater Clinker Reclaim Scale	KILN FEED BELT SCALE	MAIN STACK OPACITY	BYPASS STACK OPACITY	MAIN STACK NOX (PRIMARY)	MAIN STACK SO2 (PRIMARY)	MAIN STACK CO	BYPASS STACK NOX	BYPASS STACK SO2	BYPASS STACK CO
Date	Hour	t/h	t/h	%	%	ppm	ppm	ppm	ppm	ppm	ppm
11/10/2009	08:00 - 09:00	7.07	309.8	6.32	2.29	355.1	396.0	1062.7	90.2	94.8	242.9
11/10/2009	09:00 - 10:00	7.24	310.2	5.00	0.81	338.6	385.9	1091.1	43.3	4.1	82.9
11/10/2009	10:00 - 11:00	6.42	310.1	5.16	0.79	355.5	385.9	1056.3	49.2	-0.9	70.6
11/10/2009	11:00 - 12:00	6.91	310.1	5.29	0.81	340.7	384.3	1140.6	45.5	-0.9	78.2
11/10/2009	12:00 - 13:00	7.00	309.7	5.36	0.87	345.3	373.4	1088.6	47.9	0.1	59.8
11/10/2009	13:00 - 14:00	7.10	310.5	5.28	0.94	349.6	387.3	1077.4	48.0	-0.9	64.3
11/10/2009	14:00 - 15:00	7.12	309.7	5.39	0.96	348.3	370.9	1050.0	49.3	-0.6	46.4
11/10/2009	15:00 - 16:00	7.02	309.7	5.35	0.96	343.2	377.7	1047.9	47.9	-1.9	41.1
11/10/2009	16:00 - 17:00	7.13	310.4	5.29	1.11	336.3	388.3	1023.3	46.4	-1.9	30.8
11/10/2009	17:00 - 18:00	7.21	308.3	5.18	1.12	337.3	375.9	1093.8	46.7	-1.6	34.9
11/10/2009	18:00 - 19:00	7.27	310.1	5.09	1.17	348.1	373.1	1096.2	50.9	-1.9	24.8
11/10/2009	19:00 - 20:00	6.34	309.8	5.25	1.34	352.7	378.9	1094.1	55.4	-2.0	22.4
11/10/2009	20:00 - 21:00	6.34	310.2	5.16	1.35	348.1	382.7	1079.0	51.3	-2.3	56.4
11/10/2009	21:00 - 22:00	7.36	310.0	5.25	1.57	342.9	372.4	1121.3	50.5	-1.7	30.1
11/10/2009	22:00 - 23:00	7.32	309.7	5.23	1.55	342.0	383.3	1109.7	50.8	-1.6	26.9
11/10/2009	23:00 - 00:00	6.12	310.0	5.13	3.11	342.9	389.5	1089.3	48.9	-1.1	30.8
11/11/2009	00:00 - 01:00	7.29	310.1	4.95	1.72	342.8	389.1	1069.4	48.8	-2.0	24.7
11/11/2009	01:00 - 02:00	6.93	309.9	4.75	1.62	335.6	388.7	1073.9	44.3	-2.0	46.5
11/11/2009	02:00 - 03:00	6.92	310.3	4.83	1.59	340.6	397.6	1057.5	45.4	-2.1	45.7
11/11/2009	03:00 - 04:00	6.87	309.8	4.82	1.68	335.4	393.2	1085.3	44.7	-2.0	51.0
11/11/2009	04:00 - 05:00	7.10	310.0	4.92	2.03	334.7	394.9	1105.8	45.9	-2.3	51.8
11/11/2009	05:00 - 06:00	7.14	310.1	4.97	3.10	337.8	360.3	1178.8	47.6	-1.7	44.2
11/11/2009	06:00 - 07:00	7.05	309.7	5.02	3.35	344.8	327.5	1169.3	50.3	-2.3	38.8

CEMS Units calbration included in average

50% Shingle and 50% clinker feed rate

SMC Table 4- SHINGLES AT 2.5 TONS PER HOUR

		Preheater Clinker Reclaim Scale	KILN FEED BELT SCALE	MAIN STACK OPACITY	BYPASS STACK OPACITY	MAIN STACK NOX (PRIMARY)	MAIN STACK SO2 (PRIMARY)	MAIN STACK CO	BYPASS STACK NOX	BYPASS STACK SO2	BYPASS STACK CO
Date	Hour	t/h	t/h	%	%	ppm	ppm	ppm	ppm	ppm	ppm
11/11/2009	07:00 - 08:00	6.17	310.1	5.11	6.06	325.9	315.5	1036.5	50.9	-2.6	54.9
11/11/2009	08:00 - 09:00	5.13	310.1	6.26	7.73	343.3	312.1	1243.0	92.3	91.3	271.3
11/11/2009	09:00 - 10:00	5.17	310.0	4.95	5.62	345.6	327.9	1278.7	50.7	-2.6	115.7
11/11/2009	10:00 - 11:00	5.34	309.9	5.04	4.86	347.9	353.5	1182.4	54.9	-2.7	103.0
11/11/2009	11:00 - 12:00	5.36	310.1	5.28	6.60	343.2	358.3	1232.5	55.3	-2.7	117.8
11/11/2009	12:00 - 13:00	5.04	307.6	5.29	7.11	342.5	338.0	1256.0	57.5	-2.7	124.1

CEMS Units calbration included in average

50% Shingle and 50% clinker feed rate

LABORTORY DATA

SGS

Analysis Report

December 07, 2009

ST MARYS CEMENT COMPANY
CHARLEVIOX PLANT
16000 BELLS BAY ROAD
CHARLEVOIX MI 49720

ATTN: CORTNEY SCHMIDT

Client Sample ID:	Coal Sample	Sample ID By:	St. Mary's Cement
Date Sampled:	N/A	Sample Taken By:	Submitted
Date Received:	Oct 26, 2009	Sample Taken At:	Submitted
Product Description:	COAL		

SGS Minerals Sample ID: 491-0940311-001

		Method	As Received	Dry	DAF
Moisture, Total %		ASTM D3302	9.69		
Ash %		ASTM D3174	9.81	10.86	
Sulfur %		ASTM D4239 Method B	1.80	2.00	
Gross Calorific Value	BTU/LB	ASTM D5865	12115	13414	15048
Carbon %		ASTM D5373	26.33	29.16	
Hydrogen %		ASTM D5373	2.74	3.04	
Nitrogen %		ASTM D5373	1.28	1.42	
Oxygen %		ASTM D5373 (by diff)	48.35	53.52	
Chlorine, Cl %		ASTM D4208	0.07	0.08	
Mercury, Hg	UG/G	ASTM D6722		<0.02	

Tests	Result	Unit	Method

Vanessa Chambliss

VANESSA_CHAMBLISS

SGS North America Inc. | Minerals Services Division
16130 Van Drunen Road South Holland IL 60473 t (708) 331-2900 f (708) 333-3060 www.sgs.com/minerals

SGS

Analysis Report

December 07, 2009

ST MARYS CEMENT COMPANY
CHARLEVIOX PLANT
16000 BELLS BAY ROAD
CHARLEVOIX MI 49720

ATTN: CORTNEY SCHMIDT

Client Sample ID:	Coal Sample	Sample ID By:	St. Mary`s Cement
Date Sampled:	N/A	Sample Taken By:	Submitted
Date Received:	Oct 26, 2009	Sample Taken At:	Submitted
Product Description:	COAL		

SGS Minerals Sample ID: 491-0940311-001

Tests	Result	Unit	Method
ANALYSIS OF ASH			
Basis	IGNITED	---	ASTM D4326
Silicon Dioxide, SiO2	50.51	%	ASTM D4326
Aluminum Oxide, Al2O3	25.40	%	ASTM D4326
Titanium Dioxide, TiO2	1.20	%	ASTM D4326
Iron Oxide, Fe2O3	13.83	%	ASTM D4326
Calcium Oxide, CaO	2.90	%	ASTM D4326
Magnesium Oxide, MgO	0.86	%	ASTM D4326
Potassium Oxide, K2O	2.14	%	ASTM D4326
Sodium Oxide, Na2O	0.63	%	ASTM D4326
Sulfur Trioxide, SO3	1.98	%	ASTM D4326
Phosphorus Pentoxide, P2O5	0.31	%	ASTM D4326
Strontium Oxide, SrO	0.11	%	ASTM D4326
Barium Oxide, BaO	0.11	%	ASTM D4326
Manganese Oxide, MnO2	0.02	%	ASTM D4326
Undetermined	0.00	%	ASTM D4326
Sum of Oxides	100.00	%	ASTM D4326
Silica Value	74.17	%	ASTM D4326
Base Acid Ratio	0.26	---	ASTM D4326
T250 Temperature	2603	°F	ASTM D4326
Fouling Index	0.17	%	ASTM D4326
Alkalies as Na2O, Dry	0.22	%	ASTM D4326
Type of Ash	BITUMINOUS	---	ASTM D4326

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Analysis Report

December 07, 2009

ST MARYS CEMENT COMPANY
CHARLEVIOX PLANT
16000 BELLS BAY ROAD
CHARLEVOIX MI 49720

ATTN: CORTNEY SCHMIDT

Client Sample ID:	Coal Sample	Sample ID By:	St. Mary's Cement
Date Sampled:	N/A	Sample Taken By:	Submitted
Date Received:	Oct 26, 2009	Sample Taken At:	Submitted
Product Description:	COAL		

SGS Minerals Sample ID: 491-0940311-001

Tests	Result	Unit	Method
TRACE ELEMENTS - DRY BASIS			
Arsenic, As	4	µg/g	ASTM D3683
Beryllium, Be	1	µg/g	ASTM D3683 (Mod)
Cadmium, Cd	<1	µg/g	ASTM D3683 (Mod)
Chromium, Cr	16	µg/g	ASTM D3683 (Mod)
Lead, Pb	5	µg/g	ASTM D3683 (Mod)
Manganese, Mn	19	µg/g	ASTM D3683 (Mod)
Nickel, Ni	7	µg/g	ASTM D3683 (Mod)
Selenium, Se	1	µg/g	ASTM D3683
Zinc, Zn	9	µg/g	ASTM D3683 (Mod)

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Analysis Report

December 07, 2009

ST MARYS CEMENT COMPANY
CHARLEVIOX PLANT
16000 BELLS BAY ROAD
CHARLEVOIX MI 49720

ATTN: CORTNEY SCHMIDT

Client Sample ID:	Petroleum Coke Sample	Sample ID By:	St. Mary's Cement
Date Sampled:	N/A	Sample Taken At:	Submitted
Date Received:	Oct 26, 2009	Sample Taken By:	Submitted
Product Description:	PETCOKE		

SGS Minerals Sample ID: 491-0940311-002

		Method	As Received	Dry	DAF
Moisture, Total %		ASTM D4931	8.20		
Ash %		ASTM D4422 (Mod)	1.53	1.67	
Sulfur %		ASTM D4239 Method B	5.25	5.72	
Gross Calorific Value	BTU/LB	ASTM D5865	13661	14881	15134
Carbon %		ASTM D5373	77.93	84.89	
Hydrogen %		ASTM D5373	3.36	3.66	
Nitrogen %		ASTM D5373	1.42	1.54	
Oxygen (by diff) %		ASTM D5373 (by diff)	2.31	2.52	
Chlorine, Cl %		ASTM D4208	0.02	0.03	
Mercury, Hg UG/G		ASTM D6722		<0.02	

Tests	Result	Unit	Method

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Analysis Report

December 07, 2009

ST MARYS CEMENT COMPANY
CHARLEVIOX PLANT
16000 BELLS BAY ROAD
CHARLEVOIX MI 49720

ATTN: CORTNEY SCHMIDT

Client Sample ID:	Petroleum Coke Sample	Sample ID By:	St. Mary`s Cement
Date Sampled:	N/A	Sample Taken At:	Submitted
Date Received:	Oct 26, 2009	Sample Taken By:	Submitted
Product Description:	PETCOKE		

SGS Minerals Sample ID: 491-0940311-002

Tests	Result	Unit	Method
ANALYSIS OF ASH			
Basis	IGNITED	---	ASTM D4326
Silicon Dioxide, SiO2	24.37	%	ASTM D4326
Aluminum Oxide, Al2O3	7.72	%	ASTM D4326
Titanium Dioxide, TiO2	0.68	%	ASTM D4326
Iron Oxide, Fe2O3	11.27	%	ASTM D4326
Calcium Oxide, CaO	18.87	%	ASTM D4326
Magnesium Oxide, MgO	3.19	%	ASTM D4326
Potassium Oxide, K2O	0.59	%	ASTM D4326
Sodium Oxide, Na2O	0.93	%	ASTM D4326
Sulfur Trioxide, SO3	21.34	%	ASTM D4326
Phosphorus Pentoxide, P2O5	0.32	%	ASTM D4326
Strontium Oxide, SrO	0.09	%	ASTM D4326
Barium Oxide, BaO	0.14	%	ASTM D4326
Manganese Oxide, MnO2	0.55	%	ASTM D4326
Undetermined	9.94	%	ASTM D4326
Sum of Oxides	90.06	%	ASTM D4326
Silica Value	42.24	%	ASTM D4326
Base Acid Ratio	1.06	---	ASTM D4326
Fouling Index	0.93	%	ASTM D4326
Type of Ash	LIGNITIC	---	ASTM D4326

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Analysis Report

December 07, 2009

ST MARYS CEMENT COMPANY
CHARLEVIOX PLANT
16000 BELLS BAY ROAD
CHARLEVOIX MI 49720

ATTN: CORTNEY SCHMIDT

Client Sample ID:	Petroleum Coke Sample	Sample ID By:	St. Mary's Cement
Date Sampled:	N/A	Sample Taken At:	Submitted
Date Received:	Oct 26, 2009	Sample Taken By:	Submitted
Product Description:	PETCOKE		

SGS Minerals Sample ID: 491-0940311-002

Tests	Result	Unit	Method
TRACE ELEMENTS - DRY BASIS			
Arsenic, As	<1	µg/g	ASTM D5056
Beryllium, Be	<1	µg/g	ASTM D3683 (Mod)
Cadmium, Cd	<1	µg/g	ASTM D3683 (Mod)
Chromium, Cr	10	µg/g	ASTM D3683 (Mod)
Lead, Pb	<2	µg/g	ASTM D3683 (Mod)
Manganese, Mn	58	µg/g	ASTM D3683 (Mod)
Nickel, Ni	240	µg/g	ASTM D3683 (Mod)
Selenium, Se	<1	µg/g	ASTM D5056
Zinc, Zn	36	µg/g	ASTM D3683 (Mod)

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Analysis Report

December 07, 2009

ST MARYS CEMENT COMPANY
CHARLEVIOX PLANT
16000 BELLS BAY ROAD
CHARLEVOIX MI 49720

ATTN: CORTNEY SCHMIDT

Client Sample ID:	Shingles Sample	Sample ID By:	St. Mary's Cement
Date Sampled:	N/A	Sample Taken At:	Submitted
Date Received:	Oct 26, 2009	Sample Taken By:	Submitted
Product Description:	RDF OR TDF		
Comments:	NOTE: OXYGEN CAN NOT BE DETERMINED DUE TO ULTIMATE TOTALING OVER 100%.		

SGS Minerals Sample ID: 491-0940311-003

		Method	As Received	Dry
Moisture, Total %		ASTM E949	3.14	
Ash %		ASTM E830	69.72	71.97
Sulfur %		ASTM D4239 Method B	0.77	0.79
Gross Calorific Value	BTU/LB	ASTM E711	5842	6032
Carbon %		ASTM D5373	27.74	28.64
Hydrogen %		ASTM D5373	3.01	3.11
Nitrogen %		ASTM D5373	0.27	0.27
Chlorine, Cl %		ASTM D4208	0.04	0.04
Mercury, Hg UG/G		ASTM D3684		0.11

Tests	Result	Unit	Method

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Analysis Report

December 07, 2009

ST MARYS CEMENT COMPANY
CHARLEVIOX PLANT
16000 BELLS BAY ROAD
CHARLEVOIX MI 49720

ATTN: CORTNEY SCHMIDT

Client Sample ID:	Shingles Sample	Sample ID By:	St. Mary's Cement
Date Sampled:	N/A	Sample Taken At:	Submitted
Date Received:	Oct 26, 2009	Sample Taken By:	Submitted
Product Description:	RDF OR TDF		
Comments:	NOTE: OXYGEN CAN NOT BE DETERMINED DUE TO ULTIMATE TOTALING OVER 100%.		

SGS Minerals Sample ID: 491-0940311-003

Tests	Result	Unit	Method
ANALYSIS OF ASH			
Basis	IGNITED	---	ASTM D4326
Silicon Dioxide, SiO2	46.96	%	ASTM D4326
Aluminum Oxide, Al2O3	12.96	%	ASTM D4326
Titanium Dioxide, TiO2	0.72	%	ASTM D4326
Iron Oxide, Fe2O3	7.74	%	ASTM D4326
Calcium Oxide, CaO	16.25	%	ASTM D4326
Magnesium Oxide, MgO	6.39	%	ASTM D4326
Potassium Oxide, K2O	1.83	%	ASTM D4326
Sodium Oxide, Na2O	2.26	%	ASTM D4326
Sulfur Trioxide, SO3	4.53	%	ASTM D4326
Phosphorus Pentoxide, P2O5	0.15	%	ASTM D4326
Strontium Oxide, SrO	0.03	%	ASTM D4326
Barium Oxide, BaO	0.09	%	ASTM D4326
Manganese Oxide, MnO2	0.09	%	ASTM D4326
Undetermined	0.00	%	ASTM D4326
Sum of Oxides	100.00	%	ASTM D4326
Silica Value	60.72	%	ASTM D4326
Base Acid Ratio	0.57	---	ASTM D4326
T250 Temperature	2264	°F	ASTM D4326
Fouling Index	2.26	%	ASTM D4326
Type of Ash	LIGNITIC	---	ASTM D4326

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Analysis Report

December 07, 2009

ST MARYS CEMENT COMPANY
CHARLEVIOX PLANT
16000 BELLS BAY ROAD
CHARLEVOIX MI 49720

ATTN: CORTNEY SCHMIDT

Client Sample ID:	Shingles Sample	Sample ID By:	St. Mary's Cement
Date Sampled:	N/A	Sample Taken At:	Submitted
Date Received:	Oct 26, 2009	Sample Taken By:	Submitted
Product Description:	RDF OR TDF		
Comments:	NOTE: OXYGEN CAN NOT BE DETERMINED DUE TO ULTIMATE TOTALING OVER 100%.		

SGS Minerals Sample ID: 491-0940311-003

Tests	Result	Unit	Method
TRACE ELEMENTS - DRY BASIS			
Arsenic, As	<1	µg/g	ASTM D3683
Beryllium, Be	<1	µg/g	ASTM D3683 (Mod)
Cadmium, Cd	<1.4	µg/g	ASTM D3683 (Mod)
Chromium, Cr	41	µg/g	ASTM D3683 (Mod)
Lead, Pb	21	µg/g	ASTM D3683 (Mod)
Manganese, Mn	273	µg/g	ASTM D3683 (Mod)
Nickel, Ni	43	µg/g	ASTM D3683 (Mod)
Selenium, Se	<1	µg/g	ASTM D3683
Zinc, Zn	115	µg/g	ASTM D3683 (Mod)

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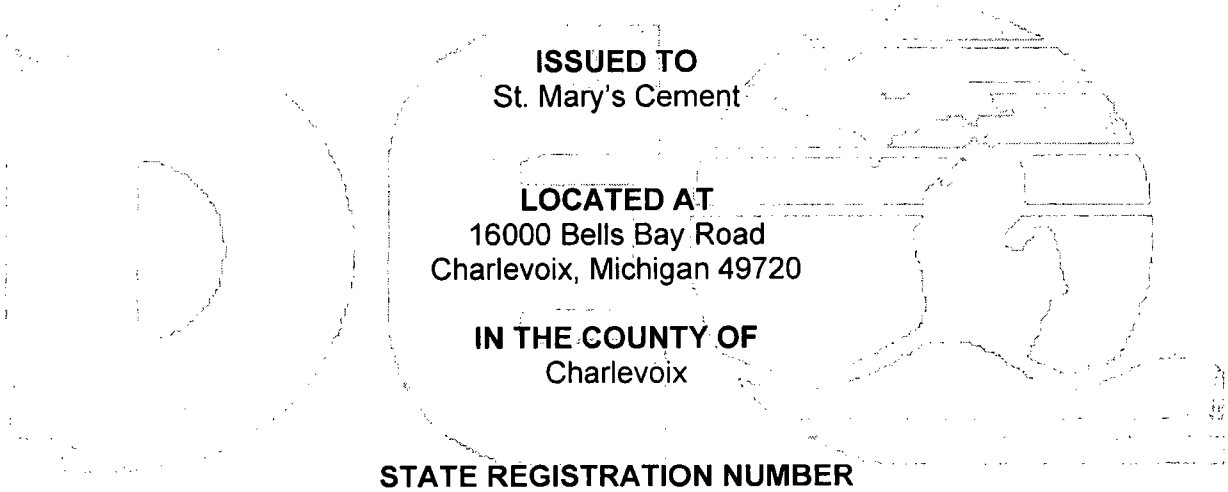
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

October 16, 2009

PERMIT TO INSTALL
No. 238-09



ISSUED TO
St. Mary's Cement

LOCATED AT
16000 Bells Bay Road
Charlevoix, Michigan 49720

IN THE COUNTY OF
Charlevoix

STATE REGISTRATION NUMBER
B1559

The Air Quality Division has approved this Permit to Install, pursuant to the delegation of authority from the Michigan Department of Environmental Quality. This permit is hereby issued in accordance with and subject to Section 5505(1) of Article II, Chapter I, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Pursuant to Air Pollution Control Rule 336.1201(1), this permit constitutes the permittee's authority to install the identified emission unit(s) in accordance with all administrative rules of the Department and the attached conditions. Operation of the emission unit(s) identified in this Permit to Install is allowed pursuant to Rule 336.1201(6).

DATE OF RECEIPT OF ALL INFORMATION REQUIRED BY RULE 203: **10/12/2009**	
DATE PERMIT TO INSTALL APPROVED: **1016/2009**	SIGNATURE:
DATE PERMIT VOIDED:	SIGNATURE:
DATE PERMIT REVOKED:	SIGNATURE:

PERMIT TO INSTALL

Table of Contents

Common Abbreviations / Acronyms

Common Acronyms		Pollutant/Measurement Abbreviations	
AQD	Air Quality Division	BTU	British Thermal Unit
ANSI	American National Standards Institute	°C	Degrees Celsius
BACT	Best Available Control Technology	CO	Carbon Monoxide
CAA	Clean Air Act	dscf	Dry standard cubic foot
CEM	Continuous Emission Monitoring	dscm	Dry standard cubic meter
CFR	Code of Federal Regulations	°F	Degrees Fahrenheit
COM	Continuous Opacity Monitoring	gr	Grains
EPA	Environmental Protection Agency	Hg	Mercury
EU	Emission Unit	hr	Hour
FG	Flexible Group	H_2S	Hydrogen Sulfide
GACS	Gallon of Applied Coating Solids	hp	Horsepower
GC	General Condition	lb	Pound
HAP	Hazardous Air Pollutant	m	Meter
HVLP	High Volume Low Pressure *	mg	Milligram
ID	Identification	mm	Millimeter
LAER	Lowest Achievable Emission Rate	MM	Million
MACT	Maximum Achievable Control Technology	MW	Megawatts
MAERS	Michigan Air Emissions Reporting System	ng	Nanogram
MAP	Malfunction Abatement Plan	NO_x	Oxides of Nitrogen
MDEQ	Michigan Department of Environmental Quality	PM	Particulate Matter
MIOSHA	Michigan Occupational Safety & Health Administration	PM10	PM less than 10 microns diameter
MSDS	Material Safety Data Sheet	PM2.5	PM less than 2.5 microns diameter
NESHAP	National Emission Standard for Hazardous Air Pollutants	pph	Pound per hour
NSPS	New Source Performance Standards	ppm	Parts per million
NSR	New Source Review	ppmv	Parts per million by volume
PS	Performance Specification	ppmw	Parts per million by weight
PSD	Prevention of Significant Deterioration	psia	Pounds per square inch absolute
PTE	Permanent Total Enclosure	psig	Pounds per square inch gauge
PTI	Permit to Install	scf	Standard cubic feet
RACT	Reasonably Available Control Technology	sec	Seconds
ROP	Renewable Operating Permit	SO_2	Sulfur Dioxide
SC	Special Condition	THC	Total Hydrocarbons
SCR	Selective Catalytic Reduction	tpy	Tons per year
SRN	State Registration Number	µg	Microgram
TAC	Toxic Air Contaminant	VOC	Volatile Organic Compounds
TEQ	Toxicity Equivalence Quotient	yr	Year
VE	Visible Emissions		

* For High Volume Low Pressure (HVLP) applicators, the pressure measured at the HVLP gun air cap shall not exceed ten (10) pounds per square inch gauge (psig).

GENERAL CONDITIONS

1. The process or process equipment covered by this permit shall not be reconstructed, relocated, or modified, unless a Permit to Install authorizing such action is issued by the Department, except to the extent such action is exempt from the Permit to Install requirements by any applicable rule. **(R 336.1201(1))**

2. If the installation, construction, reconstruction, relocation, or modification of the equipment for which this permit has been approved has not commenced within 18 months, or has been interrupted for 18 months, this permit shall become void unless otherwise authorized by the Department. Furthermore, the permittee or the designated authorized agent shall notify the Department via the Supervisor, Permit Section, Air Quality Division, Michigan Department of Environmental Quality, P.O. Box 30260, Lansing, Michigan 48909, if it is decided not to pursue the installation, construction, reconstruction, relocation, or modification of the equipment allowed by this Permit to Install. **(R 336.1201(4))**

3. If this Permit to Install is issued for a process or process equipment located at a stationary source that is not subject to the Renewable Operating Permit program requirements pursuant to R 336.1210, operation of the process or process equipment is allowed by this permit if the equipment performs in accordance with the terms and conditions of this Permit to Install. **(R 336.1201(6)(b))**

4. The Department may, after notice and opportunity for a hearing, revoke this Permit to Install if evidence indicates the process or process equipment is not performing in accordance with the terms and conditions of this permit or is violating the Department's rules or the Clean Air Act. **(R 336.1201(8), Section 5510 of Act 451, PA 1994)**

5. The AQD District Supervisor shall be notified, in writing, of a change in ownership or operational control of the stationary source or emission unit(s) authorized by this Permit to Install pursuant to R 336.1219. The notification shall include all of the information required by R 336.1219(1)(a) and (b). In addition, a new owner or operator must submit a written statement pursuant to R 336.1219(1)(c), agreeing to and accepting the terms and conditions of this Permit to Install, and shall notify the AQD District Supervisor of any change in the contact person for this Permit to Install. **(R 336.1219)**

6. Operation of this equipment shall not result in the emission of an air contaminant which causes injurious effects to human health or safety, animal life, plant life of significant economic value, or property, or which causes unreasonable interference with the comfortable enjoyment of life and property. **(R 336.1901)**

7. The permittee shall provide notice of an abnormal condition, start-up, shutdown, or malfunction that results in emissions of a hazardous or toxic air pollutant which continue for more than one hour in excess of any applicable standard or limitation, or emissions of any air contaminant continuing for more than two hours in excess of an applicable standard or limitation, as required in Rule 912, to the Department. The notice shall be provided not later than two business days after start-up, shutdown, or discovery of the abnormal condition or malfunction. Written reports, if required, must be filed with the Department within 10 days after the start-up or shutdown occurred, within 10 days after the abnormal conditions or malfunction has been corrected, or within 30 days of discovery of the abnormal condition or malfunction, whichever is first. The written reports shall include all of the information required in Rule 912(5). **(R 336.1912)**

8. Approval of this permit does not exempt the permittee from complying with any future applicable requirements which may be promulgated under Part 55 of 1994 PA 451, as amended or the Federal Clean Air Act.

9. Approval of this permit does not obviate the necessity of obtaining such permits or approvals from other units of government as required by law.

10. Operation of this equipment may be subject to other requirements of Part 55 of 1994 PA 451, as amended and the rules promulgated thereunder.

11. Except as provided in subrules (2) and (3) or unless the special conditions of the Permit to Install include an alternate opacity limit established pursuant to subrule (4) of R 336.1301, the permittee shall not cause or permit to be discharged into the outer air from a process or process equipment a visible emission of density greater than the most stringent of the following. The grading of visible emissions shall be determined in accordance with R 336.1303. **(R 336.1301)**
    a) A six-minute average of 20 percent opacity, except for one six-minute average per hour of not more than 27 percent opacity.
    b) A visible emission limit specified by an applicable federal new source performance standard.
    c) A visible emission limit specified as a condition of this Permit to Install.

12. Collected air contaminants shall be removed as necessary to maintain the equipment at the required operating efficiency. The collection and disposal of air contaminants shall be performed in a manner so as to minimize the introduction of contaminants to the outer air. Transport of collected air contaminants in Priority I and II areas requires the use of material handling methods specified in R 336.1370(2). **(R 336.1370)**

13. The Department may require the permittee to conduct acceptable performance tests, at the permittee's expense, in accordance with R 336.2001 and R 336.2003, under any of the conditions listed in R 336.2001. **(R 336.2001)**

SPECIAL CONDITIONS

EMISSION UNIT SUMMARY TABLE

The descriptions provided below are for informational purposes and do not constitute enforceable conditions.

Emission Unit ID	Emission Unit Description (Process Equipment & Control Devices)	Installation Date / Modification Date	Flexible Group ID
EUSHINGLES10-09	Trial burn for up to 210 tons of asphalt shingles as an alternative fuel in EUKILN.	October 16, 2009	FGKILNRAWMILLS
Changes to the equipment described in this table are subject to the requirements of R 336.1201, except as allowed by R 336.1278 to R 336.1290.			

The following conditions apply to: EUSHINGLES10-09

DESCRIPTION: Trial burn for up to 210 tons of asphalt shingles as an alternative fuel in EUKILN.

Flexible Group ID: FGKILNRAWMILLS

POLLUTION CONTROL EQUIPMENT: *Baghouse, Electrostatic Precipitator*

I. EMISSION LIMITS

NA

II. MATERIAL LIMITS

1. The permittee shall not burn more than 210 tons of asphalt shingles during the trial burn authorized by this permit to install. **(R 336.1205(3), R 336.1225, R 336.1702(a), R 336.2803, R 336.2804, 40 CFR 52.21 (c) and (d))**

III. PROCESS/OPERATIONAL RESTRICTIONS

1. The permittee shall only feed the asphalt shingles to EUKILN between the kiln and the calciner. **(R 336.1205(3), R 336.1225, R 336.1702(a), R 336.2803, R 336.2804, 40 CFR 52.21 (c) and (d))**

IV. DESIGN/EQUIPMENT PARAMETERS

NA

V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. The permittee shall obtain ultimate and trace elements fuel analyses of the coal/PET coke and asphalt shingles in use when the asphalt shingles are used as fuel. These analyses shall also include determination of the chlorine and BTU content of the fuels. **(R 336.1205(3), R 336.1225, R 336.1702(a), R 336.2803, R 336.2804, 40 CFR 52.21 (c) and (d))**

2. The permittee shall obtain an ash analysis of the coal/PET coke and asphalt shingles in use when the asphalt shingles are used as fuel. **(R 336.1205(3), R 336.1225, R 336.1702(a), R 336.2803, R 336.2804, 40 CFR 52.21 (c) and (d))**

VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. The permittee shall monitor and record the asphalt shingle feed rate in tons per day through EUKILN on a daily basis with instrumentation acceptable to the AQD. All records shall be made available to the Department upon request. **(R 336.1205(3), R 336.1225, R 336.1702(a), R 336.2803, R 336.2804, 40 CFR 52.21 (c) and (d))**

2. While burning asphalt shingles as fuel in EUKILN, the permittee shall operate the NOx, SO_2, and CO CEMS. **(R 336.1205(3), R 336.1225, R 336.1702(a), R 336.2803, R 336.2804, 40 CFR 52.21 (c) and (d))**

3. While burning asphalt shingles as fuel in EUKILN, the permittee shall operate the COMS. **(R 336.1205(3), R 336.1225, R 336.1702(a), R 336.2803, R 336.2804, 40 CFR 52.21 (c) and (d))**

VII. REPORTING

1. The permittee shall submit the asphalt shingle feed rate records to the Department no later than December 15, 2009. **(R 336.1205(3), R 336.1225, R 336.1702(a), R 336.2803, R 336.2804, 40 CFR 52.21 (c) and (d))**

2. The permittee shall submit the NOx, SO_2, and CO CEMS monitoring data for each day asphalt shingles are burned as fuel in EUKILNS and for two days of normal operation immediately prior to the use of asphalt shingles as fuel in EUKILN to the Department no later than December 15, 2009. **(R 336.1205(3), R 336.1225, R 336.1702(a), R 336.2803, R 336.2804, 40 CFR 52.21 (c) and (d))**

3. The permittee shall submit the COMS monitoring data for each day asphalt shingles are burned as fuel in EUKILNS and for two days of normal operation immediately prior to the use of asphalt shingles as fuel in EUKILN to the Department no later than December 15, 2009. **(R 336.1205(3), R 336.1225, R 336.1702(a), R 336.2803, R 336.2804, 40 CFR 52.21 (c) and (d))**

4. The permittee shall submit the fuel and ash analyses of the coal/PET coke and asphalt shingles obtained in accordance with SC V.1 and SC V.2 to the Department no later than December 15, 2009 or an alternate date agreed to by the AQD District Supervisor. **(R 336.1205(3), R 336.1225, R 336.1702(a), R 336.2803, R 336.2804, 40 CFR 52.21 (c) and (d))**

VIII. STACK/VENT RESTRICTIONS

NA

IX. OTHER REQUIREMENTS

1. At least seven calendar days prior to burning asphalt shingles as fuel in EUKILN, the permittee shall notify the AQD District Supervisor in writing of the date asphalt shingles will be burned as fuel in EUKILN. **(R 336.1205(3), R 336.1225, R 336.1702(a), R 336.2803, R 336.2804, 40 CFR 52.21 (c) and (d))**

2. The permittee shall complete the trial burn authorized by this permit to install by November 30, 2009. **(R 336.1205(3), R 336.1225, R 336.1702(a), R 336.2803, R 336.2804, 40 CFR 52.21 (c) and (d))**

Footnotes:

[1]This condition is state only enforceable and was established pursuant to Rule 201(1)(b).