Dholakia, Umesh

From: Angel Berrios [Angel.Berrios@erm.com]
Sent: Wednesday, March 13, 2013 8:30 PM
To: Dholakia, Umesh
Cc: beatriz.rivera@essroc.com; Steve Cullen
Subject: RE: Essroc Answer to Request for Information
Attachments: 2012 Internal Testing.pdf

Umesh,
Essroc currently have CEMs for the following pollutants: SO2, NO2, CO and O2. They are in the process of installing a Hg sensor.

An internal test was performed last year by Essroc. The pollutants were the following: Metals, PM10, Condensable PM10, Benzene, HCl, PM2.5, PAH and PM. Attached are the results from the test.
If you need any other information let me know.
Angel

From: Dholakia, Umesh [Dholakia.Umesh@epa.gov]
Sent: Wednesday, March 13, 2013 9:57 AM
To: Angel Berrios
Cc: beatriz.rivera@essroc.com; Steve Cullen
Subject: RE: Essroc Answer to Request for Information

Thanks.

Are there any CEMs currently in use- for the kiln stack?
Was there any stack test done for any pollutant?

From: Angel Berrios [mailto:Angel.Berrios@erm.com]
Sent: Thursday, March 07, 2013 9:38 AM
To: Dholakia, Umesh
Cc: beatriz.rivera@essroc.com; Steve Cullen
Subject: RE: Essroc Answer to Request for Information

Umesh, the Btu/lb clinker for Essroc is in the range of 1450 - 1750 Btu/lb clinker which are the between the average used in the industry. See attached document with example of calculations for coal, biomass and used oil.

Angel

From: Dholakia, Umesh [Dholakia.Umesh@epa.gov]
Sent: Thursday, February 28, 2013 9:01 AM
To: Angel Berrios
Cc: beatriz.rivera@essroc.com; Steve Cullen
Subject: RE: Essroc Answer to Request for Information

Thanks.

What is the heat balance? That is, what is the MMBTU/ton of clinker produced number for ESSROC? Is it [1980000 MMBTU/241,000 tons]? The average is around 1800 Btu/lb of clinker.....that I have seen.

From: Angel Berrios [mailto:Angel.Berrios@erm.com]
Sent: Wednesday, February 27, 2013 6:33 PM
To: Dholakia, Umesh

Cc: beatriz.rivera@essroc.com; Steve Cullen
Subject: Essroc Answer to Request for Information

Umesh ,

The following are the answer to your questions.

The up to 35 percent of AF substitution represent the substitution of the current fuels used at Essroc. The approach that we would like to use is adding the use of a new fuel to the process.

The use of up to 70,000 tons of alternative fuel per year represent a substitution of approximately 32,000 tons of coal per year or 22,000 tons of oil. The total amount of clinker that can be produced is up to 241,305 ton of clinker per year which is below the current permitted limit.

1. Please justify ESSROC's proposed 35% (70,000 tons/year) limit with Heat Input numbers- MMBtu/year or better.

The idea is to maintain the same requirements established in the permits issued to Essroc for coal and oil. The approach used in the construction and Title V permit is to establish the amount of fuel that is need for the production of clinker. As stated above the plans are to substitute up to 35 percent of the current fuels used at the facility. The following information will provide you with the percent of substitution of fossil fuel.

Type Fuel	Total Fuel (ton/year)	Average Heat Content (MMBtu/ton)	Total Heat Input for Clinker Production (MMBTU/year)	Percent Substitution
Coal	90000	22	1980000	35%
Biomass	70000	10	700000	

Type Fuel	Total Fuel (ton/year)	Average Heat Content (MMBtu/ton)	Total Heat Input for Clinker Production (MMBTU/year)	Percent Substitution
Oil	69657	34	2368338	30%
Biomass	70000	10	700000	

2. Does ESSROC keep track of the coal, oil, and tire's heat contents?
   Yes, Essroc maintain records of each batch of coal or oil received.

3. Also, ESSROC proposes to stack test to verify the emission factors used in this non-app demonstration- that is my understanding.

   Yes, a stack test will be performed to verify and emission factors.

If you have any more questions please let me know.

Angel

Angel O. Berríos Silvestre, P.E.

Custom

Stack Analysis, LLC.

1-800-824-4274

Essroc San Juan
Carr. #2 KM. 26 BO Espionosa
Dorado, Puerto Rico 00646

Report

Performed Velocity, Moisture, Temperature, Volumetric Flow Rate, Metals, PM_{10}, Condensable Particulate Matter, Benzene, Hydrochloric Acid, $PM_{2.5}$, PAH^2 and Particulate Emissions Testing

Sampling performed on the Baghouse #2 Outlet

Dorado, Puerto Rico

Test Date: 07/10/2012 & 07/11/2012

Essroc San Juan
Carr. #2 KM. 26 BO Espionosa
Dorado, Puerto Rico 00646

Report

Performed Velocity, Moisture, Temperature, Volumetric Flow Rate, Metals, PM_{10}, Condensable Particulate Matter, Benzene, Hydrochloric Acid, $PM_{2.5}$, PAH^2 and Particulate Emissions Testing

Sampling performed on the Baghouse #2 Outlet

Dorado, Puerto Rico

Test Date: 07/10/2012 & 07/11/2012

James K. Gray
Custom Stack Analysis, LLC.

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APPENDIX

Test Data 1

Laboratory Data 2

Calibration Data 3

EXECUTIVE SUMMARY

Custom Stack Analysis, LLC. conducted emissions sampling using USEPA Methods 1-4, 18, 29, 26A, 201A, 202 and 23. Testing was conducted on the Kiln Baghouse Outlet on July 10th and 11th, 2012 for performance purposes. The Custom Stack Analysis, LLC. test crew consisted of Mr. James Gray, Mr. Joe Crowe, Mr. Brian Lemasters and Mr. Leonel Figueroa. The testing procedures were coordinated by Ms. Beatriz Rivera Mercado of Essroc San Juan.

A description of the testing protocol is included on pages 7-14. All testing calculations are located on pages 21-35. Appendix 1 includes field test data. Appendix 2 contains laboratory data from Custom Stack Analysis, LLC., Columbia Analytical Services, Inc. and Data Analysis Technologies, Inc. Appendix 3 contains calibration data for the equipment used on test day. Test results are located on pages 2-6.

Test Results

Essroc San Juan - #2 Baghouse Outlet - Mill On
7/10/2012
Method 18 & 29

		Run #1	Run #2	Run #3	Avg.
Stack Gas Velocity (ft/sec)		98.04	99.40	97.63	98.36
Standard Cubic Feet an Hour		9,623,600	10,220,173	9,958,702	9,934,158
Actual Cubic Feet per Minute		245,639	249,046	244,634	246,440
Stack Temperature (F)		260	229	234	241
Moisture % (Measured)		8.32%	8.10%	8.22%	8.21%
Isokinicity %		98.2%	98.7%	100.3%	99.0%
Carbon Dioxide %		5.00%	5.00%	5.00%	5.00%
Oxygen %		15.00%	15.00%	15.00%	15.00%
Nitrogen %		80.00%	80.00%	80.00%	80.00%
Method 18					
Benzene	(µg/nm³)	0.38440	0.35999	0.36363	0.36934
Method 29					
Antimony	(mg/dscm)	3.36E-07	7.22E-08	1.90E-07	1.99E-07
	(µg/nm³)	3.36E-04	7.22E-05	1.90E-04	1.99E-04
	(lbs/hr)	2.52E-04	5.74E-05	1.47E-04	1.52E-04
Arsenic	(mg/dscm)	8.46E-04	7.92E-04	8.00E-04	8.13E-04
	(µg/nm³)	8.46E-01	7.92E-01	8.00E-01	8.13E-01
	(lbs/hr)	5.08E-04	5.05E-04	4.97E-04	5.04E-04
Cadmium	(mg/dscm)	1.08E-04	9.00E-05	8.00E-05	9.25E-05
	(µg/nm³)	1.08E-01	9.00E-02	8.00E-02	9.25E-02
	(lbs/hr)	6.47E-05	5.74E-05	4.97E-05	5.73E-05
Chromium	(mg/dscm)	8.34E-03	1.15E-03	1.38E-03	3.63E-03
	(µg/nm³)	8.34E+00	1.15E+00	1.38E+00	3.63E+00
	(lbs/hr)	5.01E-03	7.35E-04	8.59E-04	2.20E-03
Cobalt	(mg/dscm)	3.11E-04	1.37E-04	1.75E-04	2.08E-04
	(µg/nm³)	3.11E-01	1.37E-01	1.75E-01	2.08E-01
	(lbs/hr)	1.87E-04	8.73E-05	1.09E-04	1.28E-04
Copper	(mg/dscm)	6.38E-03	3.12E-03	1.08E-03	3.52E-03
	(µg/nm³)	6.38E+00	3.12E+00	1.08E+00	3.52E+00
	(lbs/hr)	3.83E-03	1.99E-03	6.69E-04	2.16E-03
Lead	(mg/dscm)	3.04E-03	5.72E-04	3.71E-04	1.33E-03
	(µg/nm³)	3.04E+00	5.72E-01	3.71E-01	1.33E+00
	(lbs/hr)	1.83E-03	3.65E-04	2.31E-04	8.08E-04
Manganese	(mg/dscm)	1.01E+01	1.37E+01	1.52E+01	1.30E+01
	(µg/nm³)	1.01E+04	1.37E+04	1.52E+04	1.30E+04
	(lbs/hr)	5.52E-03	7.21E-03	8.01E-03	6.91E-03
Mercury	(mg/dscm)	7.61E-03	5.33E-03	5.31E-03	6.08E-03
	(µg/nm³)	7.61E+00	5.33E+00	5.31E+00	6.08E+00
	(lbs/hr)	4.57E-03	3.40E-03	3.30E-03	3.76E-03
Nickel	(mg/dscm)	5.65E-03	1.66E-03	9.82E-04	2.76E-03
	(µg/nm³)	5.65E+00	1.66E+00	9.82E-01	2.76E+00
	(lbs/hr)	3.40E-03	1.06E-03	6.11E-04	1.69E-03
Thallium	(mg/dscm)	2.47E-03	1.34E-03	1.54E-03	1.78E-03
	(µg/nm³)	2.47E+00	1.34E+00	1.54E+00	1.78E+00
	(lbs/hr)	1.48E-03	8.55E-04	9.57E-04	1.10E-03
Vanadium	(mg/dscm)	1.11E-03	9.00E-04	1.09E-03	1.04E-03
	(µg/nm³)	1.11E+00	9.00E-01	1.09E+00	1.04E+00
	(lbs/hr)	6.70E-04	5.74E-04	6.78E-04	6.41E-04

Test Results

Essroc San Juan - #2 Baghouse Outlet - Mill On
7/10/2012
Method 23

	Run #1	Run #2	Run #3	Avg.
Stack Gas Velocity (ft/sec)	105.29	100.81	98.81	101.64
Standard Cubic Feet an Hour	10,542,551	10,551,650	10,363,976	10486059
Actual Cubic Feet per Minute	263,255	252,044	247,045	254114.72
Stack Temperature (F)	258	228	225	237.03
Moisture % (Measured)	6.55%	6.42%	6.55%	6.51%
Isokinicity %	96.1%	94.5%	95.7%	95.4%
Carbon Dioxide %	5.00%	5.00%	5.00%	5.00%
Oxygen %	15.00%	15.00%	15.00%	15.00%
Nitrogen %	80.00%	80.00%	80.00%	80.00%

METHOD CARB 429 - PAH Mill On

µg/nm³

Naphthalene	21.1430	5.3697	5.5722	10.6950
2-Methylnaphthalene	6.3943	7.6000	2.1839	5.3927
Acenaphthylene	0.0000	0.0000	0.0202	0.0067
Acenaphthene	0.3136	0.3641	0.1375	0.2717
Fluorene	0.5473	0.3631	0.1862	0.3655
Phenanthrene	1.6822	1.5139	0.7781	1.3247
Anthracene	0.0000	0.0917	0.0585	0.0501
Fluoranthene	0.3176	0.1673	0.0858	0.1903
Pyrene	0.3680	0.1332	0.0742	0.1918
Benzo(a)anthracene	0.0772	0.0021	0.0012	0.0268
Chrysene	0.0000	0.0073	0.0039	0.0037
Benzo(b)fluroanthene	0.0000	0.0077	0.0013	0.0030
Benzo(k)fluroanthene	0.0000	0.0000	0.0020	0.0007
Benzo(e)pyrene	0.0208	0.0030	0.0022	0.0087
Benzo(a)pyrene	0.0187	0.0016	0.0006	0.0070
Perylene	0.0065	0.0004	0.0003	0.0024
Indeno(1,2,3-c,d)anthracene	0.0000	0.0019	0.0012	0.0010
Dibenzo(a,h)anthracene	0.0246	0.0009	0.0009	0.0088
Benzo(g,h,i)perylene	0.0000	0.0027	0.0020	0.0016

Test Results

Essroc Method 26A Mill On - Baghouse Outlet
7/11/2012

		Run #1	Run #2	Run #3	Avg.
Stack Gas Velocity (ft/sec)		99.57	99.14	99.15	99.28
Standard Cubic Feet an Hour		10,145,636	10,153,889	10,108,417	10,135,980
Actual Cubic Feet per Minute		249,473	248,398	248,426	248,765
Stack Temperature (F)		237	232	239	236
Moisture % (Measured)		7.87%	8.06%	7.60%	7.84%
Isokinicity %		99.4%	96.8%	101.2%	99.1%
Carbon Dioxide %		5.00%	5.00%	5.00%	5.00%
Oxygen %		15.00%	15.00%	15.00%	15.00%
Nitrogen %		80.00%	80.00%	80.00%	80.00%
HCL	(lbs/hr)	2.178	2.237	2.140	2.185
	(lbs/dscf)	2.15E-07	2.20E-07	2.12E-07	2.16E-07
	(ppm)	2.277	2.337	2.245	2.286
	(µg/nm³)	3437.899	3528.341	3389.493	3451.911

Custom Stack Analysis, LLC. P. O. Box 3750 14614 Cenfield St NE Alliance, Ohio 44601 Phone: 330-525-5119 Fax: 330-525-7908 E-mail: stacks@customstackanalysis.com

Test Results

Essroc Method 201A & 202 Mill On - Baghouse Outlet
7/11/2012

		Run #1	Run #2	Run #3	Avg.
Stack Gas Velocity (ft/sec)		98.25	97.99	98.22	98.15
Standard Cubic Feet an Hour		9,856,191	10,049,498	10,006,942	9,970,877
Actual Cubic Feet per Minute		246,184	245,521	246,107	245,937
Stack Temperature (F)		245	229	232	235
Moisture % (Measured)		8.37%	8.39%	8.64%	8.47%
Isokinicity %		101.2%	98.0%	95.8%	98.3%
Carbon Dioxide %		5.0%	5.0%	5.0%	5.0%
Oxygen %		15.0%	15.0%	15.0%	15.0%
Nitrogen %		80.0%	80.0%	80.0%	80.0%
Cont. #1, ≤ $PM_{2.5}$					
Particulate	(lbs/hr)	6.5610	6.4388	6.1784	6.3928
Particulate	(gr/dscf)	0.0047	0.0045	0.0043	0.0045
Particulate	(lbs/dscf)	6.66E-07	6.41E-07	6.17E-07	6.41E-07
Particulate	(µg/nm³)	7,748.86	7,640.84	6,928.21	7,439.30
Cont. #2, > PM_{10}					
Particulate	(lbs/hr)	7.9440	8.6727	8.3826	8.3331
Particulate	(gr/dscf)	0.0056	0.0060	0.0059	0.0058
Particulate	(lbs/dscf)	8.06E-07	8.63E-07	8.38E-07	8.36E-07
Particulate	(µg/nm³)	9,382.20	10,291.75	9,399.89	9,691.28
Cont. #3, ≤ PM_{10} and > $PM_{2.5}$					
Particulate	(lbs/hr)	5.564	3.614	6.245	5.141
Particulate	(gr/dscf)	0.0040	0.0025	0.0044	0.0036
Particulate	(lbs/dscf)	5.65E-07	3.60E-07	6.24E-07	5.16E-07
Particulate	(µg/nm³)	6.57E+03	4.29E+03	7.00E+03	5.95E+03
Cont. #4, ≤ $PM_{2.5}$					
Particulate	(lbs/hr)	7.848	7.819	6.345	7.337
Particulate	(gr/dscf)	0.0056	0.0054	0.0044	0.0052
Particulate	(lbs/dscf)	7.96E-07	7.78E-07	6.34E-07	7.36E-07
Particulate	(µg/nm³)	9,512.07	9,278.17	7,115.46	8,635.23
Totals					
Particulate	(lbs/hr)	27.9166	26.5438	27.1517	27.2041
Particulate	(gr/dscf)	0.0198	0.0185	0.0190	0.0191
Particulate	(lbs/dscf)	2.83E-06	2.64E-06	2.71E-06	2.73E-06
Particulate	(µg/nm³)	33,214.46	31,498.98	30,446.67	31,720.04
Condensable Particulate Matter	(lbs/hr)	6.6575	7.7200	6.0706	6.8160
Condensable Particulate Matter	(gr/dscf)	0.0047	0.0054	0.0042	0.0048
Condensable Particulate Matter	(lbs/dscf)	6.75E-07	7.68E-07	6.07E-07	6.83E-07
Condensable Particulate Matter	(µg/nm³)	7,862.81	9,161.21	6,778.41	7,934.15

Test Results

Essroc Method 201A & 202 Mill On - Baghouse Outlet
Method $PM_{2.5}$ - 12/15/2011

	Run #1	Run #2	Run #3	Avg.
Cont. #1, ≤ $PM_{2.5}$				
Particulate (lbs/hr)	6.561	6.439	6.178	6.393
Particulate (gr/dscf)	0.0047	0.0045	0.0043	0.0045
Particulate (lbs/dscf)	6.66E-07	6.41E-07	6.17E-07	6.41E-07
Particulate (µg/nm³)	7,748.86	7,640.84	6,928.21	7,439.30
Cont. #4, ≤ $PM_{2.5}$				
Particulate (lbs/hr)	7.848	7.819	6.345	7.337
Particulate (gr/dscf)	0.0056	0.0054	0.0044	0.0052
Particulate (lbs/dscf)	7.96E-07	7.78E-07	6.34E-07	7.36E-07
Particulate (µg/nm³)	9,512.07	9,278.17	7,115.46	8,635.23
Total $PM_{2.5}$				
Particulate (lbs/hr)	14.409	14.257	12.524	13.730
Particulate (gr/dscf)	0.0102	0.0099	0.0088	0.0096
Particulate (lbs/dscf)	1.46E-06	1.42E-06	1.25E-06	1.38E-06
Particulate (µg/nm³)	17,260.93	16,919.01	14,043.67	16,074.53
D_{50} $PM_{2.5}$	2.483	2.500	2.576	2.520

Test Results

Essroc Method 201A & 202 Mill On - Baghouse Outlet
Method PM_{10} - 12/15/2011

	Run #1	Run #2	Run #3	Avg.
Cont. #1, ≤ $PM_{2.5}$				
Particulate (lbs/hr)	6.561	6.439	6.178	6.393
Particulate (gr/dscf)	0.0047	0.0045	0.0043	0.0045
Particulate (lbs/dscf)	6.66E-07	6.41E-07	6.17E-07	6.41E-07
Particulate (µg/nm³)	7,748.86	7,640.84	6,928.21	7,439.30
Cont. #3, ≤ PM_{10} and > $PM_{2.5}$				
Particulate (lbs/hr)	5.564	3.614	6.245	5.141
Particulate (gr/dscf)	0.0040	0.0025	0.0044	0.0036
Particulate (lbs/dscf)	5.65E-07	3.60E-07	6.24E-07	5.16E-07
Particulate (µg/nm³)	6,571.34	4,288.23	7,003.11	5,954.22
Cont. #4, ≤ $PM_{2.5}$				
Particulate (lbs/hr)	7.848	7.819	6.345	7.337
Particulate (gr/dscf)	0.0056	0.0054	0.0044	0.0052
Particulate (lbs/dscf)	7.96E-07	7.78E-07	6.34E-07	7.36E-07
Particulate (µg/nm³)	9,512.07	9,278.17	7,115.46	8,635.23
Total PM_{10}				
Particulate (lbs/hr)	19.973	17.871	18.769	18.871
Particulate (gr/dscf)	0.01418	0.01245	0.01313	0.01325
Particulate (lbs/dscf)	2.03E-06	1.78E-06	1.88E-06	1.89E-06
Particulate (µg/nm³)	23,832.27	21,207.24	21,046.77	22,028.76
D_{50} PM_{10}	10.670	10.753	10.930	10.784
Total PM_{10} & CPM				
(lbs/hr)	34.5741	34.2639	33.2223	34.0201
(gr/dscf)	0.0246	0.0239	0.0232	0.0239
(lbs/dscf)	3.51E-06	3.41E-06	3.32E-06	3.41E-06
(µg/nm³)	41,077.28	40,660.20	37,225.08	39,654.18

Custom Stack Analysis, LLC P. O. Box 3750 14614 Canfield St NE Alliance, Ohio 44601 Phone: 330-525-5119 Fax: 330-525-7908 E-mail: stacks@customstackanalysis.com

METHOD 1

Sample and velocity traverses for stationary sources.

To aid in the representative measurement of pollutant emissions and/ or total volumetric flow rate from a stationary source, a measurement site where the effluent stream is flowing in a known direction is selected, and the cross-section of the stack is divided into a number of equal areas. A traverse point is then located within each of these equal areas.

METHOD 2

Determination of stack gas velocity and volumetric flow rate.

The average gas velocity in a stack is determined from the gas density and from measurement of the average velocity head with a Type S (Stausscheibe or reverse type) pitot tube.

METHOD 3

Gas analysis for the determination of dry molecular weight.

This method is applicable for determining carbon dioxide and oxygen concentrations and dry molecular weight of a sample from a gas stream of a fossil-fuel combustion process.

METHOD 4

Determination of moisture content in stack gases.

A gas sample is extracted at a constant rate from the source. It is determined either volumetrically or gravimetrically.