Table 2 – Calciner No. 4, Particulate Emissions

Test Parameters	**Run 1**	**Run 2**	**Run 3**	**Average**
Date (2001)	3/2	3/2	3/2	
Start Time	8:05	10:45	12:44	
Stop Time	9:18	11:51	13:50	
Process Conditions*				
Production Rate (tons/hr)	255	255	255	**255**
Fuel Flow (MSCFH)	251.8	258.9	255.1	**255.3**
Fuel Btu Value	1,065	1,065	1,065	**1,065**
Opacity (%)	7.7	2.3	1.3	**3.8**
Gas Conditions				
Temperature (°F)	286	296	304	**296**
Volumetric Flow Rate (acfm)	254,800	274,600	274,900	**268,100**
Volumetric Flow Rate (scfm)	142,000	151,000	149,600	**147,500**
Volumetric Flow Rate (dscfm)	96,830	102,410	101,130	**100,120**
Carbon Dioxide (% dry)	11.8	12.1	12.2	**12.0**
Oxygen (% dry)	10.7	10.9	10.8	**10.8**
Moisture (%)	31.8	32.2	32.4	**32.1**
Front Half Particulate				
Concentration (grains/dscf)	0.00189	0.00259	0.00143	**0.00197**
Emission Rate (lb/hr)	1.57	2.28	1.24	**1.70**
Back Half Organic Particulate				
Concentration (grains/dscf)	0.0272	0.0263	0.0649	**0.0395**
Emission Rate (lb/hr)	22.5	23.1	56.3	**34.0**
Back Half Inorganic Particulate				
Concentration (grains/dscf)	0.00466	0.00559	0.0114	**0.00723**
Emission Rate (lb/hr)	3.86	4.90	9.92	**6.23**
Front and Back Half Inorganic Particulate				
Concentration (grains/dscf)	0.00655	0.00818	0.0129	**0.00920**
Emission Rate (lb/hr)	5.43	7.18	11.2	**7.93**

* Process conditions provided by Solvay Minerals, Inc.

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Results

Table 1 – Calciner No. 4, Gaseous Emissions

Test Parameters	**Run 1**	**Run 2**	**Run 3**	**Average**
Date	3/1/01	3/1/01	3/1/01	
Start Time	11:38	13:08	14:26	
Stop Time	12:38	14:08	15:26	
Process Conditions*				
Production Rate (tons/hr)	255	255	255	**255**
Fuel Flow (MSCFH)	249.0	247.1	245.5	**247.2**
Fuel Btu Value	1030	1030	1030	**1030**
Opacity (%)	1.6	1.5	1.3	**1.5**
Gas Conditions				
Temperature (°F)	303	302	299	**301**
Volumetric Flow Rate (acfm)	274,100	273,400	262,000	**269,800**
Volumetric Flow Rate (scfm)	149,300	149,200	143,500	**147,300**
Volumetric Flow Rate (dscfm)	100,810	100,510	96,910	**99,410**
Carbon Dioxide (% dry)	12.5	12.4	12.5	**12.4**
Oxygen (% dry)	10.0	9.9	10.1	**10.0**
Moisture (%)	32.5	32.7	32.5	**32.6**
Nitrogen Oxide Results				
Concentration (ppmdv)	15.1	18.3	17.1	**16.8**
Emission (lb/hr)	10.9	13.2	11.8	**12.0**
Carbon Monoxide Results				
Concentration (ppmdv)	375	326	467	**389**
Emission (lb/hr)	165	143	197	**168**
Total HC Results (as propane)				
Concentration (ppmwv)	40.3	34.9	51.6	**42.3**
Emission (lb/hr)	41.4	35.7	50.8	**42.6**
Methane Results				
Concentration (ppmdv)	98.8	91.8	117	**102**
Emission (lb/hr)	24.9	23.0	28.2	**25.4**
TNMHC Results (as propane)				
Emission (lb/hr)	16.5	12.7	22.6	**17.3**

* Process conditions provided by Solvay Minerals, Inc.

9.3 9.3 9.1

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2.0 SUMMARY OF RESULTS

2.1 CA-4 Particulate and Nitrogen Oxides Results

Operating Conditions	Run 1	Run 2	Run 3	Average
Fuel Flow, MSCFH	332.0	330.0	335.0	**332.3**
Production Rate, TPH	322	319	323	**321.1**
Opacity, %	2.7	2.7	2.7	**2.7**

Pollutants	Run 1	Run 2	Run 3	Average
Front Half Particulate, gr/dscf	0.00639	0.00486	0.00475	**0.00533**
Front Half Particulate, lb/hr	6.73	5.17	5.11	**5.67**
Back Half Inorganic Particulate,	0.00379	0.00336	0.00199	**0.00305**
Back Half Inorganic Particulate, lb/hr	3.99	3.58	2.14	**3.24**
Back Half Organic Particulate, gr/dscf	0.0205	0.0181	0.0183	**0.0190**
Back Half Organic Particulate, lb/hr	21.6	19.2	19.7	**20.2**
Total Inorganic Particulate, gr/dscf	0.0102	0.00822	0.00674	**0.00838**
Total Inorganic Particulate, lb/hr	10.7	8.75	7.25	**8.91**
Nitrogen Oxides, ppmdv	17.2	17.2	18.3	**17.6**
Nitrogen Oxides, lb/hr	15.1	15.3	16.5	**15.6**

Parameters	Run 1	Run 2	Run 3	Average
Date (2003)	5/20	5/20	5/20	
Start Time	8:50	11:28	13:55	
Stop Time	10:30	12:49	15:14	
Stack Temp, °F	286	279	281	**282**
O_2, %	13.0	13.0	12.7	**12.9**
CO_2, %	9.5	9.6	9.7	**9.6**
Moisture, %	30.5	30.0	30.8	**30.5**
Velocity, ft/sec	60.1	59.7	61.3	**60.3**
Acfm	309,770	307,580	315,780	**311,040**
Scfm	176,860	177,280	181,390	**178,510**
Dscfm	122,950	124,090	125,560	**124,200**
Isokintetics, %	96.8	99.6	100.7	**99.0**

2.0 SUMMARY OF RESULTS

2.1 CA-4 Particulate Results (Runs 1 - 4)

Operating Conditions	Run 1	Run 2	Run 3	Run 4
ESP Setting	All Fields	Field 2 Off	Field 4 Off	Field 5 Off
Production Rate, ton/hr	250.0	248.0	267.0	262.0
Opacity, %	3.1	3.1	3.1	3.0

Particulate Results	Run 1	Run 2	Run 3	Run 4
Front Half Particulate (TSP), gr/dscf	0.00137	0.00176	0.00130	0.00148
Front Half Particulate (TSP), lb/hr	1.14	1.33	1.14	1.33
Inorganic Condensible Particulate, gr/dscf	0.00443	0.00199	0.00195	0.00274
Inorganic Condensible Particulate, lb/hr	3.71	1.51	1.70	2.46
Organic Condensible Particulate, gr/dscf	0.0232	0.00930	0.0142	0.00813
Organic Condensible Particulate, lb/hr	19.4	7.05	12.4	7.30
Total Inorganic Particulate, gr/dscf	0.00580	0.00375	0.00325	0.00422
Total Inorganic Particulate, lb/hr	4.85	2.85	2.85	3.78

Parameters	Run 1	Run 2	Run 3	Run 4
Date (2005)	8/25	8/25	8/25	8/25
Start Time	8:00	10:10	12:25	14:35
Stop Time	9:09	11:19	13:34	15:43
Stack Temp, °F	262	267	271	275
O_2, %	11.5	11.6	11.5	11.5
CO_2, %	11.8	11.9	12.1	12.0
Moisture, %	30.3	30.4	30.2	28.9
Velocity, ft/sec	46.5	42.5	49.0	49.7
Acfm	239,640	218,920	252,630	256,270
Scfm	140,090	127,100	146,030	147,190
Dscfm	97,670	88,500	101,990	104,670
Isokinetics, %	105.2	101.3	100.3	99.8

2.2 CA-4 Particulate Results (Runs 5 – 8)

Operating Conditions	Run 5	Run 6	Run 7	Run 8
ESP Setting	Field 6 Off	Fields 2 &4 off	Fields 3 &5 off	Fields 4, 5, + 6 off
Production Rate, ton/hr	257.0	258.0	262.0	259.0
Opacity, %	2.8	2.9	3.1	3.2

Particulate Results	Run 5	Run 6	Run 7	Run 8
Front Half Particulate (TSP), gr/dscf	0.00169	0.00123	0.00146	0.00260
Front Half Particulate (TSP), lb/hr	1.50	1.04	1.27	2.32
Inorganic Condensible Particulate, gr/dscf	0.00239	0.00271	0.00289	0.00261
Inorganic Condensible Particulate, lb/hr	2.12	2.29	2.50	2.33
Organic Condensible Particulate, gr/dscf	0.00832	0.0106	0.000412	0.0112
Organic Condensible Particulate, lb/hr	7.37	8.93	0.357	10.0
Total Inorganic Particulate, gr/dscf	0.00408	0.00394	0.00434	0.00521
Total Inorganic Particulate, lb/hr	3.61	3.33	3.77	4.65

Parameters	Run 5	Run 6	Run 7	Run 8
Date (2005)	8/26	8/26	8/26	8/26
Start Time	8:00	10:15	12:30	14:45
Stop Time	9:08	11:25	13:38	15:56
Stack Temp, °F	264	268	268	270
O_2, %	11.3	11.2	11.2	11.2
CO_2, %	12.0	12.1	12.3	12.1
Moisture, %	29.9	30.3	30.3	30.0
Velocity, ft/sec	48.8	47.1	48.3	49.7
Acfm	251,510	242,930	249,190	256,150
Scfm	147,370	141,520	145,030	148,740
Dscfm	103,340	98,690	101,180	104,100
Isokinetics, %	101.8	101.5	100.6	101.5

2.0 SUMMARY OF RESULTS

2.1 CA-D Particulate Results

Operating Conditions, CA-D	Run 1	Run 2	Run 3	Average
Fuel Flow, MSCFH	225	226	226	**226**
Fuel Btu Value, scf/10^6Btu	1,054	1,054	1,063	**1,057**
Calciner Production Rate, Ton/hr	225	225	226	**225.3**
Baghouse Dust Transfer Rate, Ton/hr	10	10	10	**10**
Opacity, %	2.27	2.46	2.36	**2.36**

Particulate Results	Run 1	Run 2	Run 3	Average
Front Half Particulate, gr/dscf	0.00696	0.00278	0.00447	**0.00474**
Front Half Particulate, lb/hr	5.02	2.09	3.35	**3.49**
Back Half Inorganic Particulate, gr/dscf	0.00580	0.00412	0.00269	**0.00420**
Back Half Inorganic Particulate, lb/hr	4.19	3.09	2.01	**3.10**
Back Half Organic Particulate, gr/dscf	0.0236	0.0210	0.0259	**0.0235**
Back Half Organic Particulate, lb/hr	17.0	15.8	19.4	**17.4**
Total Inorganic Particulate, gr/dscf	0.0128	0.00690	0.00716	**0.00894**
Total Inorganic Particulate, lb/hr	9.21	5.19	5.36	**6.59**

Parameters	Run 1	Run 2	Run 3	Average
Date (2005)	12/16	12/16	12/16	
Start Time	10:00	12:49	14:45	
Stop Time	12:10	14:12	16:08	
Stack Temp, °F	259	256	257	**257**
O_2, %	11.7	11.5	11.1	**11.4**
CO_2, %	11.3	11.6	12.4	**11.8**
Moisture, %	35.1	31.6	32.0	**32.9**
Velocity, ft/sec	43.4	42.6	42.8	**42.9**
Acfm	223,490	219,620	220,710	**221,270**
Scfm	129,730	128,050	128,510	**128,760**
Dscfm	84,170	87,670	87,410	**86,420**
Isokintetics, %	91.7	93.0	100.9	**95.2**

2.0 SUMMARY OF RESULTS

2.1 Particulate and Nitrogen Oxides Results

Operating Conditions	Run 1	Run 2	Run 3	Average
Production Rate, Ton/hr	226	224	223	**225**
Opacity, %	1.4	1.4	1.3	**1.3**

Nitrogen Oxides Results	Run 1	Run 2	Run 3	Average
NOx, ppmdv	14.69	14.70	14.81	**14.73**
NOx, lb/hr	10.2	11.0	10.7	**10.6**

Particulate Results	Run 1	Run 2	Run 3	Average
Front Half Particulate (TSP), gr/dscf	0.000645	0.000469	0.00226	**0.00113**
Front Half Particulate (TSP), lb/hr	0.538	0.419	1.95	**0.970**
Inorganic Condensable Particulate, gr/dscf	0.00337	0.00408	0.00353	**0.00366**
Inorganic Condensable Particulate, lb/hr	2.82	3.65	3.05	**3.17**
Organic Condensable Particulate, gr/dscf	0.0142	0.0118	0.0191	**0.0151**
Organic Condensable Particulate, lb/hr	11.8	10.6	16.5	**13.0**
Total Inorganic Particulate, gr/dscf	0.00402	0.00455	0.00579	**0.00479**
Total Inorganic Particulate, lb/hr	3.35	4.06	5.00	**4.14**

Table 4 – Calciner 4 (ADQ # 80) Emissions Results

Test Parameters	**Run 1**	**Run 2**	**Run 3**	**Average**
Date	10/23/2013	10/23/2013	10/23/2013	
Start Time	9:13	11:40	12:48	
Stop Time	10:13	12:40	13:48	
Process Conditions				
Production Rate (ton/hr)	214	206	204	**208**
Gas Conditions				
Temperature (°F)	258	260	261	**260**
Volumetric Flow Rate (acfm)	251,000	248,000	252,000	**250,000**
Volumetric Flow Rate (scfm)	145,000	143,000	145,000	**144,000**
Volumetric Flow Rate (dscfm)	102,000	99,000	101,000	**101,000**
Carbon Dioxide (% dry)	10.2	9.90	10.2	**10.1**
Oxygen (% dry)	12.2	12.2	12.1	**12.2**
Moisture (%)	29.8	30.7	30.6	**30.4**
Nitrogen Oxides Results				
Concentration (ppmdv)	13.8	13.8	14.9	**14.2**
Emission Rate (lb/hr)	10.1	9.81	10.7	**10.2**

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